PRIVATE SAVING DETERMINANTS IN BAHRAIN

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Abstract

The study aims at determining the main factors that affect private saving in kingdom of Bahrain during the period (1990-2013). The framework for our analysis is derived from the life-cycle model that has been the standard theory for the explanation of changes in private savings over time and across countries. The findings support the hypothesis that the private saving rates have strong inertia, while government saving does not tend to crowd out private saving and the Ricardian equivalence does not hold. Growth of per capita real income has a positive impact on the private saving rate, while there is negative impact of current account deficit, Terms of Trade and dummy variables on private saving rate, while average tariff rate, exchange rate and demographic variables are statistically insignificant. The study recommends that the focus of development policy in Bahrain should be to increase the productive base of the economy in order to promote real income growth and reduce unemployment, also, because public and private saving rates are complementary, government should therefore no longer embark on spending sprees under the pretext that saving excess revenue would crowd out private saving.

Keywords: Private saving, life-cycle, Cointegration, Bahrain

INTRODUCTION

Private savings in Bahrain economy represent an integral part of national savings, and it is the most important source of funds to finance capital investment in the real sector, because foreign capital is mostly invested in production of natural resources like oil and gas. Currently the ratio of private savings to GDP in Bahrain equals to 39%, which is considered one of the highest saving/GDP ratios in emerging economies, compared with 20% and 18.6 % in year 2000, and 1990, respectively. Investment behavior witnessed reasonable records, with an average of real gross fixed capital formulation as a ratio of real GDP to be 23% through the period (1990-2013). However, about 73% of investment has been only funded from private savings. There is no doubt that the challenge of boosting savings has great importance in Bahrain to sustain the

achieved growth rate and increase its investment rate. Because of that, an understanding of the fundamental determinants of saving in Bahrain represents critical importance in order to formulate policies to raise the private savings rate in line with the needs of economic growth.

The purpose of this paper is to examine the determinants of the private saving rate in kingdom of Bahrain during the period (1990-2013). The framework for our analysis is derived from the life-cycle model that has been the standard theory for the explanation of changes in private savings over time and across countries. The attractiveness of the life cycle model for our analysis lies on both in its elegant formulation of the effect of growth and the interest rate on saving, and the flexibility provided for incorporating other relevant theoretical considerations to form an integrated analytical framework, without changing the basic structure of the model.

Although a vast empirical literature has shed light on various aspects of saving behavior, several crucial questions remain unanswered with regard to the relevance of policies in raising the saving rate vis-à-vis the non-policy determinants of saving. From the perspective of policies, there is need to know the following: What is the magnitude and direction of these variables on saving? How effective are growth-enhancing policies such as macroeconomic stability and higher income growth in raising the saving rate? What is the effectiveness of financial development in rising private saving? Is there a role for fiscal policy in increasing private saving? What is the impact of interest rate on total saving? Answering these questions would help to determine what needs to be taken into consideration in order to increase both saving and investment in Bahrain, this is necessary if economic growth and development is to be stimulated in Bahrain.

Kingdom of Bahrain is a very appropriate case study of the subject at hand for the following reasons. First, the saving and investment database of Bahrain is considered relatively good by developing country standards, and data are available on a comparable basis for a period of time adequate for systematic econometric investigation. Secondly, Bahrain has also undergone significant policy transitions relating to the key variables relevant for the analysis, providing an appropriate setting for a historical analysis of the subject at hand. Finally, saving performance has figured prominently in the policy debate in Bahrain, but there is no hard empirical evidence to inform this policy debate.

Rest of the paper is organized as follows: Section two surveys theoretical and empirical issues on the determinants of saving, drawing on the life-cycle model of saving and Consumption. Section three discusses the sources of data and estimation procedure of the study. Section four presents the empirical results. Section five concludes this paper with an agenda for policy makers.

LITERATURE REVIEW

Both theoretical and empirical work on savings, have consistently outlined the major potential determinants of savings that can be grouped loosely under the headings of income and growth, demographic structures, the interest rate, macroeconomic stability, government policy, the extent of financial sector development, uncertainty measures, and external variables. The life-cycle hypothesis proposed by Modigliani (1986) and extended by Jappelli and Pagano (1994) provides a theoretical framework of most determinants of saving behavior used in recent empirical studies. The major argument of the model is that individuals seek to smooth out consumption over time, saving in "good times" to consume in "bad times". This precautionary motive for savings fundamentally affects the saving behavior in the economy through a number of channels. In this section we try to analyze the theoretical framework of these determinants, followed by some recent empirical studies investigated these factors.

- **Inertia**

 It is an observed fact that saving rates generally contain inertia; that is, they are serially correlated, even after controlling for other factors, therefore, the lagged private saving rate should be included as a potential determinant of savings in a given year, which implies that factors that affect saving rates will have larger long term impacts than short-term ones.

- **Income and Growth**

The fundamental assumption of the life-cycle hypothesis is that an individual seeks to maximize the present value of lifetime utility subject to the budget constraint. The theory predicts that consumption in a particular period, and thus the decision to save, depends on expectations about lifetime income. According to this theory, the lifetime of an individual is divided into working period and retirement period. Individuals are assumed to be net savers during the working period and dissevers during the retirement period. In the light of that, growth of per capita income will result in an increase of aggregate saving rate, because it increases the lifetime earnings and saving of younger age groups relative to older age groups. Thus countries with higher per capita growth rates are expected to have higher saving ratios than countries with lower growth rates. However, there is another view indicates that the size of this effect is likely to decline as per capita income rises and may even become negative for rich countries where investment opportunities and growth are relatively lower.

- **Demographic variables**

Demographic variables such as: the age distribution of the population, dependency ratios, life expectancy, labor force participation rate and urbanization rate are the variables commonly investigated in saving analysis. Private agents will arrange their saving patterns across different periods of their life. Changes in life expectancy would also influence the saving decisions as it may change the relative spans of active working and non-working periods. The higher

percentage of elder people in a population would normally decrease the saving rate as they are not part of the active labor force anymore and represent the part of the population that is expected to finance their consumption out of their past savings (part of the population that are expected to dissave). On the other hand, the higher young dependency ratio may have dual effects on saving and consumption behavior. It may increase the consumption of families for child care and force families to save for the future expenses of their kids such as their education. Labor force participation rate reflects the active part of the population and therefore is expected to increase savings. Urbanization ratio can affect the saving behavior through the precautionary saving behavior. Increased urbanization is expected to decrease the requirement for precautionary savings which is more relevant in rural areas since rural population is relatively more prone to income volatility.

- **Fiscal Policy**

The neo-classical version of the lifecycle model assumes that a decline in government saving (more budget deficit) will tend to raise consumption and discourage saving by shifting the tax burden from present to future generations. As a result of that, a decline in government savings will cause a decline in national savings. There is another view indicates that an increase in government savings would have no effect on national savings, as it would be completely offset by a corresponding fall in private savings (The Ricardian Equivalence). According to the Ricardian Equivalence Hypothesis, it does not matter whether government finances its expenditure through taxes or by borrowing. The Ricardian Equivalence depends on the assumption of perfect capital markets, and therefore saving behavior does not experience any uncertainty. However, if this assumption does not hold, then perfect substitution between public and private savings will not be achieved.

- **Interest rate**

The life-cycle theory introduced that the net effect of the real interest rate on savings is ambiguous. The net effect of the real interest rate on savings can be decomposed into two effects. The substitution effect implies that a higher interest rate increases the current price of consumption relative to the future price, and thus affecting savings positively. The other effect, which is called the income effect, indicates that if the household is a net lender, an increase in the interest rate will increase lifetime income, and so increase consumption and reduce saving. Therefore, it is expected that the interest rate will have a positive impact on saving ratio only when the substitution effect dominates the income effect. In developing countries where financial markets are still not well developed, substitution effect is expected to be much greater than income effect, and thus the real interest rate is likely to have a net positive impact on domestic savings. However, the complexity and distortions in both the real and the financial

sides of the economy tend to reduce the benefits of an increase in interest rates, and thus the positive impact on domestic savings may not be achieved.

- **Macroeconomic uncertainty**

Uncertainty and risks about the future give rise to precautionary saving motives for risk-averse agents. In order to safeguard against future unexpected negative income shocks, individuals prefer saving today. Since the instability of the economy is synonymous to more frequent income shocks, it exacerbates the saving motive. Instability in an economy may be proxied by several variables including growth volatility, real exchange rate volatility, real interest rate volatility and inflation. In this paper, we use the inflation rate as a proxy for the instability of the economy and expect this variable to have a positive impact on savings.

- **External Variables**

The external variables that might be relevant to savings are the current account deficit and terms of trade (TOT). It is supposed that an increase in the current account deficit (foreign saving) is associated with a partial decline in private saving, as foreign saving may tend to act as a substitute to domestic saving. Terms of trade represents another external variable that may have an effect on saving behavior especially for the oil exporters. Positive terms of trade may result in an increase of savings through the positive effect on wealth and income. The traditional explanation of this relationship is illustrated in the Harberger–Laursen- Metzler hypothesis (HLM). It assumes that deterioration in terms of trade reduces real income and thus saving. This hypothesis assumed myopic expectations of consumers. However, recent literature argues that a change in terms of trade has an ambiguous effect on saving depending on whether the change in the former is seen to be permanent or temporary. A transitory improvement in terms of trade causes only a transitory change in income, and thus should lead to higher saving rather than higher consumption. This conclusion supports the direction of the HLM effect. Nevertheless; permanent improvement tends to reduce saving as consumers increase their consumption. Thus, the effect of terms of trade changes on saving depends on whether the change was anticipated or not.

- **Financial Development**

The degree of financial sector development and the range and availability of financial assets to suit savers represents another important factor in promoting savings. The expansion of bank branches and improving the accessibility to banking facilities will result in reducing the cost of banking transactions, and thus motivate individuals' savings. On the other hand, if financial institutions are not well organized and stable, savings will be kept in non-monetary terms such as jewelry and real estate, and this may defeat the main purpose of saving. Therefore, the potential positive effect between the development of the consumer's credit market and household financial saving depends also on the degree of substitution between financial saving

and other forms of savings in the household asset portfolio. As a result of that, the potential impact of financial development on private savings seems to be ambiguous.

The empirical studies that examined these determinants in developed or developing countries took several ways. Some studies have concentrated mainly on fixed-effect models using OLS estimates to explain the variations in saving performance among countries. Other studies depended on some robust techniques such as cointegration and integration tests, which allow for heterogeneity in parameters and dynamics across countries, to examine the long-run determinants of saving rates. Some of these studies concentrated mainly on interactions between demographic and saving. Others examined a variety of macroeconomic variables such as income, real interest rate, and changes in terms of trade, money supply, government expenditure and openness of economy to capture the main determinants of saving levels. In addition, other studies used a mixed of demographic and macroeconomic factors. This will be illustrated as follows.

McKinnon (1973), Shaw (1973) and Giovannini (1985) empirically investigated the hypothesis that savings respond positively to changes in the real interest rate in Less Developed Countries (LDCs). They hinge their argument on the fact that the financial markets of these countries are not well developed, where self-financing and bank loans make up the bulk of investment funds, accumulation of financial saving is determined more by the desire to invest than the desire to live on interest income. As a result, the greater part of private saving will be in the form of cash and near-money assets. Thus, the substitution effect will usually be much greater than the income effect of an interest rate change. In other word, they pointed out that the presence of very low responses of aggregate saving to the real interest rate.

In an attempt to investigate the determinants of saving rate in Pakistan, Khan et al (1994) used a variety of factors that included income, real interest rate, dependency ratio, foreign capital inflows, foreign aid, changes in TOT and openness of economy. The study found a strong and positive effect of per capita GNP on national saving. In addition, it was found that real interest rate, change TOT and openness of the economy positively influenced national saving. On the other way, debt to GNP ratio and dependency ratio were found to have adverse impact on national saving. Another empirical study by Doshi(1994) examined the role of life expectancy as a determinant of saving performance. He demonstrated that life expectancy is a statistically significant and important factor affecting LDCs saving levels. However, the overall results were sensitive to the level of development and regional diversity.

Among several other empirical studies, Edwards (1996) examined the process of determination of saving rates by incorporating some policy-related, demographic, structural and political variables that possibly determine the saving ratio. Per capita income growth seemed to be the most important determinant of private and public savings. Moreover, the results indicated

that public savings were lower in countries with higher political instability, and public savings crowded out private savings, but less than proportionately.

Dayal-Ghulati and Thimann (1997) examined empirical determinants of private savings for a sample of economies in Southeast Asia and Latin America over the period (1975-1995). They used panel estimations to examine relationship between private saving rates and policy and non-policy variables. Their results indicated that fiscal policy, particularly social security arrangements influenced private saving, macroeconomic stability and financial deepening also appeared as important variables determining saving behavior in the two regions.

Mwega (1997) conducted a comparative analysis of average private saving rates in 15 African countries for the period (1970-1993) and he found a negative and highly significant coefficient on fiscal balance. Concretely, a 1% increase in government budget surplus was found to reduce the private saving rate by up to 0.9, implying full Ricardian Equivalence. The implication is that fiscal balance and private saving are perfect substitutes.

Masson et al (1998) examined the determinants of private savings for a large sample of industrial and developing countries using both time series and cross-section data. The results suggested that there was a partial offset to private savings from changes in public saving for industrial countries, whereas in developing countries demographics and GDP growth were the most important determinants of private saving rates. In another study, Cardenas and Escobar (1998) analyzed the determinants of saving in Colombia, the findings reinforced the importance linkage among national savings, government expenditure and age dependency. The results concluded that national saving partially responded to temporary changes in output, and higher government expenditures were associated with lower national saving. The results also indicated that an increase in age dependency has a significantly negative effect on private saving rates.

Özcan (2000) examined empirical determinants of private saving for a sample of 15 MENA countries. Factors accounted for saving can be summarized as: In MENA region private saving rates had strong inertia and they were highly serially correlated. The effects of a change in a given saving determinant were fully realized in longer term than the short term (less than a year period). The most important findings of this study is that government savings to GPDI ratio had a negative impact on the saving rate, confirming the claim that government savings would tend to crowd out private savings. For the MENA countries, increases in government savings would be offset by reductions in public savings. The findings further indicated that, although higher government savings crowd out private savings, they did it in a less than one-to-one manner and the Ricardian equivalence did not hold strictly. From a policy point of view, financial depth and development measure of MENA region (M2 to GPDI) suggested that countries with deeper financial systems would tend to have higher private saving rates. Private credit and real interest rates also capture the severity of the borrowing constraints and the degree of financial

repression. The precautionary motive for saving is supported by the findings that inflation captures the degree of macroeconomic volatility and has a positive impact on private saving in the area. The empirical findings presented here indicate a number of variables that affect saving in the selected MENA countries. They clearly indicated the role of policies pursued by each country and the complexity of the relationship between saving and other variables that affect saving.

The extreme-bounds analysis was used by Hussain and Brookins (2001) to examine the determinants of national savings, based on both cross-sectional and panel data across a large sample of countries. Their results supported that agricultural share in total output; public saving, budget balance, and the current account balance were robust in explaining saving behavior. Sarantis and Stewart (2001) adopted unit root and cointegration tests to examine the long run determinants of aggregate private saving rates in a dynamic panel of OECD countries during the post Second World War period. They found strong evidence for the existence of a long-run equilibrium saving function. Although the results suggested a number of significant determinants of saving rates, the parameter estimates varied significantly across countries.

Özcan, et al. (2003) investigated the determinants of private saving for Turkey during the period (1968-1994) using a number of policy and non-policy variables. The findings of the estimated model supported the hypothesis that the private saving rates have strong inertia. It was found that the effects of a change in a given saving determinant were fully realized in the long run rather than in the short run. The findings further indicated that although higher government savings crowded out private savings, they did it in less than one-to-one manner, and thus the Ricardian Equivalence did not hold strictly. In addition, income level showed a positive effect on the private saving rate, however, the growth rate of income was not statistically significant. Moreover, financial depth and development measure of Turkey suggested that countries with deeper financial systems tend to have higher private saving rates. The results also indicated that life expectancy rate tends to have a negative impact on savings. Furthermore, the precautionary motive for saving was supported by the findings that inflation captured the degree of macroeconomic uncertainty and had a positive impact on private saving in Turkey. With regard to external factors, it was found that terms of trade shocks increased private saving in Turkey. Although the current account deficit represents an important explanatory variable for the private savings, its effect was insignificant in Turkey.

In another study by Metin_Özcan and Özcan (2005) to examine the relationship between a variety of macroeconomic variables and private savings. They used a sample of 15 countries in the Middle East and North Africa (MENA) over the period (1981–1994). The estimated results provided further evidence of the significantly positive effect of the growth rate of income, and per capita income on private savings. In addition, public savings crowded out private savings only partially which means that the Ricardian Equivalence does not hold strictly. Regarding the

financial factors, the paper provided evidence that countries with deeper financial systems tend to have higher private savings. Moreover, macroeconomic stability captured by the inflation rate was found to have a positive impact on savings.

In Nigeria, Onwioduokit (1998) employed the Error Correction Methodology(ECM) to examine the effects of financial development on savings mobilization in Nigeria. Their results reveal that there is no long-run equilibrium relationship between financial depth and domestic resource mobilization. Another study employed the Error-Correction Methodology by Chete (1999) who evaluated the determinants of saving, using data from (1973-1993). He found that financial development and external debt had a negative significant relationship on private saving, while terms of trade changes and level of income had a positive significant impact on saving. On the other hand, real interest rate, inflation, public saving and dependency ratio were all insignificant in the regression.

Also, Nwachukwu, and Egwaikhide(2007) examined the determinants of private saving in Nigeria. They compared the estimation results of the ECM with those of three conventional models: partial-adjustment, growth rate and static models. The conclusion is that the ECM performs much better than the other models. Its results reveal that the saving rate rises with the level of disposable income but falls with the rate of growth of disposable income. The real interest rate on bank deposits has a significant negative impact while public saving seems not to crowd out private saving. Furthermore, external terms of trade, inflation rate and external debt service ratio have a positive impact on private saving. While Nwachukwu and Odigie (2009), discussed the trend of Nigerian saving behavior and reviews policy options to increase domestic saving. They also examined the determinants of private saving in Nigeria during the period covering (1970–2007).The framework for analysis involved the estimation of a saving rate function derived from the life cycle hypothesis while taking into consideration the structural characteristics of a developing economy. The study employed ECM procedure which minimized the possibility of estimating spurious relations, while at the same time retaining long run information. The results of the analysis showed that the saving rate rose with both the growth rate of disposable income and the real interest rate on bank deposits. Public saving seemed not to crowd out private saving; suggesting that government policies aimed at improving the fiscal balance has the potential of bringing about a substantial increase in the national saving rate. Finally, the degree of financial depth had a negative but insignificant impact on saving behavior in Nigerian.

In Jordan, Hallaq (2003) analyzed and examined the determinants of private savings during the period (1976-2000) using the OLS and the instrumental variable methods. The main results indicated that the dependency ratio had a negative and significant effect on private savings, and government savings depressed private savings. However, GDP growth rate and

GDP per capita income had a significant positive effect on private savings. Moreover, the development of Jordan consumer's credit market, the ratio of social security, and welfare public expenditures to total public expenditures appeared to have positive effects on private savings. Finally, the real interest rate, inflation rate, and terms of trade were found to have insignificant impact on the level of private saving in Jordan.

In India, Athukorala and Sen (2004) examined the determinants of private saving during the period (1954-1998). The methodology used in this study involved the estimation of a saving rate function derived from the life-cycle model. The results of the estimated model provided an evidence of a statistically positive effect of the real interest rate, the growth and the level of per capita income, the spread of banking facilities, and the rate of inflation on domestic saving. On the other hand, terms of trade and inward remittances by expatriate Indians witnessed a negative impact on the saving rate. Fiscal policy reported that public saving seemed to be an imperfect substitute for private saving. The result relating to the inflation rate suggested that mild inflation seemed to have a positive impact on private saving.

In Oman, Narayan and AL Siyabi, S. (2005) examined the long run and short run effects of Oman's national savings for the period (1977-2003) using the bounds testing approach to cointegration. The main findings provided strong evidence that the current account, the urbanization rate and the money supply had statistically significant impacts on Oman's national savings in the long run.

George Hondroyiannis (2006) investigated the determinants of aggregate private saving in European countries employing panel data. The long run saving function is estimated based on an extended lifecycle hypothesis taking into account the economic and demographic developments during this period. Along-run saving function sensitive to dependency ratio, old dependency ratio, liquidity, public finances, real disposable income growth, real interest rate and inflation is found to exist. The empirical evidence suggests the existence of a long-run saving function in Europe. The policy implications of such a relationship are presented.

The study of Caroline Van (2009) looked into the evolution and determinants of the saving rate in Turkey, with particular focus on private saving. The data shows that Turkey's private saving rate is low compared to other emerging market countries, but this is a recent Phenomenon. He adopted previous econometric studies on the determinants of the private saving rate in Turkey and emerging markets in general, and he found out that the recent decline in private saving could be explained by the recent rapid increase in credit along with sharp increases in housing prices. Also he found out there is positive impact of demographic trends on Turkey's future saving rate.

In Ghana, Davis (2013) explored the determinants of private savings in Ghana using the Phillips and Ouliaris (1990) residual-based tests for cointegration to determine the long run relationship between private savings and its determinants. Financial liberalization, per capita income and inflation were found to have a positive and significant relationship with private savings. The positive and significant coefficient of the fiscal deficit variable confirmed the Ricardian Equivalence hypothesis in Ghana. There is a strong willingness to save but the capacity to save is not very robust. Financial liberalization is recommended to be deepened to give financial institutions room for improved financial packages for increased savings. Growth should be pursued vigorously to improve incomes and hence people's capacity to save. He concluded that in spite of the results for fiscal deficits, government must keep its spending within sustainable limits and invest appropriately.

In Pakistan, Khalil and Haider (2013) explained the determinants of savings in the process of economic growth by using Autoregressive Distributed Lag Model (ARDL) bound testing approach for cointegration techniques to check the robustness for long run relationship and ECM for short run dynamics during the period (1974-2010). They found that the per capita income inversely related with national saving rate, both in long run and as well in short run significantly. The exchange rate and inflation rate had a negative impact on national saving but lagged exchange rate had significantly impact. Because of floating exchange rates and the decrease in capital controls, the volume of international capital flows in a country had increased significantly. Trade openness was positive associated with national savings in Pakistan because trade openness caused to increase the income and welfare of the society via the market economy. Money supply was positively linked with national saving. The growth of the income level had negatively related with national savings. Keynesian and permanent income hypothesis of income and savings was not valid for Pakistan because per capita income and income growth inverse function of savings at national level.

We can conclude from the previous literature that the determinants of saving performance are diverse. Most empirical studies emphasized the significant and negative influence of government savings on the saving rates, confirming the claim that government savings tend to crowd out private savings. Moreover, direct positive association between GDP growth rate, GDP per capita growth rate and private savings, indicates that these variables represent the most important determinants of private and public savings. Interest rate, inflation rate and TOT appear to have an ambiguous impact on saving levels. Moreover, demographic factors such as dependency ratio and urbanization rate seem to have a negative effect on private saving rates; however, the significance of these variables was mixed between studies.

RESEARCH METHODOLOGY

The discussion of literature review suggests a number of factors, which might be important in determining private saving behavior in Bahrain. The current study utilizes annual data covering the period (1990-2013). Data is based largely on Central Bank of Bahrain (CBB), National accounts statistics (various issues), and Economic statistical bulletin (various issues). Some of the missing observations were updated with comparable data from the World Bank International Financial Statistics database the International Financial. All the data used are in terms of a constant local currency unit (2005=100). First, we outline the dependent variables used in our model, and then we outline the methodology adopted.

So, the model can be represented as follows:

$$PS_t = f\ (PS_{t-1}, PCRI_t, GS_t, RI_t, M2_t, PL_t, CA_t, ATR_t,\ EX_t,\ TOT_t,\ DPR_t,\ ODR_t,\ Dumy) \qquad (1)$$
$$t=1,2,\ldots\ldots,n$$

Where:

PSt   :   Private saving rate (calculated residually by subtracting the gross public sector savings rate from the gross national savings rate)

PSt-1   :   Lagged of private saving rate (Inertia)

PCRIt   :   Per capita real income growth

GSt   :   Public saving rate (the surplus or deficit as a percentage of GDP)

RIt   :   Real interest rate (nominal interest rate - inflation rate)

M2t   :   Ratio of broad money supply to GDP (as a proxy of financial depth)

PLt   :   Inflation rate (the annual change in the natural logarithm of the GDP deflator).

CAt   :   Current account deficit ratio to GDP

ATR_t :   Average tariff rate as a proxy of trade openness

EXt   :   Exchange rate

TOT_t :   Terms of trade (ratio of export price index to import price index)

DPR_t :   Dependency ratio

ODR_t :   Old age dependency ratio

Dumy   :   Financial Crisis dummy, used to effects of international financial crisis years on the Bahrain private saving rate. It takes (1) in the years of crisis and (0) otherwise.

Most macroeconomic time series exhibit substantial co-movement, and thus estimating the previous model using OLS frequently suffers from the problem of nonstationary regressors and spurious regressions, which do not reflect the long run relationship but common time trends (Engle and Granger, 1987). Therefore, in order to investigate the long run effects of the model, we should first test whether the proposed variables in the equation (1) are stationary or not. This step is carried out using Augmented Dickey Fuller (ADF) test (Dickey and Fuller, 1981). ADF

test is being conducted to indicate that variables under study have unit roots in the level data based on the following equations:

$$\Delta X = \beta X_{t-1} + \sum \mu i \, \Delta X_{t-1+i} + \varepsilon \quad P \qquad (2)$$
$$i\text{-}2$$

$$\Delta X = \alpha 0 + \beta X_{t-1} + \sum \mu i \, \Delta X_{t-1-i} + \varepsilon_t \quad P \qquad (3)$$
$$i\text{-}2$$

$$\Delta X = \alpha 0 + \beta X_{t-1} + \delta t + \sum \mu i \, \Delta X_{t-1-i} + \quad P \qquad (4)$$

Where X is log of the variables series, *p* is the *i-2* num lag, and *ε* is the stationary random error.

The first equation is a test of pure random walk since there is no time trend and intercept. The hypothesis test is to test if $\beta = 0$ or not. Equation (4) is being tested in the begging. In case of rejecting the null, one should go back to test equation (3) and (2), which are more restricted. In the presence of unit roots, the variables needed to be differenced one year or more in order for the series to be stationary. The choice of optimum *P* lag was determined on the basis of minimizing the Schwarz information criterion to ensure serially uncorrelated residuals.

The next step is to test for the presence of cointegration among the explanatory variables by using the Johansen cointegration test (1988) for the study variables that are I(1) in Bahrain. To estimate the cointegration rank and vector, the following λ trace and λmax statistics test are being used where:

$$\lambda_{trace}(r) = -T \sum Ln(1-\lambda_i) \qquad n$$
$$i = r + t$$

$$\lambda_{max}(r, r+1) = -T \, Ln(1-\lambda_{r+1}) \qquad (6)$$

for λtrace statistics, the null hypothesis is that the number of cointegrating vectors is less than or equal to r, against r =1,2,3,4…, while in case of λmas statistics, the null hypothesis is that the number of cointegrating vectors is less than or equal to r, against r = r + 1.

Having identified the cointegration vector using Johansen, we proceed to investigate the dynamics of the private saving process by employing ECM. If the results show that the coefficient of the error-term for the estimated saving equation is both statistically significant and negative.

Thus, it will rightly act to correct any deviations from long run equilibrium. Specifically, if actual equilibrium value is too high, the error correction term will reduce it while if it is too low, the error correction term will raise it.

EMPIRICAL RESULTS

The Augmented Dickey Fuller (ADF) tests are applied to study the unit roots in the variables. For a given variable and null order, two values are reported in each cell. The first value is the ADF statistics and the second value in the parenthesis is the longest significant lag with significant t value. Four lags are allowed in each variable's ADF regression. All regressions include constant term and time trend. If variables are in their log levels, the sample is 1990-2013 (t=24). If the variables are in their first differences the sample is 1990-2013 (t=23). The results of these tests are presented in table (1). The results show PS_t , PCRIt, GSt and M2t are integrated of order one I(1). The other variables are stationary at level.

Table (1) ADF test for unit root

Variables	Level(intercept+ trend)	1st differences(intercept+ trend)
PS	-1.84(1)	-5.81(2)*
PCRIt	-2.47(0)	-4.65(1)*
GSt	-1.55(4)	-8.23(3)*
RIt	-1.98(0)	-1.31(1)
M2t	-2.01(2)	-1.712(3)***
PLt	-0.63(1)	-1.541(2)
CAt	-2.07(0)	-1.07(1)
ATR_t	-3.14(1)	-1.314(2)
EXt	-1.86(1)	-1.06(3)
TOT_t	-3.01(0)	-1.47(2)
DPR_t	-1.35(1)	-1.56(2)
ODR_t	-2.01(0)	-1.53(1)

ADF critical values at level are: -4.071 at 1%, -3.464 at 5% and -3.158 at 10%. While ADF critical values at first differences are: -2.727 at 1%, -1.964 at 5% and -1.627 at 10%

*** The numbers in parentheses are the lag length, which are augmented up to a maximum of 4 lags , The optimal lag length is determined based on Schwarz Information Criterion (SIC).*

The next step is to carry out the Johansen cointegration test for the study variables that are I(1). The Trace and Maximum-Eigen cointegration rank tests are reported in table (2) below. A cursory glance at table (2) reveals that the null hypothesis of no cointegrating equation is rejected by both tests. While the trace statistic value is shown to be greater than the critical values at both 5% and 1% levels. Hence, we reject the null hypothesis of no cointegration in favor of existence of cointegration for all the series at both 5% and 1% levels; the maximum-Eigen statistic value indicates that one cointegration equation at 5% level of significance, while it shows no cointegration at 1% level.

The implication is that even though the series: PS_t , PCRIt, GSt and M2t are not individually stationary, a linear combination of the four series was found to be stationary. The four original non stationary series are therefore said to be cointegrated. In other words, there is

a stable long-run relationship between them and so we can avoid both the spurious and inconsistent regression problems which otherwise would occur with regression of non-stationary data series. The existence of cointegrating relationships among the four I(1) variables implies that the determinants of private saving in Bahrain is most efficiently represented by an error correction specification.

Table (2) Johansen Panel cointegration (Trace and Maximum Eigen Value Test)

Hypothesized No. of CE(s)	Trace Statistic	5% critical value	1% critical value	Series
None	23.156	15.197	18.310	PS_t , PCRIt, GSt and M2t
At most one	4.642	13.41	15.03	
At most two	1.146	3.78	7.63	
Hypothesized No. of CE(s)	Max-Eigen Statistic	5% critical value	1% critical value	Series
None	16.254	15.036	17.936	PS_t , PCRIt, GSt and M2t
At most one	5.408	12.06	14.63	
At most two	1.371	3.78	7.65	

The critical values in the table are copied from Walter Enders, Applied Economic Time Series, Wiley Series in Probability and Statistics, 1995, page 420.

Having identified the cointegrating vector using Johansen, we proceed to investigate the dynamics of the saving process. Table (3) reports the final parsimonious estimated equation. The results show that the coefficient of the error-term for the estimated saving equation is both statistically significant and negative. Thus, it will rightly act to correct any deviations from long-run equilibrium. The Adjusted R^2 is almost 73%, which implies that changes in the explanatory variables explain well over 73% of the variations in private saving rate in Bahrain during the period (1990-2013). There is no serial autocorrelation given that the Durbin Watson Statistic is within the acceptable bound. In addition, the probability of the F-statistic suggests that the model has a very good fit. The results support the previous one that the variables constitute a cointegrated set.

Table (3) Estimated Regression Results for the Private Saving Model

Variable	Coefficient	t-statistic
Constant	-0.018	-0.175
PS_{t-1}	-0.627	-2.939**
PCRIt(-1)	0.049	1.979*
GSt	0.656	-2.951**
RIt(-2)	0.018	2.83**
M2t	1.014	2.533**
PLt(-1)	0.153	2.570**
CAt	-0.281	-2.483**
ATR_t	-0.006	-0.0331
Ext (-1)	-0.458	-0.9467
TOT_t	-0.255	-3.619***
DPR_t	1.081	1.135
ODR_t	0.244	1.538
Dummy	-0.115	-4.189***
ECM(-1)	-0.803	-3.835***
Adjusted R^2	0.739	
S.E. of regression	0.5447	
Durbin-Watson stat	2.93	
S.D dependent var.	1.1095	
F-statistic	7.2576	
Prob. (F-statistic)	0.0003	

*,**,*** *indicate statistical significant at 1%,5% 1nd 10% level, respectively*

The estimated parameters of the explanatory variables show the following:

- The presence of inertia in private saving rates (PS_{t-1}) in Bahrain is clearly evident from the empirical results as the coefficient of the lagged private saving rate is negative and highly significant effect on today's savings rates. The coefficient is about -0.63 indicating that savings rates clarify a certain degree of persistence.

- The Keynesian absolute income hypothesis is found to hold for saving behavior in Bahrain. The coefficient for per capita real income growth (PCRIt) is positive and statistically significant at the 10% level. Thus the Bahrain experience provides support for the argument that, for countries in the initial stages of development, the level of income is an important determinant of the capacity to save. In this respect, our results are consistent with the cross country results of Modigliani (1993), Hussein and Thirlwall (1999), Loayza et al (2000) and the results for India of Athukorala and Sen (2004). This implies that the high unemployment rate which results in low disposable income is a strong impediment in raising the saving rate in Bahrain.

- The result for public saving rate (GSt) points to the fact that the Ricardian Equivalence Principle does not hold in the case of Bahrain. The coefficient for public saving rate is both positive and significant effect, thus rejecting any substitutability between public and private saving in the Bahrain context. Thus, public and private saving rates are complementary and mutually reinforcing. This result is consistent with Keynesian theory,

which affirms the importance of budget deficits as a powerful instrument for bringing about output growth. Our findings are also in line with those obtained by Chete (1999).

- The result for the real interest rate variable (RI_t) suggests that the real rate of return on bank deposits has a statistically significant positive effect on saving behavior in Bahrain. A 1% increase in RI_t is associated with a 0.018 percentage point increase in the private saving rate. This finding is consistent with the McKinnon–Shaw proposition that, in an economy where the saving behavior is highly intensive in money and near-money assets, the direct incentive effect of high real interest rates on saving behavior (income effect) generally overwhelms the substitution of other assets for financial assets in response in face of such interest rate changes (substitution effect).

- The financial depth as captured by ($M2_t$) is positive and statistically significant. This finding confirms our prediction that an increase in "financial depth", proxy by the increase in the M2/GDP ratio, is likely to be very important in a country like Bahrain, which is undergoing a financial liberalization process.

- The inflation rate (PL_t) has a strong positive effect on the private saving rate. This result is consistent with the precautionary motive, suggesting that increased macroeconomic uncertainty induces people to save a larger proportion of their incomes. This is particularly true for households in developing countries such as Bahrain whose income prospects are more uncertain than their counterparts in developed countries. While one might be tempted to conclude that inflation stabilization could have an adverse effect on saving, it is important to keep in mind that stabilization also affects saving through other channels that are likely to more than compensate for any negative direct effect of inflation. In this regard, our result shows that lower inflation raises growth which in turn increases private saving.

- Current account deficit (CA_t) recorded a negative and statistically significant effect on both the short run and the long run. The results indicate that 1% decrease in current account deficit leads to 0.28 % point increase in the private saving ratio. An increase in external saving or the current account deficit is met by a partial decline in private saving, as external saving may tend to act as a substitute to private saving. This reinforces that an increase in current account deficit, which is financed by foreign governments rather than private investors, may have a negative impact on private savings. This heavy reliance on foreign creditors may raise political economy concerns.

- Despite of average tariff rate (ATRt) is associated with private savings in Bahrain because trade openness cause to increase the income of the market player, there is inverse association between tariff rate and private saving but statistically insignificant.

This means that the tariff imposition is not affecting the private saving in Bahrain during study period.

- The exchange rate (Ext) is statistically insignificant, this because Bahraini dinar is linked to the U.S. dollar at an exchange rate steady since 1980. The use of large foreign currency as a pillar of monetary policy arrangement is customary with small open economies and has proven successful when it is supported by a flexible fiscal policy; therefore

- The results for TOT point to a strong negative relationship between the terms of trade change and the private saving rate suggesting that private agents increase saving when faced with lower future real incomes as a result of terms of trade deterioration. Private agents in Bahrain seem to consider terms of trade deterioration as a permanent (negative) shock and their attempts to smooth consumption in face of such perceived shocks lead to an increase in domestic saving. 1% deterioration in the terms of trade brings about 0.25 percentage point increase in the private saving rate. At first blush, this significant (negative) relationship between TOT and the saving rate is surprising for a country like Bahrain whose dependence on foreign trade (as conventionally measured by the trade-GDP ratio) is rather low. There are however, strong reasons to believe that the actual trade dependence of the Bahrain economy (and hence the possible impact of TOT changes on the economy) would have been much greater than what is suggested by this conventional measure. As an outcome of the strong commitment to an import-substitution strategy, throughout most of the period under study Bahrain's imports remained concentrated in critical developmental inputs, in particular, petroleum, Aluminum and various inputs to domestic industry for which there were virtually no domestic substitutes. Given this delicate form of import dependence, the performance of the economy was extremely vulnerable to import compression at times of TOT shocks.

- Another striking result that emerges from our analysis is that two of the demographic variables (DPRt and ODRt) are insignificant. This may be due to the fact that, in a developing country like Bahrain, where the family structure is still quite traditional, especially, the age dependency ratios are likely to exhibit a picture divergent from the predictions of pure theory. The most vivid example, probably, is the devotion of a great part of the household's resources to child rearing, until the children start to earn their own income, no matter when. This increases the burden of the adults, lessening their chance to save This observation, coupled with the fact that it is seen as the children's responsibility to care for the old, brings forth the possibility that the old can be expected to save more, along with the lowered expenses in their budget.

- One of the most results insights that emerge from these estimations is that the coefficient for the crisis dummy is negative and statistically significant, This means the world financial crisis -like that happened on 2008- had a negative impact on the private saving behavior in Bahrain, where private saving growth rate decreased by more than 30% in year 2009 compared with previous year, while it started to increase by 0.06% in year.

CONCLUSION

The econometric estimates of private saving function for Kingdom of Bahrain covering the period (1990-2013) are presented and examined in this study. The choice of this period for analytical purposes was necessitated by the availability of consistent time series data on numerous macroeconomic variables required for estimating the econometric model of saving behavior. The findings reveal that private saving is determined by the following factors. First, the growth of per capita income is found to have positive influence on private savings, especially on the long run. Second, public saving rate appears to have positive and significant effect on private saving ratio. This means that public and private saving rates are complementary and mutually reinforcing. Third, the development of financial market as proxied by the increase in the M2/GDP ratio shows a positive and significant effect on private savings. Fourth, the real interest rate, and inflation rate prove to have positive and significant impact on the level of private savings in Bahrain. Finally, current account deficit recorded and TOT have negative and statistically significant effect on both the short run and the long run, which imply that external saving may tend to act as a substitute to private saving.

Accordingly, the study recommends some polices that can be drawn from the analysis as follows:

- The focus of development policy in Bahrain should be to increase the productive base of the economy in order to promote real income growth and reduce unemployment. For this to be achieved, a diversification of resources base is indispensable. This policy thrust should include the adoption of a comprehensive energy policy, with stable electricity as a critical factor; the establishment of a viable iron and steel industry; the promotion of small and medium scale enterprises and a serious effort at improving information technology.
- Because public and private saving rates are complementary. Government should therefore no longer embark on spending sprees under the pretext that saving excess revenue would crowd out private saving. A stop must be put to the sharing of excess oil revenue among the various tiers of government since this usually has an inflationary impact on the economy.

Lastly, it is pertinent to note that though this paper has concentrated on Bahrain, we are of the opinion that its results can be applied to other Gulf countries not previously studied. They contain some valuable lessons for informing policy measures in the current thrust towards greater mobilization of private saving in the Gulf countries.

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