Modeling of Parameters Effective on Consumer's Behavior

Seyed Yahya Alavidehkordi

PhD of Business Administration Marketing, Florida International University, Florida

Abstract: From the target aspect, this research is considered as a research applied category, and from data compilation aspect, it is considered as a library category, because it is intended to explain the relationship between and calculation of the rate of correlation and coefficients of each independent variable (rate of inflation, rate of employment, rate of population and economic growth) and the behavior of the consumer in Iran. To compile data and information required for research, the method of library studies, documentary branch, and the information related to research variables, was used by reference to the annual reports of the World Bank. To find a meaningful relationship or absence of relationship pertinent to independent and dependent variables, the Pierson correlation coefficient test was conducted by use of SPSS software. To investigate stability of time series, the extended single radical Dickey-Fuller test was conducted by using E-Views software which is considered one of the most suitable tests for the stability of the variables. The calculations demonstrate that a meaningful and persistent exists between the independent variables (rate of population and economic growth) and dependent variables (consumer's behavior). [Seyed Yahya Alavidehkordi. **Modeling of Parameters Effective on Consumer's Behavior.** *Life Sci J* 2013;10(7s):859-865] (ISSN:1097-8135). http://www.lifesciencesite.com. 138

1. Introduction

Scientific researches demonstrate that financial policies can play an important role in the economic growth (Ghali, K.H., 2008). A workable financial system, delivers capital from the depositors to the loan seekers, and it directs the resources towards the productive and beneficial projects. The more the investment productivity, the more will be the rate of the economic growth (King, R.G., et al., 1993). Some intellectuals believe that the financial markets are the mastermind of the economic growth and the main focus of decision making, and should such markets face failure and collapse, performance of entire economic system will be damaged (Stiglitz, J, 1994). Financial policy in economy and political sciences benefits from the government revenue treasury (tax) and expenses (cost) to affect economy. Two main tools of financial policy are tax and government expenses. Changes in level and structure of government tax and expenses can affect general demand variables and economic activities level, resources allocation pattern, and income distribution in economy. Financial policy spotlights use of government budget to affect the economic activities.

Three major standpoints of financial policies stances is the neutral financial policy, and it will be implemented when the economy is in a balanced stance. Government expenses are entirely covered by tax incomes, and the budget result generally has a neutral effect on the level of economic activities. Expansionary financial policy includes surplus of governmental expenses against tax revenue, and it has been usually implemented during the recession period. A contraction financial policy happens when government's expenses are less than tax revenue, and it is usually committed to refund the government's debts. Yet, such definitions can be misleading, because even without any change in the expenses or taxation laws in the alternating fluctuations, the cause of economic cycles fluctuations of tax revenues and some kinds of government expenses, are not considered as a change in budget deficit status, but what is considered is a change in the policies. Thus, to meet the addressed definitions, "tax revenue" and "government expenses" are usually substituted by two expressions of "government's periodic adjusted expenses" and "periodic adjusted income tax". But, what supported the objective of preparing this paper is, study and analysis of the relationship or absence of relationship between these two and the consumer's behavior that is due to the ability to purchase.

2. Analysis of Literature of the Subject

In this section, the theoretical and research background are respectively presented. As it is understood from the subject of the research, the aim at conducting a research is to study and examine the relationship between the financial policies and the consumer's rotary. Thus, in the theoretical essentials of research, we will deal with definition of economic growth resulting from demand attraction due to consumer's behavior, national saving, family's individual consumption costs and other variables intended for the financial policies.

2.1. Theoretical Essentials

Based on definitions of national accounts, *Net National Saving at a Fixed Price* is calculated by deducting depreciation from gross national saving.

$$IRNNS = IRGNS - IRCCA$$

National Gross Saving per a Fixed Rate is resulted on the basis of definitions for national accounts, from sum of investment, change in store stock, commercial balance, and the net income from production factors abroad. Thus, the exchange relation is resulted as follows:

IRGNS = IRI + IRII + IRBOT + IRNFY + IRTOT

Families' Individual Consumption Costs: In addition to national accounting system, COICOP classification is used in three fields; family's budget plans, consumer's rate indices, and international appraisals on domestic gross production. Individual consumption costs consist of the following:
- All families' consumption expenses are defined as individual consumption (sections 1 to 12 of COICOP),
- All consumption costs of private institutes that give service to families, are also costs expended to the benefit of families (section 13 of COICOP classification) and it defines the costs of private institutes giving service to families.

Inflation Rate Index of Consumer's Cost is calculated by dividing the subtraction of this year and last year's forgoing index by value of the index of the earlier year of the concerned index:

IRINFCPI = [IRCPI – IRCPI (-1)] / IRCPI (-1)

Employment (a thousand people) in this equation is in effect supply of manpower. Supply of manpower in this equation is assumed as a function of nominal wage index for the industrial workshops and active population. Estimated coefficient of these two variables should be positive:

IREMP = IREMP (-1) + B (31041) * (IRWIND – IRWIND (-1) + B (31042) * IRPOPA + B (31043) * IRD66 + B (31044) * IRD76

Country's ***Total Population*** in each year is estimated as a regression of the earlier year population:
IRPOP = B (31020) + B (31021) * IRPOP (-1)

Economic Growth is considered the main symbol of governments' performance. Thus, the economists try to help policy makers in improving the economic growth by better and more precise recognition of dynamics and the factors effective in changes in this index. In the economic literature, accumulation of physical capital reserve is defined as an important factor to reach more production and productivity, and to establish a constant flow of increased income for the society. Production function should be used to find theoretical relation between investment and economic growth. The most prominent production function used in analysis of economic growth process, was used in the 40s by "Haroud & Dumar". The main assumption of this pattern is that the rate of production in each economic unit, including institution, industry or entire economy, is dependent on the rate of investment in that unit. Thus, if rate of production is shown by (Y) and the amount of capital by (K), then relation between production and capital will be based on the following:

Y = K/k

In which (k) is a constant figure and this relation is called the ratio of capital to production. By subtraction in the above relation and dividing both sides by production rate (Y), the relation between economic growth and investment variations can be found. The stages to find it are as follows:

$\Delta Y = \Delta K / k$
$g = \Delta Y / Y = (\Delta K / Y) * 1/k$

In which ΔK can be substituted by the rate of investment (I) which is in a balance state equal to saving rate (S). Thus, ($\Delta K/Y$) will be turned into (I/Y), and this relation will be equal to (S/Y). As (S/Y) is national saving rate (S), growth equation can be rephrased as follows:

Y = S/k

This means that the economic growth is equal to ratio of saving to production (Akbarian, R. & et al, 2009).

2.2. Research Background
In this section, the past studies made by the intellectuals on the present research or similar issues are presented. (Liang Q et al, 2006) Financial Development and Economic Growth, (Liu W.C. et al, 2006) The Role of Financial Development in Economic Growth, (Hao C, 2006) Development of Financial Intermediation and Economic Growth, (Folster S et al, 2001) Growth Effects of Government Expenditure and Taxation in Rich Countries, (Mitchell D, 2005) The Impact of Government Spending on Economic Growth, (Akbarian R et al, 2006) Analysis of Relation between Financial Market Development and Economic Growth with a Collective Approach, (Torky L, 2003) Development of Financial Markets and Its Impact on Economic Growth, (Kazerouni, Reza, 2003) Relation between Financial Development and Economic Growth, Iranian Experiences, (Naderi, Morteza, 2003) Financial Development and Economic Growth,

Events of Financial Crisis and the Reasons for Selection of a Proper Financial System.

3. Research Methodology

From purpose aspect, this research is an applied research, and from data compilation, this research is of a library category, because by use of econometric models we seek to explain the relation, and to calculate the rate of correlation and coefficients of each independent variable (financial policy), with the economic growth and inflation in Iran. To compile data and information required for the research, the method of library studies, documentary branch, and the information related to research variables by reference to annual reports of the Central Bank of Iran, from 1978 to 2006, have been used.

3.1. Research Hypotheses

In order to illustrate a research conceptual model, certain steps have been taken to compile data and calculations as mentioned below. First, all required data and statistics were deployed from the Central Bank of Iran's databank. Then, because the research model has two dependent variables, it was decided that the research model is evaluated by two separate models. To prepare research hypotheses, this question is raised that whether or not there is a meaningful relation between consumer's behavior within the scope of individual consumption expenditure of families and national saving as dependent variables and economic indices within the scope of inflation rate, employment rate, population rate, and economic growth as independent variables? To answer this question, the research assumptions are defined as follows:

- There is a meaningful relation between family individual expenditure and inflation rate.
- There is a meaningful relation between family individual expenditure and employment rate.
- There is a meaningful relation between family individual expenditure and population rate.
- There is a meaningful relation between family individual expenditure and economic growth.
- There is a meaningful relation between national saving and inflation rate.
- There is a meaningful relation between national saving and employment rate.
- There is a meaningful relation between national saving and population rate.
- There is a meaningful relation between national saving and economic growth.

3.2. Research Conceptual Model

The conceptual model of relation between independent variables of research and dependent variables is shown in figure No1.

Figure 1: Research Conceptual Model
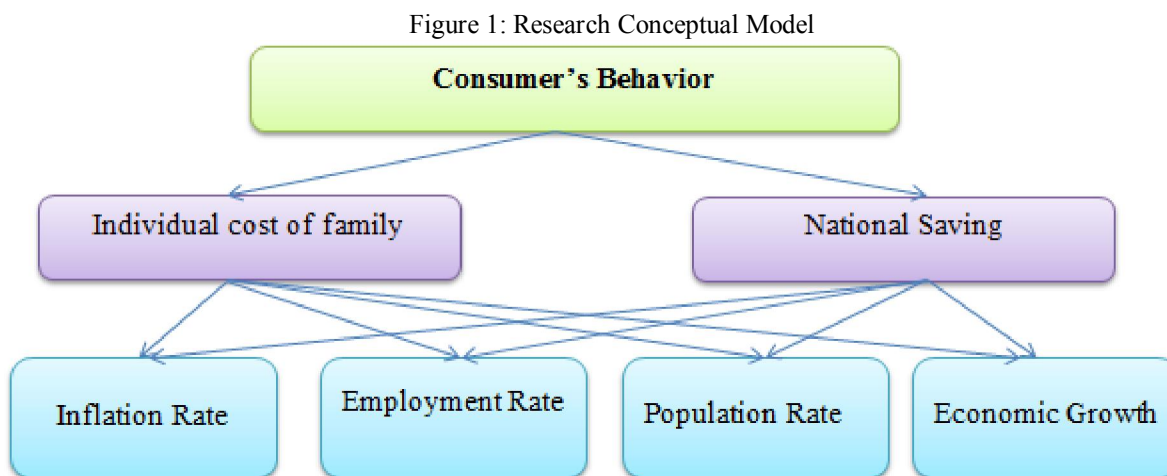
4. Research Methodology

To find a meaningful relationship or absence of relationship pertinent to independent and dependent variables, the Pierson correlation coefficient test is conducted by use of SPSS software to conduct calculations. To investigate stability of time series, the extended single radical Dickey-Fuller test is conducted by using E-Views software which is considered one of the most suitable tests for the stability of the variables conducted by use of single radical Dickey-Fuller for the research variables.

4.1. Pierson's Correlation Coefficient

To find a meaningful relation between the hypotheses and correlation coefficients, Pierson's Test was used. The results of the test are shown in Tables No. 1 and 2 below.

Table No.1: Results of Pierson's Correlation Coefficient Test (Individual cost of family)

Test Result	Sig	Correlation Coefficient	Independent Variables
Absence of meaningful Relation	0.118	- 0.297	Individual cost of family Inflation Rate
Absence of meaningful Relation	0.031	- 0.401	Individual cost of family Employment Rate
Existence of meaningful relation in straight direction	0.000	0.749	Individual cost of family Population Rate
Existence of meaningful relation in straight direction	0.000	0.943	Individual cost of family Economic Growth

As it is noted, there is no meaningful relation between the variables of inflation and employment rates and the consumer's behavior (individual cost of family), and accordingly the following are concluded for the research hypotheses:
- There is no meaningful relation between individual cost of family and inflation rate.
- There is no meaningful relation between individual cost of family and employment rate.
- There is a meaningful relation between individual cost of family and population rate.
- There is a meaningful relation between individual cost of family and economic growth.

Table No.2: Results of Pierson's Correlation Coefficient Test (National Saving)

Test Result	Sig	Correlation Coefficient	Independent Variables
Existence of meaningful relation in straight direction	0.120	- 0.295	National Saving Inflation Rate
Existence of meaningful relation in straight direction	0.061	- 0.353	National Saving Employment Rate
Existence of meaningful relation in straight direction	0.000	0.700	National Saving Population Rate
Existence of meaningful relation in straight direction	0.000	0.915	National Saving Economic Growth

As it is noted, there is no meaningful relation between the variables of inflation and employment rates and the consumer's behavior (individual cost of family), and accordingly the following are concluded for the research hypotheses:
- There is no meaningful relation between national saving and inflation rate.
- There is no meaningful relation between national saving and employment rate.
- There is a meaningful relation between national saving and population rate.
- There is a meaningful relation between national saving and economic growth.

Consequently, it can be said that there is a straight and meaningful relation between the consumer's behavior within the scope of individual cost of family and national saving, and the population rate and economic growth; and such relation is assured by 99%.

4.2. Ordinary Least Squares Test (OLS)
This test was conducted separately for two dependent variables of family individual expenditure and national saving.

4.3. Dickey- Fuller's Single Radical Stability Test
Analyses made show that in many economic time series the variables are instable. Thus, in accordance with the collectivity theory in new econometrics, it is necessary to research on their stability or instability. Due to elongation of the process of this test by E-Views software, the results are shown in accumulation in Table No. 3 below.

Table No.3: Results of Dickey-Fuller single radical stability test (individual cost of family)

Grade	Result	Mac Kinon Critical Value	Dickey-Fuller Statistics	Variable
I (2)	Stable	-3.724070	-5.363871	D (Individual Cost of Family)
I (2)	Stable	-3.769597	-5.363871	D (National Saving)
I (1)	Stable	-3.711457	-5.363871	D (Inflation)
I (0)	Stable	-3.6998741	-5.246651	D (Employment)
I (0)	Stable	-3.711457	-5.321557	D (Population)
I (2)	Stable	-3.737853	-3.898161	D (Economic Growth)

Results of econometric model calculations and E-Views software for consumer's behavior variable (individual cost of family and national saving) are shown respectively in Tables No. 4 and 5 below.

Table 4: Results of Modeling the Individual Cost of Family

Dependent Variable: Individual cost of family				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Inflation	-1231.714	308.4053	-3.993817	0.0007
Employment	-12202.23	2602.881	-4.687971	0.0001
Population	0.013699	0.006908	1.982997	0.0613
Economic Growth	4.001937	0.625741	6.395518	0.0000
C	-2183855	335382.7	-6.511532	0.0000
R-squared	0.995450	Mean dependent var		230722.4
Adjusted R-squared	0.993630	S.D. dependent var		356012.2
S.E. of regression	28414.52	Akaike info criterion		23.59631
Sum squared resid	1.61E+10	Schwarz criterion		24.02065
Log likelihood	-333.1466	Hannan-Quinn criter.		23.72921
F-statistic	546.9363	Durbin-Watson stat		1.857810
Prob (F-statistic)	0.000000			

T-Statistics and variables coefficients demonstrate that the variables of population rate and economic growth affect consumer's behavior (individual cost of family), such that by increase in population rate and economic growth for one unit, consumer's behavior will be increased by coefficient of 0.013699 and 4.001937 units. Value of R-squared is equal to 0.995450, and it indicates that 0.99% of dependent variable variations (consumer's behavior) are explained by independent variables of the model, and this is suggestive of the high explanatory nature of the model. Durbin-Watson statistics of the model was estimated at 1.857810, and it ranges between 1.75 and 2.25, which rejects the hypothesis of autocorrelation between the model components. As F statistics of the model is high (546.9363), it indicates that the entire regression is meaningful.

T-Statistics and variables coefficients demonstrate that the variables of population rate and economic growth affect consumer's behavior (national saving), such that by increase in population rate and economic growth for one unit, consumer's behavior will be increased by coefficient of 0.047673 and 0.753161 units. Value of R-squared is equal to 0.979927, and it indicates that 0.99% of dependent variable variations (consumer's behavior) are explained by independent variables of the model, and this is suggestive of the high explanatory nature of the model. Durbin-Watson statistics of the model was estimated at 2.199690, and it ranges between 1.75 and 2.25, which rejects the hypothesis of autocorrelation between the model components. As F statistics of the model is high (162.7282), it indicates that the entire regression is meaningful.

Table 5: Results of Modeling the National Saving

Dependent Variable: National saving				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Inflation	-374.5296	649.2153	-3.993817	0.0002
Employment	-1540.456	5174.970	-0.297674	0.0004
Population	0.047673	0.036611	1.302166	0.0057
Economic Growth	0.753161	0.561167	1.342134	0.0093
C	-3057386	2645706	-1.155603	0.2615
R-squared	0.979927	Mean dependent var		103664.8
Adjusted R-squared	0.973905	S.D. dependent var		175194.6
S.E. of regression	28300.70	Akaike info criterion		23.55757
Sum squared resid	1.60E+10	Schwarz criterion		23.89353
Log likelihood	-311.0273	Hannan-Quinn criter.		23.65747
F-statistic	162.7282	Durbin-Watson stat		2.199690
Prob (F-statistic)	0.000000			

Conclusion

Calculations based on Pierson correlation coefficient indicate that there is meaningful relation between the dependent variable (consumer's behavior) and the independent variable (population rate and economic growth). The results of the ordinary least squares have also approved the calculations by Pierson's correlation coefficient test, and it demonstrates that the variables of population and economic growth affect consumer's behavior. Accordingly it can be said that the two variables of population rate and economic growth are factors that a government can shape consumers' behavior by controlling them, and leading them by adopting persuasive policies towards consumption optimum control (family cost) and directing the saving towards capital markets and stock exchange. To this end, and to prepare the required planning and budget for the economic programs, below regression models are given to find weights of each of variables having a meaningful relation with consumer. Based on the data on problem calculation model, and by using correlation coefficients resulted from calculations of E-Views software, the regression model of consumer's behavioral relations with the research independent variables is:

θ_1 = C + Population + Economic growth = -2183855 + 0.013699 + 4.001937
(-6.5115)   (1.9830)   (6.3955)

Where θ_1 is indicative of consumer's behavior (individual cost of family), C is the value of width from the reference point, and the figures inside parentheses are the figures of t-Statistics.

θ_2 = C + Population + Economic growth = -3057386 + 0.047673 + 0.753161
(-1.1556)   (1.3022)   (1.3421)

Where θ_2 is indicative of consumer's behavior (national saving), C is the value of width from the reference point, and the figures inside parentheses are the figures of t-Statistics.
The results of this research demonstrate that:

Suggestion

The process of calculating the model was performed based on the data under current conditions of the country and reliable and accessible sources. It is suggested that by using the process of research in this Paper, the researchers and scholars not the followings in their future researchers:
1. Create econometric models based on calculations of other economic models and patterns such as government's complete monopoly, absolute freedom of economy …..etc. Meanwhile, compare the obtained results against each other, and present the most suitable model for the analysis of consumer's behavior.

2. Compare results of Paper model with those of other countries of similar economy.

3. Add other variables to the model and recalculate and create more complete models of consumer.

Reference

1. Akbarian, Reza, Heidaripour, Mohsen, 2009, Analysis of Impact of Financial Market Development on the Economic Growth in Iran during the years 1966 – 2007, Journal of Economic Research, Issue No.3, Pages 43 – 63.

2. Akbarian, Reza, Nejati, Mehdi, 2006, Analysis of Relation between Financial Markets Development and Economic Growth, with a Collective Approach; Monetary & Banking Research Center, Central Bank of IRI.

3. Folster, Stefan, Magnus, Henrekson, 2001, "Growth Effects of Government Expenditure and Taxation in Rich Countries", European Economic Review, Vol.45, No.8, pp.1501-1520.

4. Ghali, K. H., 2008, Financial Development and Economic Growth, Review of Development Economics, 3 Issue 3, 310-322.

5. Hao, C., "Development of Financial Intermediation and Economic Growth: The Chinese Experience", China Economic Review, Vol. 17, (2006): 347-362.

6. Harrod, Roy F. (1939), 'An Essay in Dynamic Theory' Economic Journal NO 49, PP: 14–33

7. Kazerouni, Reza, 2003, Relation between Financial Development and Economic Growth – Iranian Experience, Monetary & Banking Research Center, Central Bank of IRI.

8. King, Robert G. and Levine, Ross, 1993, Financial Intermediation and Economic Development, Colin Mayer and Xaviervives, London: Centre for Economic Policy Research, 89-156.

9. Liang, Q. & J. Z. Teng, 2006, "Financial Development and Economic Growth, Evidence from China"., China Economic Review, Vol. 17, pp. 395-411.

10. Liu, W. C. & C. M. Hsu., 2006 "The Role of Financial Development in Economic Growth: The Experiences of Taiwan, Korea, and Japan"., Journal of Asian Economics, Vol. 17, pp. 667-690.

11. Mitchell, Daniel, 2005, "The Impact of Government Spending on Economic Growth", Federal Bank, Working Paper, No.345.

12. Naderi, Morteza, 2003, Financial Development and Economic Growth, Financial Crisis Events and Reasons for Selection of a Proper Financial System, Monetary & Banking Research Center, Central Bank of IRI.

13. Stiglitz, J, 1994, the Role of the State in Financial Market, Supplement to World Bank Economic Review and World Bank Research Observer, 19-27.

14. Torki, Leila, 2003, Financial Markets Development and Its Impact on Economic Growth, Dissertation, Shiraz University.

6/11/2013