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Dynamic Relationship between Income and Consumption: A Time Series Analysis of Spain

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Abstract:
This study examined the household and government consumption with income separately both in short and long run.The data is collected from the WDI from 1960 to 2010 of spain. Analysis is done by using the co integration technique and error correction model. The results of the study demonstrate that household consumption is more than that of income in short run but in long run with the adjustment rate of 7% the consumption is less than income. In contrast ,the expenditures of government and consumption is more than that of its income in long run and vice versa. The reason for the more expenditures in long run is due to the debt financing.
Keywords: Income, Consumption, Co integration, Error correction model, Spain

1.INTRODUCTION

Consumption is one of the main concepts both at household and economic level. Household consumption is the spending of income to satisfy their needs and wants. All durable and nondurable goods come under the category of the household consumption. For the purpose of fiscal planning the consumption expenditures is considered because it is one of the central components of GDP and policy makers review that how consumption responds to fluctuations in income. In macroeconomics, aggregate consumption is the planned expenditure and it depends upon the real income level. Keynes (1946) discussed basic points about disposable income and consumption and provide the absolute income hypothesis. First of all consumption depends upon disposable income. Second disposable income and consumption have positive relation i.e. consumption increases with an increase in income. And consumption changes with a less amount than the change in income. This relationship can be shown by the following function.

Ct=Co + (MPC) (Yd)

C=consumption

Co = autonomous consumption which is independent of income.

MPC= marginal propensity to consume.

Yd= disposable income.

MPC lies between 0 and 1. This means with increase in income consumption increases and with decrease in income consumption decreases. Permanent income hypothesis (PIH) is a momentous way used to prospect this relationship. This theory says that consumption and income should have a long run relationship. The criticism on the Keynesian model is done by Kuznets (1952) and his findings confirmed the existence of bth long term and short term consumption function. In the short run the Keynesian function of consumption provides the true results but in the long run it has average propensity to consume (Mankiw, 2010). Another theory that is developed by James Duesenberry (1949) emphasizes that consumption s not only the function of the absolute income but also verified the position in income distribution. Life cycle income hypotheis is developed by the Modigliani and Brumberg (1954) that consumption not only depends upon the current level of income but also on the future earnings and wealth. Many other researchers criticized the Keynesian theory and this lead to the emergence of Friedman's (1957) permanent income hypothesis and this states that there are both short-term and lasting fluctuations in income that individuals face but consumption does not respond to temporary income changes. For the assessment permanent income hypothesis a number of econometric techniques have been used. Hall (1978) and many other researchers have analyzed the Income and consumption for error correction model in a time series framework. The facts provided both from theoretical and practical basis were the confirmation for the error correction model of consumption actions: Consumers make plans which may not be fulfilled and then they make plans for next periods to construct back a part of error that connecting consumption and income. Engle and Granger (1987) first confirmed that whether income and consumption are actually I (1) or not. They tested the Fuller (1976) and Dickey and Fuller (1979) study and they also analyzed by running many other co integration tests and they concluded that these variables were co integrated. In this paper, WDI data for Spain from1960 to 2010 are used to analyze a very important component of demand called aggregate consumption. In it we'll find short and long run relationship between income and consumption of Spain.

This study has been divided in the following sub sections:
Section II will present the literature review.
Section III will explain the data and methodology that will be used in the estimation of relationship between consumption and income.
Section IV will present the result and will explain the short and long term relationship between income and consumption.
The final section will give conclusion

2. REVIEW OF EMPIRICAL FINDINGS

Santos (2013) tested the Keynesian absolute income hypothesis in Nigeria by considering the data for the period of 1970-2011.Least square model was used for the analysis of both MPC and APC. Results of the study reveal that APC decreased with an increase in income but in long run MPC is not stable.

Ofwona (2013) investigated the consumption function by using the absolute income hypothesis. Data was analyzed by using the ordinary least square for the period of 1992 to 2011.The relation between the household consumption and income was analyzed and results showed that in Kenya the consumption function is determined by the Absolute income hypothesis.

Chee-KeongChoong, Evan Lau and Xiao-HuiChye (2011) studied the association between consumption of energy and GDP by using the panel estimation for seventeen Asian countries .They found that the variables were in a stationary fashion in their first differences or were in an $I(1)$ process. Findings of the study demonstrated the long-run equilibrium association among the variables. Energy consumption variable had a positive sign which indicated that an increase in GDP will result in more use of energy.

Granger causality test provided the evidence of unidirectional causal relationship in succession of energy consumption to GDP. So, in the short run economic growth follows the energy consumption and the economies of these seventeen Asian countries are dependent on energy. Moreover, GDP caused the energy consumption in long run for these countries .So, they concluded that use of energy is outcome of economic activity not only being the important part of the production. They also declared that changing the energy conservation policies and implementing these in short run may direct the temporary but negatively significant impact on the economic growth. However, economic development in the Asian countries is less dependent on energy in the long-run. Developing countries may benefit from their developed nations counterparts, where they may fetch advanced technology and capital to facilitate the proficient use of energy while reducing energy consumption and carbon emissions. They further said that efforts must be made in pursuit of more environmentally-friendly and resource-saving societies to promote energy efficiency in the face of concern about the effects of global warming for the Asian region. With the recent experience of unprecedented high levels of energy prices, depleting energy sources and international initiatives, the commitment needs to be established to facilitate successful energy conservation policies.

Loganathan, Nanthakumar and Subramaniam (2010) investigated that economic growth and energy consumption are co integrated in Malaysia both in short and long run. They used the three distinctive empirical techniques OLS-EG, DOLS, ARDL and ECM and found that there is bidirectional causal relation between both Economic growth and GDP variables used in their study. So, on the whole the consumption level of energy in Malaysia is on sustainable boundaries with comparable high speed of adjustment from disequilibrium level following short run shocks. The Malaysian energy sector is still dependent on non-renewable resources such as coal, fossil fuels and natural gas as major source of energy generation from past few decades until now. These sources of energy always face unstable price transmission in the open economy. Therefore, fuel price crises may harm the sustainable growth of Malaysia's economy and as a consequent it may reflect on the energy production in future because the per unit energy cost will increase and burden the government to produce energy for the citizen. So, they also recommended that the Malaysian government should consider many other resources of the energy production like solar, nuclear etc instead of using only fuel as a main source of energy generation.

Jiri Slacalek (2004) examined the verification of co-integration by connecting (i) consumption, labor income and wealth (ii) consumption and disposable income. He used the international data by taking 26 different countries as a sample in his study and he found that there is a little stable co integration between consumption, labor income and wealth. He found the evidence for the rejection of the stable co integration among three variables for at least four of six countries as well as for the U.S also. The results for the co integration between consumption and disposable income are a bit unclear. Out of 26 countries there was no proof for the stable co integration in ten countries and it existed only in four countries. For the other twelve countries he did not find any clear evidence for the stable co integration due to ambiguity of data. Furthermore, he found the proof of the co integration between disposable income and consumption for the countries that have stationary saving rates like Australia and Portugal. In his study he also suggested that if there is absence of stable co integration relationship, the item like marginal propensity to consume is of less importance to be investigated by the co integration technique. Moreover, the co integration results of the study for consumption and disposable income

granted the falsification of the permanent income hypothesis.

Fuchu Jinusednational examined the data from twelve OECD countries to check the non stationarity of consumption and disposable income. By using the panel data they also studied the co integration between these two variables. The results of the study explained that tests accepted the unit root hypothesis for either consumption and disposable income. He concluded that when co integration tests are performed on individual time series, one cannot reject the null hypothesis that consumption and disposable income are not co integrated. In comparison, when the data are used as a panel, the evidence strongly rejects the null hypothesis of no cointegration. he therefore concluded that the results from individual countries were due to small sample size, and that consumption and disposable income are indeed co integrated as implied by the rational expectation-permanent income hypothesis.

Soytas, U., Sari, R., and Ozdemir, O.,(2001)examined the causal relationship between energy consumption and GDP in Turkey using annual time-series data for the 1960-95. They used Johansen-Juselius Co integration Methodology and Vector Error Correction Modeling to analyze the relationship for Turkey. The results indicated a unidirectional causality running from energy consumption to GDP. They concluded that energy conservation may harm economic growth in the long run.

3. DATA AND METHODOLOGY

All data is collected from WDI from 1960 to 2010 for Spain. Aggregate consumption is taken as final consumption expenditure (FCE) which is expenditure on goods and services purchased from domestic and foreign market. Final consumption expenditure has been further divided into government consumption expenditure(GCE) and household consumption expenditure(HCE). And the relationship of them with income is separately analyzed.

A long run relationship is assumed to exist between income and aggregate consumption. Three vectors of variables are thus formed (ln FCE, ln GDP), (ln HCE, ln GDP) and (ln GCE, ln GDP) for which co integration relation has to be found.

3.1 Test for Stationarity

Unit root test is used to check whether data is stationary or non stationary. Economic theory suggests that this test is the initial test when finding long run relationship among variables. The concept behind this relationship is that certain economic variables should not move independent of each other. Instead they should move in such a way that they do not move far from one another. They should always be bound to one another

3.2 Johanson cointegration test

Granger who presented this theory of cointegration was of the view that if two variables are non stationary that means are integrated of order 1 and have co integration relation among them then the dynamic relation can be presented by error correction model. The concept of error correction model has been presented by Philips and is applied by Sargan. But actual popularity to this error correction model has been given by David Hendry who used it in his so many models.

For estimation of johansen co integration we used likelihood test which gives trace and eigen value to check the rank of the model. Rank represents number of cointigrated equations in a matrix. R should always be less than total number of equations. And if the long run relationship is present it should not be zero. After this dynamic error correction model is estimated which has a disequilibrium term and it's coefficient shows rate of adjustment and is called adjustment parameter.

4.EMPIRIAL RESULTS

4.1. Stationarity of Data

Data has been converted into log form. This makes data less variable than without log. First of all unit root is applied to check stationarity of data. Test is applied on level as well as on first difference. Results are given in the table given below which show that data is not stationary at level. They become stationary after applying first difference. This means data is stationary of order one or data is I(1).

Table 1. ADF test for unit root

variables	At Level		At First difference	
	ADF	Lag length	ADF	Lag length
Ln GDP	-1.850	1	-3.136*	1
Ln*FCE*				
Ln*HCE*	-1.515	1	-3.143*	1
Ln *GCE*				
	-1.654	1	-3.155*	1
	-0.2627	2	-3.600**	2
5% Critical value	2.92			

4.2 Cointegration Analysis

Second step of methodology is cointegration. There are two parts of this step to find cointegration and to find long run parameter. For cointegration johansen's log likelihood test is used which is based on trace and eigen values. Results of johansen's cointigration are given in the table given below. The results show that there is a long run relation between (ln*FCEt*ln*GDP*), (ln*HCEt* , ln*GDP*) and (ln*GCEt* , ln*GDP*)

Thus equations become

lnFCEt= π1FECt-1+ πlnGDPt-1+μt

lnHCEt= π1HECt-1+ πlnGDPt-1+μt

lnGCEt= π1GECt-1+ πlnGDPt-1+μt

Table 2

Variables	Ho	H1	prob	Critical value	trace	Eigen value	Normalised cointegrating vector
(ln*FCEt*, ln*GDP*)	*r* =0	*r* =1	[0.000]**	0.05	23.235	0.37167	(1 , -0.92403)
(ln*HCEt* , ln*GDP*)	*r* =0	*r* =1	[0.000] **	0.05	41.318	0.56236	(1 , -0.91433)
(ln*GCEt* , ln*GDP*)	*r* =0	*r* =1	[0.030] *	0.05	4.6874	0.089488	(1, -1.1553)

Since probability at r=0 is less than 0.05 for all equations so we reject Ho which is no cointegration and accept the alternative which means there is cointigration and there is long run relationship between consumption and income.The estimated long run results are as follows:

lnFCEt= 0.92403lnGDPt-1+μt

this means that 100% increase in GDP will increase full consumption expenditure by 92%

which shows that MPC is less than 1 people don't consume all the income.

lnHCEt= 0.91433lnGDPt-1+μt

this equation shows almost the same thing that 100% increase in GDP will increase household consumption expenditure by 91%

lnGCEt= 1.1553lnGDPt-1+μt

whereas in the case of government consumptiont situation is different. Our results show that increase in income increases consumption by more than 100%. It's because government's expenditures are not according to income. It makes expenditure list first and then decides how much it has to earn. And the rest is fulfilled by either money printing or debt accumulation.That's why many governments are under heavy debt burden(both domestic and foreign).

4.3.Error correction model

An error correction term is obtained from the long run estimated equation. Error correction term shows with which rate system converges and errors are corrected with time.It is also called the short run analysis. The function is thus estimated:

Table 3

ECM	
ΔlnFCEt= 0.00279170 +0.0575790*et*-1+0.852694 ΔlnGDP*t*-1 (2.77) (.268) (15.6)	R=0.86DW=1.97 F=151.9
ΔlnHCEt= -0.000784803 -0.0752925*et*-1+1.03138 ΔlnGDP*t*-1 (-0.800) (-1.09) (19.8)	R=0.89DW=1.7 F=202.9
ΔlnGCEt=0.0142701 +0.308246*et*-1+0.286708ΔlnGDP*t*-1 (7.25) (2.15) (2.78)	R=0.201DW=1.91 F=5.97

Results of ECM for HCE show the value of disequilibrium term as -.0752 which shows income is greater than consumption and in the long run consumption should increase. The disequilibrium term shows the adjustment rare with which data will converge and here that rate is 7% each year.

Results of ECM for HCE show the value of disequilibrium term as +0.308246 which shows consumption is greater than income and in the long run government consumption expenditures should decrease to reach equilibrium. The disequilibrium term shows the adjustment rare with which data will converge and here that rate is 30% each year.

Results of ECM for FCE show the value of disequilibrium term as +0.0575790 which shows consumption is greater than income and in the long run overall consumption expenditures should decrease to reach equilibrium. The disequilibrium term shows the adjustment rare with which data will converge and here that rate is 5% each year.

5.CONCLSION

The aim of this paper is to estimate the dynamic relationship between final consumption expenditure and income. And then of household consumption expenditure and government consumption expenditure with income one by one, separately. The co integration method and error correction model is used in the analysis. Results show that in short run coefficient of household consumption is greater than income but in long run consumption is less than income and adjustment rate is 7%. On the other hand government expenditures in the long run are greater than income and that's because govt. finances its expenditure by debt accumulation along with its income. And for economic stability govt. should decrease its expenditures to its income level or should find ways of generating income other than debt.

Refrences

Alimi R. Santos., (2013) "*Keynes' Absolute Income Hypothesis and Kuznets Paradox*", MPRA Paper No. 49310

Duesenberry, J.S.,(1949) . "*Income, Saving and the Theory of Consumer Behavior"* , Harvard University Press, Cambridge, Mass.

Engle, R.F. and C.W. Granger., (1987). "*Co-Integration and Error Correction: Representation, Estimation, and Testing*," *Econometrica ,* 55(2), 251–76.

Evan Lau & Xiao-Hui Chye & Chee-Keong Choong, 2011."*Energy-Growth Causality: Asian Countries Revisited*, "International Journal of Energy Economics and Policy, Econjournals, vol. 1(4), pages 140-149

Friedman, M., (1957)." *A Theory of the Consumption Function"*, National Bureau of Economic Research, Princeton, NJ.

Hall, Robert E.,(1978) *"Stochastic Implications of the Life Cycle—Permanent Income Hypothesis: Theory and Evidence."* Journal of Political Economy 86 pp 971—987

Kuznets, Simon.,(1952), "*Long Term Changes In The National Income Of The United States Of America Since 1870"*, Review of Income and Wealth, 2(1): 29-241

Loganathan, N, and Subramaniam., (2010). *"Dynamic cointegration link between energy consumption and economic performance: empirical evidence from Malaysia",* International Journal of Trade, Economics and Finance, vol.1, pp. 261-267.

Mankiw, Gregory, N.,(2010)*, "Makroekonomi"*, Çev.Ömer Faruk Çoklak, EfilYayınevi, Ankara.

Modigliani, Franco, and Richard H. Brumberg.,(1954) "*Utility Analysis and The Consumption Function: an Interpretation of Cross-section Data"*, in Kenneth K. Kurihara, ed., Post- Keynesian Economics, New Brunswick, NJ. Rutgers University Press. pp 388–436.

Ofwona, Alice C., (2013). "*An Estimation of the Consumption Function for Kenya Using Keynes' Absolute Income Hypothesis for the Period 1992- 2011"*, Journal of Emerging Trends in Economics and Management Sciences (JETEMS), 4(1): 103-105.

Slacalek, Jiri,.(2004), "*How Large Are Housing And Financial Health Effects: A New Approach",* Journal of Money, Credit and Banking, 43(1), 55-79

Soytas, Ugur, Ramazan Sari, and Ozlem Ozdemir,.(2001). "*Energy consumption and GDP relation in Turkey: a cointegration and vector error correction analysis. Economies and business in transition": Facilitating competitiveness and change in the global environment proceedings* (2001): 838-844.

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