AN ANALYSIS OF HOUSEHOLD CONSUMPTION EXPENDITURES IN EA-18

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Abstract
Constituting about two thirds of the gross domestic product, household consumption expenditures are a significant financial planning tool. Household consumption expenditures are also considered a primary indicator of economic-wellbeing. Therefore, it has an important place both in macroeconomic theory and empirical studies carried out in this field. The consumption function often referred to as the relationship between income and consumption has taken place in economic literature since Keynesian General Theory. Consumption theories analyzed by Keynes’ Absolute Income Hypothesis, Friedman’s Permanent Income Hypothesis, Modigliani, Ando and Brumberg’s Life Cycle Income Hypothesis and Dusenberry’s Relative Income Hypothesis. This study aims to analyze the household consumption expenditure in EA-18. Panel Data model in this study covers the data between the years of 2000-2012. Gross domestic product (GDP) is used as a proxy for income. The data in terms of dollar are constant according to the base year of 2005 and have been taken from World Development Indicators Data Base.

Keywords: Household Consumption Expenditures, GDP, Consumption Theories

Introduction
Consumption is an important concept in terms of economy and many social sciences. Household consumption expenditures consist of the market prices of all goods and services purchased by households to satisfy their needs and wants. It includes all durable and nondurable goods such as cars, household washing machines, television etc. Household consumption expenditures excludes purchases of residences but includes owner-occupied
residences imputed rent (World Bank). There are household final consumption expenditure is typically the largest constituent of final uses of GDP, representing in general around 60% of GDP. It is therefore an essential variable for economic analysis of aggregate demand (OECD, 2009).

In macroeconomic theory, aggregate demand is considered as aggregate planned expenditure and actual expenditure is equal to output. During a business cycle, output fluctuates around its natural level. The key issue is the reciprocal relationship between output and expenditure (Dornbush,Fisher,Startz, 2010:237). According to Keynesian model, planned real expenditure depends on real income and government expenditures positively, on real interest rate and taxes negatively (Romer, 2001:219-220). Household consumption expenditures, investment, public expenditures and net export are the components of GDP. Due to the high share in GDP, consumption expenditures is taken into account in macroeconomic policies for fiscal planning. Policy makers try to predict how the consumers will behave in the face of income fluctuations. In terms of consumers, consumption phenomenon requires a decision-making process. For the reason that, consumption function reveals a behavioral relationship in macroeconomics.

This study aims to estimate the consumption function of EA-18 with the data for the years of 2000-2012. The method used in the study is Panel Data. In the first part of the study, the theoretical framework will be discussed. In the second part, the relevant literature survey will be mentioned. Third part will provide some space to the empirical model and finally the last part will present the conclusions.

**Theoretical Framework**

In Keynesian model, current real income is the primary determinant of consumption and the relationship between income and consumption is determined by Absolute Income Hypothesis. According to Keynes interest rate as one of the explanatory variables of consumption have no effect on consumption decisions due to the reason that income and substitution effect of interest rate eliminate each other. In AIH, consumers take their decisions by taking into account the current disposable income and consumption is an increasing function of the real disposable income. As the disposable income increases, so will the consumption expenditures, but it will lead to a decreasing proportion of income. (Keynes, 1936:96-97).

The first objection to Keynesian Theory came from Kuznets (1952), who analyzed the long run relationship between consumption and income in US and he found contradictory results with Keynes. According to the results of his study, consumption does not decline as income increases. These findings revealed the existence of short run and long run consumption
functions. In the short run, Keynesian consumption function gives accurate results but in the long run consumption function has a constant average propensity to consume (Mankiw, 2010:516). During the period of a business cycle or in the short run, because of the fluctuations in income, marginal propensity to consume is smaller than average propensity to consume as Keynes indicated. But in the long run average propensity to consume is constant and equals to marginal propensity to consume (Branson, 1995:222-223). Economists have attended to explain how these two different consumption function to be compatible each other (Mankiw, 2010:516).

Relative Income Hypothesis developed by James Duesenberry (1949), states that consumption depends not only on absolute income but also on relative consumption patterns determined by the position in income distribution. (Duesenberry, 1949: 3). The other consumption theories put forth later also directed criticism against the Absolute Income Hypothesis of Keynes and they developed Permanent Income Hypothesis and Life Cycle Income Hypothesis. According to Permanent Income Hypothesis developed by M. Friedman (1957), individuals are faced with both temporary and permanent fluctuations in income. But consumption does not react to changes in temporary income. Because individuals seek to smooth consumption. Life Cycle Income Hypothesis developed by F. Modigliani, A. Ando and R. Brumberg, the consumer decisions do not only depend on the current real income, but also the weighted average of expected future income and the wealth. In the model saving and borrowing are used to smooth consumption over the life cycle (Dornbush, et al., 2010: 393).

When the consumption decisions examined within the framework of rational expectations, different results arises. According to Hall’s (1978) Rational Expectations Theory, consumers want to smooth consumption over time and they use all available information about future income. Since the consumers receive the consumption decisions by using all the information, only unpredictable things would change their consumption. For this reason, consumption follows a random walk depending on the rational expectations error term (Foote, 2010: 58-60). Recent theoretical studies reveal that some consumers sensitive to current income. The reason for excess sensitivity to current income is explained by liquidity constraints approach. According to Flavin’s (1984) approach, individuals avoid from borrowing enough to smooth their consumption because of the liquidity constraints. In respect to this, current income is decisive on consumption (Dornbush, et al., 1994: 324).

**Review of Literature**

Alimi R. Santos (2013), investigates the relationship between consumption expenditure and income according to Keynes’ Absolute Income
Hypothesis (AIH) in Nigeria. The model was tested by ordinary least squares for the period of 1970-2011. In the study MPC and APC were estimated both in the short and long run. Results show that as income increases, the average propensity to consume is reduced as Keynes indicated. But in the long run although MPC is less than one it is not stable.

Alice C. Ofwona (2013), determined a consumption function for Kenya for the period 1992 to 2011 by using Keynes’s Absolute Income Hypothesis. In the study the relation between total household consumption expenditure and total income were analyzed with the method of ordinary least square. The results showed that consumption is determined by income in Kenya in accordance with AIH.

Akekere, J., Yousuo, P.O.J. (2012), investigated the effect of income changes on private consumption expenditure in Nigeria by using the Ordinary Least Square simple regression analysis for the years of 1981-2010. Results revealed that there exists positive impact of Gross Domestic Product on Private Consumption Expenditure with a slope of 0.6708253 and it explains 98.4% of private consumption expenditure.

Е. Р. Генчев, (2012), investigated the relationship between income and consumption in Bulgaria and Russia over the period 1990-2010 by using cointegration model. The study put forth that there exist positive and significant long run relationship between GNI and consumptions for Bulgaria and Russia.

Mishra, P.K. (2011), investigated the relationship between real consumption expenditure and economic growth in India with the cointegration test and the vector error correction regression for the years of 1950-51 to 2008-09. Results indicate that there is long-run equilibrium relationship among variables. According to the results of causality test in the error correction model, it has been found that there is unidirectional causal relationship from real private consumption expenditure to economic growth in the long-run. But in the short run applied Granger causality test indicated that there is no causality between them.

Sakib-Bin-Amin (2011), investigated the causal relationship between consumption expenditure and economic growth in Bangladesh using annual data from 1976-2009. The method used in the study is Johansen and ARDL cointegration tests. The results put forth that there is cointegration between consumption expenditure and economic growth in the long run. Granger causality test used in the study, revealed a long run unidirectional causal relationship running from economic growth to consumption expenditure.

Nwabueze Joy Chioma (2009), investigated the casual relationship between gross domestic product and personal consumption expenditure with regression analysis by using the data of Nigeria for the years of 1994 – 2007. The results indicated that an increase in gross domestic product has no
significant effect on the personal consumption expenditure of Nigeria and the gross domestic product explained about 3.5% of the personal consumption expenditure of Nigeria.

Guisan (2004) revealed the causal relationship between real consumption and real GDP in Mexico and United States by using several tests of Granger Causality, Modified Granger Causality, Engle-Granger Cointegration and Hausman. Granger Causality test put forth that there is no causality in Mexico but there is bilateral causality in US. Modified Granger Causality indicated that there is bidirectional relation in both country. According to Engle-Granger Cointegration, there is cointegrated relationship between consumption and GDP in the US, but the results for the case of Mexico is uncertain.

**Data, Methodology and Empirical Findings**

In this part of the study, the relationship between household consumption expenditures of EA-18 region countries (Austria, Belgium, Cyprus, Estonia, French, Finland, Germany, Latvia, Luxemburg, Malta, Holland, Slovakia, Ireland, Greece, Portuguese, Spain) and GDP is examined. The data set of household consumption expenses and GDP variables consist of annual observations and cover the period of 2000-2012. Series of variables are constant according to the base year 2005 and have been gained from the data set of World Development Indicators.

**Graph 1: Household Consumption Expenditures to GDP Ratio (2000-2012)**

- **Greece**
- **Cyprus**
- **Latvia**
- **Portugal**
In Graph 1, household consumption expenditure to GDP ratios of the countries are shown individually. In Greece, the income share of consumption was 0.68 at the beginning of the 2000s, this ratio has increased to 0.72 during the finance crisis of 2008. In a similar manner, many of the country's consumption-income ratio has fluctuated during the financial crisis.

Graph 2: Household Consumption Expenditures to GDP Ratio (2000-2012)

As displayed in Graph 2, the countries having highest consumption-income ratio are Greece, Cyprus, Latvia, Portugal, Malta, Italy, Germany and Spain. On the other hand, Slovak Republic, France, Slovenia, Estonia, Austria, Finland, Belgium, Netherland, Ireland and Luxembourg have relatively low consumption-income ratio compared to the countries in the first group.
As seen in Graph 2, consumption-income ratio of EA-18 countries remained almost flat between the years of 2000-2008, it rose in 2009 during the global finance crisis. But this rate has returned to its previous level in 2010 and 2012 again.

This study investigate the relation between GDP (income) and household consumption expenditures of EA-18 countries with the method of Panel Data. Panel data includes both the section and time series and hence adds the unit variety to the model. For this reason, multiple linear-by-linear association problem decreases as the observation number increases, since it indicates the variables relationship with each other and its solution increases the data dimension. In panel data, observation number increases.

Firstly, it is examined whether the model to be used in panel data models belong to classic, random or fixed effects model. In classic model, fixed and slope parameter change according to unit and time. On condition that unit effect behaves like a fixed term, the data set gained from main universe is more specific, there exists a correlation between independent variable and unit effect, it is possible to speak of fixed affect estimator. However, if unit affect is predicted in the error terms and there does not exist a correlation between independent variable and unit effect and the data set gained from universe is random, it is possible to speak of accidental effects. The choice among these three models are made among these three models.

<table>
<thead>
<tr>
<th>Table 1: F Test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F test that all u_i=0:</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: LM Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breusch and Pagan Lagrangian multiplier test for random effects</td>
</tr>
<tr>
<td><strong>consump[countr,t] = Xb + u[countr] + e[countr,t]</strong></td>
</tr>
<tr>
<td><strong>Estimated results:</strong></td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td><strong>consump</strong></td>
</tr>
<tr>
<td><strong>e</strong></td>
</tr>
<tr>
<td><strong>u</strong></td>
</tr>
<tr>
<td><strong>Test:</strong> Var(u) = 0</td>
</tr>
<tr>
<td>prob &gt; chi2 = 0.0000</td>
</tr>
</tbody>
</table>
Table 3: LR Test

| Likelihood-ratio test of \( \sigma_u=0 \): \( \text{chibar2(01)} = 219.08 \) Prob>=chibar2 = 0.000 |

These results show that there exists unit effect on 99 % trust level, but not in classic model. Hausman Test is carried out in order to determine whether this unit effect is fixed effects or random effects. Hausman Test is a test that enables to make a choice between fixed effects or random effects.

Table 4: Hausman Test

<table>
<thead>
<tr>
<th>( \hat{b} )</th>
<th>( \hat{B} )</th>
<th>( \hat{b}-\hat{B} )</th>
<th>sqrt(diag(V_b-V_B))</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>gdp</td>
<td>0.5664907</td>
<td>0.5696937</td>
<td>-0.003203</td>
<td>0.0017893</td>
</tr>
</tbody>
</table>

\( \hat{b} = \) consistent under \( H_0 \) and \( H_a \); obtained from xtreg
\( \hat{B} = \) inconsistent under \( H_a \); efficient under \( H_0 \); obtained from xtreg

Test: \( H_0: \) difference in coefficients not systematic

\[ \text{chii}^2(1) = (\hat{b}-\hat{B})'[(V_b-V_B)^{-1}](\hat{b}-\hat{B}) = 3.20 \]

Prob>\( \text{chii}^2 = 0.0734 \) *

B refers to fixed effects, \( \hat{B} \) refers to random effects and the hypothesis of Hausman Test is as follows:
\( b: \) fixed effects; consistent below \( H_0 \) and \( H_a \)
\( B: \) Random effects; inconsistent below \( H_a \), efficient below \( H_0 \)
* % 90 fixed effects are valid on trust level

After deciding on the model, the truth of the validity of is tested by looking at deviations from the assumptions.

Table 5: Heteroskedasticity Test

| Modified Wald test for groupwise heteroskedasticity in fixed effect regression model |
|---|---|
| \( H_0: \) \( \sigma(i)^2 = \sigma^2 \) for all \( i \) |
| \( \text{chii}^2 (18) = 5.2e+09 \) |
| Prob>\( \text{chii}^2 = 0.0000 \) |

Table 6: DW - LBI test for Auto-correlation testing

| modified Bhargava et al. Durbin-watson = .60676765 |
| Baltagi-Wu LBI = .77721518 |
When Table 5 - 6 and 7 are examined, 99% heteroskedasticity, auto-correlation and inter-unit correlation is observed on trust level. Critical value is 2 in DW – LBI auto-correlation test and comparison is made according to it. As a result, auto-correlation is observed as DW – LBI values are less than 2. After these results are gained, Driscoll Kraay estimator (1998) is used, because it corrects deviations from assumptions and puts forth a resistant estimator.

Table 8: Driscoll Kraay Test

<table>
<thead>
<tr>
<th>Regression with driscoll-kraay standard errors</th>
<th>Number of obs</th>
<th>234</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method: Fixed-effects regression</td>
<td>Number of groups</td>
<td>18</td>
</tr>
<tr>
<td>Group variable (1): country</td>
<td>F( 1, 17)</td>
<td>22170.97</td>
</tr>
<tr>
<td>maximum lag: 2</td>
<td>Prob &gt; F</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>within R-squared</td>
<td>0.9912</td>
</tr>
</tbody>
</table>

### Conclusion

In light of this test, some deviations from assumptions and meaningful results are gained. GDP is meaningful and positive on 99% trust level. Fixed term is negative and meaningless. F test that examines the meaning of independent variable over dependent variable is meaningful. $R^2$ showing the strength of independent variable in explaining the dependent variable refers to a high value of 99%. In this study carried out for Euro Zone, 1 Dollar increase in GDP will increase the household consumption by 0.566 Dollar.
References:


