INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN ECONOMICS & MANAGEMENT SCIENCES

OPEN ACCESS JOURNAL

Vol 4, Issue 1, (2015) E-ISSN: 2226-3624

Determinant of Private Saving: An Empirical Study on Malaysia

Shee Kah Keat, Har Wai Mun, Yew Peng Yuan, Lee Kit Hei, Leong Kai Hin

Universiti Tunku Abdul Rahman (UTAR), Bandar Sg Long,Cheras, 43000 Kajang, Selangor, Malaysia.

Email: harwm@utar.edu.my

To Link this Article: http://dx.doi.org/10.6007/IJAREMS/v4-i1/1610 DOI:10.6007/IJAREMS/v4-i1/1610

Published Online: 09 January 2015

Abstract

The purpose of our paper is to narrow down the determinants of private saving in Malaysia with references from past researches. This is because of the importance of private saving when considering a country's economic stability and conditions. With a good understanding of its determinants, effective policies can be devised and implemented to maintain economic stability and growth and also identifying harmful policies and correcting them. Data period is from 1985 to 2010. We use regression analysis (OLS) and ran several diagnostic tests on the data to address common assumptions of the model. Dependent variable is private saving while independent variables are GDP per capita, inflation rate, and government budget. The empirical findings support the theory of Life Cycle Model and Ricardian Equivalence existence in Malaysia. Malaysia's inflation rate has a significant and positive relationship with private savings.

Keywords: Private Saving, Income, Government Budget, Inflation, Malaysia

JEL code: E21, E62

Introduction

National saving consists of two components which are public saving and private saving. In macroeconomic aspect, national saving is always assumed to be equal with total investment of the country. This assumption has implied that the amount of a country gross investment will be influenced a lot by the amount of savings available in the country. Hence, this means that the higher the saving amount in a country, the larger the investment capacity of the country. Mckinnon (1993) have suggested to the government to implement financial liberalization to encourage saving which will then enhance economic growth. Thus, the government should identify potential determinant that will affect both public saving and private saving. This enable government to execute appropriate policy based on the determinant in order to increase saving. There are many different opinions arisen from past researches either by empirical results or theories when determining the potential determinants of private saving. There are also a few theories and hypothesis that give various opinions on determinants of private saving. Due to that, identification of determinants of

private saving still remains ambiguous. Hence, it will cause a problem for policy makers in deciding the policy that used to increase private saving in a country.

Research Objectives

Theory of Life Cycle Model and Permanent Income Hypothesis has been used to explain the effect of income per capita towards private saving. Theory of Ricardian Equivalance and Life Cycle Model commonly used to study the impact of current budget on private saving. Inflation is one of the potential variables that will affect private saving in the country but past research results still inconclusive. Furthermore, resources of Malaysia investment are largely generated from savings, thus it is essential to the government to identify which suitable policy should be implemented to increase saving either private saving. Based on those research gaps, the objectives of this research are as follows:

1. To identify relationship between income per capita and private saving in Malaysia during 1985 to 2010.
2. To determine potential relationship between government current budget and private saving in Malaysia during 1985 to 2010.
3. To examine relationship between inflation and private saving in Malaysia during 1985 to 2010.
4. To suggest appropriate policy that can be used by government to increase private saving.

Literature Review

Private saving has been defined as the remaining income or unused income of the private citizens after paying taxes and spending on consumption goods (Mankiw, 2011), which include those used to finance firms/institutions in the equity market/bond market, or invest in real assets such as properties and real estates (Reinsdorf M. B., 2005). Hence, a formula has been created based on this definition to measure private saving Sp (Private saving) = Y(income) – T(taxes) – C(consumption).

Theories and research on Income per Capita and saving involved Life Cycle Hypothesis (Modigliani &Brumberg, 1954, Ahmad Khan & Abdullah 2010) and Permanent Income Hypothesis. Browning & Crossley (2001) stated that the growth of income per capita has a positive relationship with private saving rate in Life Cycle Hypothesis. If life cycle hypothesis hold, then this paper should expect *positive* coefficient for growth of income per capita. Meanwhile, permanent income hypothesis of (Friedman, 1957) states that income per capita growth will actually decrease the private savings rate because a person's consumption at a given time is determined not only by his/her current income but also by their expected income in the future. Saving will decline when consumers' confidence is high and vice versa (Carroll & Summers, 1991). If permanent income hypothesis hold, then this paper should expect growth of income per capita carry a *negative* coefficient.

There are a few theories which suggest that private savings of a country will be affected by the country's government savings or government current budget. Firstly, there is the neo-classical version of *life cycle model* which proposes a positive relationship between government saving and private saving. For example, decline in government savings through expansionary fiscal policy will increase consumption and discourage saving because the tax burden of a country's citizen has been reduced (Ozcan, Gunay, &Ertac, 2003). If this model holds, then this paper should expect a *positive* coefficient for current budget. On the other hand, the *Ricardian Equivalence* proposition has contrasting views (Ricardo, 1846). It states that current budget has negative relationship with private saving. Expansion fiscal policy been

implemented will cause the citizens in a country anticipate payment of higher tax in future to bear the increasing burden of government. As a result, the citizens will increase their saving to ensure that they have sufficient ability to pay the tax in future. If Ricardian Equivalence holds, then this paper should expect current budget carry a *negative* coefficient. However, Ricardian equivalence has also been rejected by empirics such as Domenech, Taguas, & Varela (2000) and Seater (1993).

Inflation might affect saving behavior through various mechanisms and could be positive or negative. Most of the studies on the impact of inflation on savings found that inflation has substantial *negative* impact on savings (Heer & Süssmuth, 2006). This is due to high inflation causing rising opportunity cost in holding money and increase the benefits of spending and consuming, hence reducing savings (Miller & Benjamin, 2008).The impact on savings are dependent the households' reactions to a rise in inflation (Chopra, 1988). Opposing this is another theory, which proposes that the higher uncertainty will incentivize people to save a larger part of their income as a precaution to future financial difficulties instead (Chopra, 1988). Thus, a rise in inflation should have a *positive* effect on savings. In particular, (Deaton, 1977) affirms that private saving may increase with rising inflation if consumers misinterpret an increase in nominal prices for an increase in the real prices and decided not to spend. Hence, the effect of inflation on saving rate is *ambiguous* theoretically and practically (Heer and Suessmuth, 2006; and (Deaton and Paxson, 1993).

Methodology

Given the theories and empirical evidences from previous studies (Ahmad Khan & Abdullah, 2010), private saving (PS) function can be expressed as follows: $\boldsymbol{PS_t = f\,(GDP_t, INF_t, CB_t)}$

The symbol of PS_trepresents private saving, GDP_t represents income per capita, INF_t represents inflation rate, CB_trepresents government current budget (budget deficit/budget surplus).,

An econometric model has been formed to estimate the effect of LogGDP, INF, and CB on LogPS:

$$\boldsymbol{Log\,(PS_t) = \beta_0 + \beta_1\,Log\,(GDP_t) + \beta_2 INF_t + \beta_3 CB_t + \mu_t}$$

In the above model, $_t$ represents time series data and β represents the coefficient of the independent variables. Meanwhile, μ_t is the disturbance or error term. This term capture the effects of other variables or factors that not mention in the model on the variation of the dependent variable in the model.

For Income per Capita, gross domestic product per capita (GDP) is used. Based on (Landefeld, Seskin&Fraumeni, 2008), gross domestic product will represent total value of final output that been produced within a country in a given period. They stated that production of those output will generate income (wage, rent and others) for the owner of production factor, and thus gross domestic product will equal to the income earned by factor of production in a country. As a result, gross domestic product per capita (GDP) can be used as an indicator to represent the income per capita. Government current budget (CB_t) will be express in term of ratio form, which is *government total revenue/government total expenditure*.

The hypothesis for each independent variable is as follow:

Table 1
Hypothesis for Each Variable

Variable (symbol)	**Hypothesis null (H_0)**
Income per capita (GDP)	There is no relationship between income per capita and private saving
Government Current Budget (CB)	There is no relationship between current government budget and private saving
Inflation rate (INF)	There is no relationship between inflation and private saving

This research uses the annual data for Malaysia from the year of 1985 to 2010. There are several sources to retrieve or obtain the needed data of variables such as World Data Bank (inflation rate and income per capita), Ministry of Finance Malaysia (government current budget data) and Annual Reports of Bank Negara Malaysia (private saving data). The data of private saving and income per capita have been logged for interpretation purpose. The variables are represented by following symbols.

LPS - Log Private Saving (RM in million) (constant price, 2000 as base years)
LGDP - Log Income per capita (RM) (constant price, 2000 as base years)
CB - Government Current Budget (express in ratio form, *total government revenue/ Total government expenditure*)
INF - Inflation Rate (%)

Augmented Dicky-Fuller (ADF) and Phillps-Perron (PP) tests are applied to perform unit root test to ensure that all the variables in the model are in stationary state(Ahmad Khan & Abdullah, 2010).In both ADF and PP test, the time series variable will be tested without intercept and with intercept and trend**.** We usedcointegration test provided by Johnson and Juselius (1990), JJ Cointegration Test. This test has been widely used if there is a stationary linear combination of nonstationary random variables, and those variables have long run relationship when they tied together.

Several diagnostic tests are performed to confirm robustness. JarqueBera Test is the formal method in detection of this problem (normality of the error term). The test will use the skewness of the error and kurtosis to calculate the test statistic value.White and Autoregressive Conditional Heteroskedasticity Testare used to test the presence of White and ARCH heteroscedasticityrespectively.Durbin-Watson d Test is carried out the presence of first order autocorrelation in a regression model. Auxiliary regressions test is used to detect multicollinearity problem between the independent variables.After that,R^2 in this several auxiliary regression test will be used to calculate the TOL ($1-R^2$) and VIF ($1/1-R^2$) value.

Result and Interpretation

Table 2 shows results of both ADF and PP test (with or without trend and intercept). All variables achieve stationary (do not have unit root problem) at the same time when in second difference order. The summary of result for JJ Cointegration Test that obtained from E-view software will show in below Table 3. JJ test computed value which is Trace value is greater than its critical value when the hypothesized no of CE equal to *none, at most 1 and at most 2*. This means that the null hypothesis of JJ test is able to be rejected at three of the above situation which suggests that there are three cointegrating equation at 10% significance, in other words, it means that long term relationship exists among the variables in the research (*LPS, LGDP, INF and CB*). The summary of OLS Regression results are presented in Table 4.

Table 2
Result of unit root test on time series data (LPS, LGDP, INF and CB)

	ADF Test		**PP Test**	
Level	**With Intercept and Trend**	**Without Intercept and Trend**	**With Intercept and Trend**	**Without Intercept and Trend**
LPS	-3.0817	-2.6607	-2.9503	3.0596
LGDP	-2.2426	5.1428	-2.2992	5.9887
INF	-3.5084*	-0.7303	-3.5084*	-1.3478
CB	-1.6538	-0.2916	-1.6538	-0.2916
First Different				
LPS	-4.6271***	-2.9938***	-4.6271***	-3.7342***
LGDP	-6.9848***	-0.9743	-7.6428***	-2.8007***
INF	-8.3539***	-8.3280***	-8.7353***	-8.5995***
CB	-5.1756***	-4.9801***	-5.1849***	-4.9761***

Notes: ***, **, * indicates the null hypothesis will be rejected at 1%, 5% and 10% significant level. The null hypothesis for ADF test and PP test is the existence of unit root.

Table 3
Result of JJ Cointegration Test

Hypothesized no. of CE(s)	**Trace Value**	**Critical Value**
None	45.35164*	44.49359
At most 1	28.54253*	27.06695
At most 2	14.65536*	13.42878
At most 3	2.57014	2.705545

Notes: * indicates the null hypothesis of JJ Cointegration Test will be rejected at 10% significant.

Table 4
Summary of OLS Regression Result

Intercept (Standard Error)	-1.343972 (1.100088)
LGDP	1.36169 (0.096377)***
INF	0.057026 (0.030183)*
CB	-0.878073 (0.383463)**
R^2 **Number of Observation**	0.951587 26

Note: ***, **, * indicates the null hypothesis will be rejected at 1%, 5% and 10% significant level. The null hypothesis in this test is that the independent variables do not have significant relationship with dependent variable.

Based on Table 4, **Model 1** has been formed to show the relationship of the dependent variable and independent variable as follows:

LPS_t= -1.344 + 1.362($LGDP_t$) + 0.057(INF_t) - 0.878 (CB_t) **(Model 1)**

(S.E) (1.1101) (0.00964) *** (0.0302)* (0.3835) **

R^2 = 0.951587

F-stat = 6.868832, Prob (F-statistic) = 0.004582

Based on empirical result, we can interpret that 1% increase of income per capita (log income per capita, LGDP) will increase 1.362 % of private saving (logged private saving, LPS). Meanwhile, change in 1 unit of inflation rate (INF) will increase 5.7% (0.057*100) of private saving (LPS). Next, increase of 1 unit in government current budget (CB, which expressed in term of ratio, government revenue/government expenditure) will decrease 87.8 % of private saving (LPS).

Besides, Table 4 also indicates that LGDP has significant relationship to LPS at 1% significant level while INF is only statistically significant to LPS at 10% significant level. And lastly, CB has significant relationship on LPS at 5% significant level. Moreover, the R^2 of this test indicates that 95.16% of variation in LPS in Malaysia can be explained by variation in LGDP, INF, and CB. Last but not least, the F test statistic value is 6.868832 while critical value of F at 0.05 level of significance, with degree freedom of 3 (numerator) and 22 (denominator) is 3.05. This means that the null hypothesis for the test is able to be rejected which suggests that the overall model is statistically significance at 1%level.

Diagnostic Test

Model 1 is done by using Ordinary Least Square method. According to Gauss-Markov Theorem, a regression model needs to fulfil a few assumptions of Classical Linear Regression Model (CLRM) in order to achieve BLUE (Best Linear Unbiased Estimator). For an OLS model to achieve BLUE, the mean value of the error term should be equal to zero. For this purpose, a descriptive statistic of error term have been conducted and shown in Table 5. The mean value of error (3.26E-15) is almost equal to zero. Hence, this indicates that model 1 has met the zero mean value of error assumption.

Table 5

Descriptive Statistic of Error Term for Model 1

Mean	3.26E-15	Std. Dev.	0.17933
Median	0.00997	Skewness	0.04943
Maximum	0.43218	Kurtosis	2.80872
Minimum	-0.31017	Observations	26

Others Diagnostic Test (JarqueBera Test, Arch Test and etc)

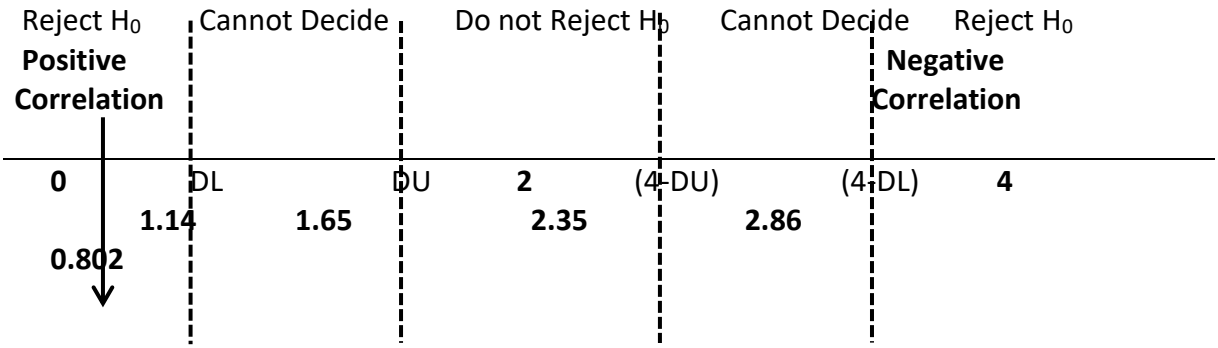
There are other diagnostic tests such as ARCH Testand JarqueBera Test also has been carried out. The summary of result for these tests is shown inTable 6.

Table 6
Summary Table for Diagnostic Test

Diagnostic Test	**H_0**	**Probability (Test value)**	**Decision**
Jarque Bera	There is normally distribution of errors in the regression model	0.975	Do not reject H_0 at 1% significant level
White Heteroscadasticity	There is no heteroscedasticity in the model	0.274	Do not reject H_0 at 1% significant level
ARCH Heteroscadasticity	There is no heteroscedasticity in the model	0.864	Do not reject H_0 at 1% significant level
Durbin Watson	There is no first order autocorrelation occurs in the model	0.802	Reject H_0 as it falls in the positive correlation area

Based on the results, we can conclude that there are no heteroscadasticity and normality problem. However, the result from Durbin Watson d Test indicates that the model is having first order autocorrelation (positive correlation). It can be showed more detail in Figure 2.

Figure 2: Durbin-Watson d Test



As a remedy to overcome this autocorrelation problem, the OLS regression model in the research has been fixed by using Newey-West Standard Error Method. This method will be deemed as sufficient to overcome autocorrelation.

Result of Auxiliary Regressions Test on multicollinearity problem is shown in Table 7.

Table 7
VIF and TOF table for Model 1

Dependent Variables	**R^2**	**TOL**	**VIF**
LGDP	0.0600	0.9400	1.0638
INF	0.3702	0.6298	1.5878
CB	0.3739	0.6261	1.5972

The value of TOL will be ranged from 0 to 1. An independent variable will be considered to have a serious multicollinearity problem if its TOL value smaller than 0.1. Based on the table, three variables in model 1 do not have cause a serious multicollinearity problem

as their TOL value (0.9400, 0.6298, and 0.6261 respectively) are greater than 0.1. An independent variable will be considered to have serious multicollinearity problem if its VIF value is greater than 10. Again, GDP, INF, and CB have the VIF value (1.0638, 1.5878, and 1.5972 respectively) that smaller than 10, this again indicates three variables in model 1 do not have serious multicollinearity problem.

Discussion and Conclusion

This research draws from previous studies like (Ahmad Khan & Abdullah, 2010) to investigate the relationship of GDP per capita (GDP) inflation rate (INF) and government current budget (CB) with private savings (PS) using an OLS linear regression model, with the function expressed as : $PS_t = f (GDP_t, INF_t, CB_t)$.Results revealed two variables (GDP and CB) are consistent with our literature review and INF to be partially consistent. In the case of GDP, it is positively correlated with PS, consistent with subsistence-consumption theory and Life Cycle Hypothesis. In the case of CB, it is negatively correlated with PS, consistent with the theory of Richardian Equivalence. We found INF to be positive correlated with private savings, consistent with the claim that inflation causes uncertainty in households, thus inducing savings.

In summary with respects to the research objectives:

1. Our findings support the theory of Life Cycle Model, which posits that as the growth of income per capita increases, people tends to save more. Our findings go against Permanent Income Hypothesis, which posits that people consume more and save less when income increases.
2. Our findings support the theory of Ricardian Equivalence in Malaysia during the studied period, where higher current budget deficit causes decreases in saving rate.
3. The year from 1985 to 2010, Malaysia's inflation rate has a positive relationship with private savings; this could be partly caused by households concern on future uncertainties, likely caused by Asian Financial crisis in 1997.
4. Findings suggest that policy that encourages growth and positive government budget, while maintaining a moderate inflation rate, can increase private savings.

Based on our findings where Ricardian Equivalence hold, Malaysian government's continuous budget deficit in the past and most likely extended into immediate future could increase private saving, thus lowering effectiveness of fiscal stimulus. However, further research needs to be done to ascertain (i) the specific effect of different types of tax (like Good and Services Tax, income tax, corporate tax) and (ii) suitable levels of taxation to maximize fiscal policy effectiveness. Policies that reduce income inequality in the country can also increase private savings because lower income inequality means people with ability are given due opportunity, which would increase productivity and economic growth, which in turn would increase income per capita of the country. Finally with an increased income per capita, households have higher ability to save, thus private savings increases. In terms of monetary policy, an expansionary monetary policy that lowered interest rates create inflationary pressure and higher inflation would increase private savings as people save more when they anticipate uncertainties.

In term of research limitation, there are only three regressors in the model. Therefore, it is highly possible that there are relevant omitted variables out there that could provide further insights. The study is also limited due to its relatively small sample size (26), which makes it more difficult for the regression model to predict the true relationship between the

dependent variable and independent variables, with higher probability in committing multicollinearity and outlier errors. As a result, the evaluation of the chosen regression model can be ambiguous (Bissonette, 1999).

References

Ahmad Khan, H.H. & Abdullah, H. (2010). Saving Determinants in Malaysia. *Journal Economi Malaysia,* 44, 23-34. Retrieved March 3, 2013, from http://www.ukm.my/fep/jem/pdf/2010-44/jeko_44-3.pdf

Bissonette, J. A. (1999). *Small Sample Size Problems in Wildlife Ecology: A Contingent Analytical Approach.* Retrieved April 17, 2013, from Wildlife Biology: http://www.wildlifebiology.com/Downloads/Article/241/en/oldpath.pdf

Browning, M., & Crossley, T. F. (2001). The Life-Cycle Model of Consumption and Saving. *Journal of Economic Perspectives*, 3-22.

Carroll, C. D., & Summers, L. H. (1991). Consumption Growth Parallels Income Growth: Some New Evidence. National Saving and Economic Performance, 305-348. Retrieved March 3, 2013, from http://www.nber.org/chapters/c5995.pdf

Chopra, S. (1988). Inflation, Household Savings and Economic Growth. *Ph. D. thesis*.

Deaton, A. (1977). Involuntary Saving Through Unanticipated Inflation. *The American Economic Review, 67*(5), 899-910.

Deaton, A. & Paxson, C. (1993). Saving, Growth and Aging in Taiwan. Working paper No. 4330, 47. Retrieved February 26, 2013, from http://www.nber.org/papers/w4330.pdf?new_window=1

Domenech, R., Taguas, D., & Varela, J. (2000). The effect of budget deficit on national saving in the OECD. *Economics Letters, 69* (3), 377-383.

Friedman, M. (1957). The Permanent Income Hypothesis. In M. Friedman, *A Theory of the Consumption Function* (pp. 20-37). Princeton University Press.

Heer, B., & Süssmuth, B. (2006). The Savings-Inflation Puzzle. *CESifo Working Paper Series No. 1645*. Retrieved March 3, 2013, from http://www.jstor.org.libezp.utar.edu.my/stable/2118428

Johansen, S., & Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money. *Oxford Bulletin of Economics and Statistics, 52*, 169-210.

Landefeld, J. S., Seskin, E. P., & Fraumeni, B. M. (2008). Taking the Pulse of the Economy: Measuring GDP. *Journal of Economic Perspective, 22(2)*, 193-216.

Mankiw, G. (2011). The Market for Loanable Funds. In G. Mankiw, *The Principles of Macroeconomics* (pp. 268-276). Mason, Ohio: Cengage Learning.

McKinnon, R. I. (1993).*The Order of Economic Liberalization: Financial Control in the Transition to a Market Economy* (2nd ed.). Baltimore, Maryland: John Hopkins University Press.

Miller, R. L., & Benjamin, D. K. (2008). *The Economics of Macro Issues.* Pearson Addison Wesley.

Modigliani, F., & Brumberg, R. H. (1954). Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data. In F. Modigliani, *The Collected Essays of Franco Modigliani* (pp. 128-197). Cambridge, Massachusetts, London, England: The MIT Press.

Ozcan, K. M., Gunay, A., & Ertac, S. (2003). Determinants of Private Saving Behavior in Turkey. *Journal of Applied Economics*, 1405-1416.

Reinsdorf, M. B. (2005). Saving, Wealth, Investment, and the Current-Account Deficit. *Survey of Current Business, 85*(4), 3.

Ricardo, D. (1846). *Essays On The Funding System, - David Ricardo, The Works of David Ricardo (McCulloch ed.).*

Seater, J. J. (1993). Ricardian Equivalence. *Journal of Economic Literature*, 31, 142-190.