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TEST OF THE ABSOLUTE INCOME HYPOTHESIS IN USA AND EUROPE

Research Assistant Emrah ARIOĞLU
Drexel University
Department of Finance
ea97@drexel.edu

Research Assistant Koray TUAN
University of Cukurova
Department of Business Administration
ktuan@cu.edu.tr

ABSTRACT

In this study, the relationship between consumption and income is investigated from the Absolute Income Hypothesis perspective, by using the Engle and Granger methodology, with an extension to their sample group, including Austria, Belgium, Denmark, Finland, Germany, Italy and UK, as well as USA. The evidences suggest that both consumption and income series for all the countries have unit roots. The results also suggest that while the residuals from the long run relation estimation regression of consumption and income for Austria, Belgium, Finland and Germany have unit roots, the residuals for Denmark, Italy, UK and USA do not have unit roots, suggesting that for the later group of countries, consumption and income series are co-integrated. Lastly, the coefficients derived by estimating the error correction model for Italy, UK and USA are in accordance with the expected signs, suggesting that consumption adjusts in the short run to its long run equilibrium value.

Key Words: Consumption, Income, Absolute Income Hypothesis, Cointegration.

I. INTRODUCTION

In most of the world economies, consumer expenditure covers 50 % to 70 % of spending (Muellbauer and Lattimore, 1999). Thus, it is not surprising that consumer expenditure and the consumption function have been some of the most studied topics in macroeconomics. To understand the nature of the consumption expenditure, we should first understand the fundamental theories about consumption because modern research about the topic has mainly been based on these theories (Fernandez-Corugedo, 2004). The fundamental theories of consumption are; absolute income hypothesis (Keynes, 1936), relative income hypothesis (Duesenberry, 1948), permanent income hypothesis (Friedman, 1957) and life cycle hypothesis (Modigliani, 1986).

The Absolute Income Hypothesis (AIH), which has an important role in the development of the subsequent theories, was developed in Keynes' (1936) seminal work "General Theory of Employment, Interest and Money". According to Keynes, the consumption function in the Absolute Income Hypothesis is in the form:

$C = a + bY$, where $a>0$, $0<b<1$
(1)

Here C represents the real consumption (national or household), Y represents real disposable income, "a" represents the autonomous consumption and "b" represents marginal propensity to consume (MPC). To find the average propensity to consume (APC), by using equation 1, both sides have to be divided by Y. Therefore we can derive APC as:

$$APC = C/Y = (a/Y) + b \quad (2)$$

According to this equation, based on the AIH, when there is an increase in real disposable income, the ratio of C to Y, thus APC, will decrease. On the other hand, MPC, shows how much the real consumption will increase following a unit increase in real disposable income and can be shown as:

$$B = MPC = (\Delta C/\Delta Y) = dC/dY \quad (3)$$

Based on these specifications, according to Keynes, if we consider the fact that a consumer considers her disposable income when deciding how much to consume, we actually consider her net income. Thus, the AIH states that the real consumption is a function of real income (real disposable income). In other words, what determines the real consumption level is the real income. Here, MPC was expected to be constant and close to 1, and the autonomous consumption, was expected to be small and positive (Fernandez-Corugedo, 2004).

The earlier studies, testing the validity of the theory have presented evidences supporting the AIH (Friedman, 1957). However, the first contradiction with Keynes' AIH was presented in Kuznets' (1946) paper, where he investigated consumption and savings by using a sample period of 1869-1936. In that study, Kuznets stated that even thou there were substantial improvements in the GDP, APC was rather stable. These findings were in contradiction with the AIH stating that as income increased, APC was expected to be decreasing. Studies testing the validity of AIH, using household data and short term data, presented evidence in support of AIH. In some studies where household consumption is investigated, the researchers have presented evidence showing that households with more income had more consumption, which can be regarded as an evidence of MPC being positive as stated by AIH. Thus, the authors have concluded that Keynes' AIH could be used in the estimation of consumer behavior (Pehlivan and Utkulu, 2007). In another study, Davis (1952), using the US annual real consumption and real disposable income data over the 1929-1940 period has presented evidences not contradicting with AIH. However, in the following periods, more studies presented evidences showing that, when tested with long term annual data, the consumption function appeared to be misspecified, which is commonly called as "the consumption puzzle" (Mankiw, 1992).

To solve the consumption puzzle, other hypothesis mentioned earlier was developed. Briefly, the Relative Income Hypothesis (RIH) developed by Duesenberry (1948), based on psychological factors, states that consumption, in contradiction to AIH, is not only a function of real income, but also a function of highest past income level. According to Duesenberry, the consumption decisions of individuals are not independent of each other's and thus consumption should be studied from a psychological and social point of view. RIH states the APC as:

$$C_t/Y_t = \alpha + \beta(Y_t/Y_0) + u_t$$
(4)

Here (Y_t/Y_0) presents the ratio of the income in time t to the highest past income level, which is presented by Y_0. According to RIH, a consumer's APC also depends on the income level distribution group she is in. Therefore, her utility depends not only on her own consumption, but also to other consumers' consumptions.

On the other hand, the Permanent Income Hypothesis (PIH) developed by Friedman (1957), assumes the consumers want to maximize not only their current but also life time utility, and focuses on the optimization of this issue. PIH separates consumption and current expenditure and also income and current receipts. According to PIH, the permanent component of consumption is a function of permanent component of income. According to Friedman, temporary income changes do not change temporary consumption, therefore consumers decide their level of consumption based on their permanent income levels. And thus, since the temporary consumption in aggregate is zero, the observed consumption is equal to the permanent consumption. Under these assumptions, the consumption function is in the form:

$C^P = cY^P$, where P presents permanent and c: MPC
(5)

The last hypothesis is the Life Cycle Hypothesis (LCH) (Modigliani, 1986). LCH also considers consumers trying to maximize their life time utility, but also takes into account the evolution of household consumption and income. The most important difference from PIH is that LCH assumes finite life of households. According to LCH, when consumers decide how much to consume in the current period, they take into account their expectations regarding the future (Sachs and Larrain, 1993). The consumption function in the LCH is:

$$C = c_1 Y_d + k_1 W$$
(6)

In this form of consumption function, Y_d represents disposable labor income, W represents the household financial wealth, c_1 represents the MPC on Y_d and k_1 represents MPC on W.

When we look at the studies about the consumption function in the literature, we see some studies with important contributions. The first of these studies is done by Hall (1978). In his study, Hall studied PIH and rational expectations theory together and provided evidence showing that consumption in US has random walk property and income and consumption are not co-integrated. The second study, by Davidson et al. (1978), presents evidence regarding the error correction model of consumption. In this study, the effects of short term and long term are distinguished. It is stated that in the long run, consumption has two components; income and inflation ratio. The third study is by Engle and Granger (1987) where the authors investigated the co-integration between real per capita consumption on nondurable and real per capita disposable income over the sample period 1947-1981 for US data and found evidences showing that income and consumption are co-integrated.

In their study, Engle and Granger (1987) connect the moving average, autoregressive and error correction representation for systems, where there is co-integration. Testing for co-integration, they look at the problems of unit root tests and also tests with parameters unidentified under their null hypothesis. For this purpose, they formulate and analyze seven different statistics, where they derive the critical values of these statistics by using Monte Carlo simulation. They present several empirical examples for co-integration, one of which includes consumption and income. For the analysis of co-integration of consumption and income, they use quarterly US real per capita consumption on nondurable and real per capita disposable income. The sample period covers 1947 to 1981. Their results suggest that the error correction model is not significant even though the variables are co-integrated.

Following Engle and Granger's investigation of the co-integration between consumption and income, other studies were executed by using different sample groups, to investigate the co-integration of income and consumption, under various consumption theories, using various estimation procedures. Robinson and Marinucci (2001) test for co-integration for consumption and income, and provide evidence that they are co-integrated, where the order of integration for the residuals is found to be higher than 0.5 but smaller than 1. Lettau and Ludvigson (2001); by using quarterly US aggregate consumption and labor income data, provide evidence suggesting that the two variables are co-integrated. Hualde and Robinson (2002) investigate co-integration for consumption and income and provided evidence that the residuals show long term memory where d is smaller than 1. Gil-Alana (2003), using UK and Japan data, investigates co-integration for consumption and income and the test regarding the order of integration of the residuals provided results suggesting the variables may be fractionally co-integrated, where the order of integration of residuals are greater than 0.5 but smaller than 1. Slacalek (2005), using a sample group of 26 industrial countries, provides evidences supporting the hypothesis that consumption and disposable income are co-integrated. Rudd and Whelan (2006), investigate consumption and labor income and conclude that they fail to reject the hypothesis that there is no co-integration between the variables, when tested with a sample of postwar US data. Dreger and Reimers (2006), investigate the relationship between private consumption and disposable income, using a sample of EU countries and stated that their evidence on the cointegration of these variables is ambiguous.

In this study, the relationship between consumption and income will be investigated from the Absolute Income Hypothesis perspective, by using the Engle and Granger methodology, with an extension to their sample group and period. The detail of the methodology is stated in the next section. The goal in investigating the AIH, by extending the Engle and Granger sample group and period is to check how the relationship between consumption and income has changed, if at all, in the last decades, where the global economy went through many crisis, which in return might have affected the relationship between consumption and income, through affecting consumers' consumption and savings choices.

II. DATA AND METHODOLOGY

The US data is gathered from U. S. Bureau of Economic Analysis webpage (www.bea.gov). For US, we use seasonally adjusted quarterly real per capita consumption on nondurable and real per capita disposable income data for the 1947/01-2009/02 period following Engle and Granger (1987). Han and Thury (1997) investigated co-integration for consumption and income using seasonally adjusted and raw data and provided evidence that the result do not differ. Following them, the series are transformed into logarithms before analyzing them.

The European Zone data is gathered from European Commission Eurostat webpage (http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/) and OECD webpage (www.oecd.org). For European Zone, we use seasonally adjusted quarterly nominal per capita consumption expenditure and nominal per capita disposable income data stated in national currencies for the 1975/01-2009/02 period. The nominal data is converted into real data by using the CPI (2005=100) to deflate the consumption and income series, following Dreger and Kosfeld (2003). Then, the series are transformed into logarithms before analyzing them. Due to the difficulty in finding quarterly data, we could find sufficient time series data from the sources listed above for only seven European Zone countries: Austria, Belgium, Denmark, Finland, Germany, Italy and UK. The sample period covers 1980/01-2009/02 for Belgium, 1983/03-2009/02 for Denmark, 1991/01-2009/02 for Germany, 1982/01-2008/03 for Italy, 1988/01- 2007/03 for Austria, 1975/01- 2009/02 for Finland and 1977/03-2008/04 for UK.

Following Enders (Enders, W., Applied Econometric Time Series), we first present the steps for Engle and Granger (1987) methodology.

The first step is to test the variables for their integration order. For co-integration to exist, we need the variables to be integrated of the same degree. To determine the number of unit roots in each variable, we can use tests such as Dickey-Fuller test (DF test), augmented Dickey-Fuller test (ADF test), Phillips-Perron test, and some other tests as well. After applying these tests, if the results show that the variables are stationary, we do not need to proceed and it is because standard time series models can be applied to stationary variables.

In the second step, we want to estimate the long run relationship between the variables. If the results from the previous step state that both variables are I(1), we then estimate the long run equilibrium relationship in the form as:

$$C_t = \beta_0 + \beta_1 Y_t + e_t \quad (7)$$

To check whether the variables are actually co-integrated, we first denote the residuals from (7) as "ê". If we find the deviations from long run equilibrium are stationary, then we can conclude that our series are co-integrated of order (1,1). Here we can look at the auto-regression of the residuals as in:

$$\Delta\hat{e}_t = a_1\hat{e}_{t-1} + \varepsilon_t \quad (8)$$

For this equation, if we cannot reject the null stating $a_1=0$, then the residual series have a unit root. Then we can conclude that the variables are not co-integrated. If the variables are both I(1) and the also the residuals are stationary, we can state that the series are co-integrated of order (1,1). Also, if the residuals of (8) are not white noise, we can use the ADF test. If we figure out that the ε_t show serial correlation, we this time, need to estimate:

$$\Delta\hat{e}_t = a_1\hat{e}_{t-1} + \sum_{i=1}^{n} a_{i+1}\hat{e}_{t-i} + \varepsilon_t \quad (9)$$

In the next step, we estimate the error correction model (ECM). If our previous results show that the variables are co-integrated, to estimate the ECM, we can use the residuals from the equilibrium regression. If both variables are CI(1,1), then the error correction form will be:

$$\Delta C_t = \alpha_1 + \alpha_C (C_{t-1} - \beta_1 Y_{t-1}) + \sum_{i=1} \alpha_{11}(i)\Delta C_{t-i} + \sum_{i=1} \alpha_{12}(i)\Delta Y_{t-i} + \varepsilon_{Ct} \quad (10)$$

$$\Delta Y_t = \alpha_2 + \alpha_Y (C_{t-1} - \beta_1 Y_{t-1}) + \sum_{i=1} \alpha_{21}(i)\Delta C_{t-i} + \sum_{i=1} \alpha_{22}(i)\Delta Y_{t-i} + \varepsilon_{Yt} \quad (11)$$

In the above equations, the error terms represent white noise disturbances, whereas β_1 represents the parameter of co-integrating vector and alphas are all parameters. Following Engle and Granger, we can use the previously found residuals from the long run equilibrium and rewrite (10) and (11) as:

$$\Delta C_t = \alpha_1 + \alpha_C \hat{e}_{t-1} + \sum_{i=1} \alpha_{11}(i)\Delta C_{t-i} + \sum_{i=1} \alpha_{12}(i)\Delta Y_{t-i} + \varepsilon_{Ct} \quad (12)$$

$$\Delta Y_t = \alpha_2 + \alpha_Y \hat{e}_{t-1} + \sum_{i=1} \alpha_{21}(i)\Delta C_{t-i} + \sum_{i=1} \alpha_{22}(i)\Delta Y_{t-i} + \varepsilon_{Yt} \quad (13)$$

The above equations constitute VAR in the first differences, other than the error terms. We can estimate it as a “near VAR”, where we apply the same procedures applied for VAR.

As mentioned earlier, according to Keynes, the consumption function in the Absolute Income Hypothesis is in the form:

$C = a + bY$, where $a>0$, $0<b<1$

Where C represents the real consumption (national or household), Y represents real disposable income; a represents the autonomous consumption and b represents marginal propensity to consume (MPC). To apply in this study, taking logarithms, we can state the function as:

$$\ln C_t = a + b \ln Y_t + u_t \quad (14)$$

In the next section, we represent the empirical results for both US and Euro Zone Countries.

III. EMPIRICAL RESULTS

In this section, we present the results for the application of Engle and Granger methodology for the 8 countries studied. All the results are derived by using Eviews statistical package. For co-integration to exist, we need the variables to have unit roots and also be integrated of the same degree. To check whether the variables have unit roots, we used both augmented Dickey-Fuller test (ADF test) and Phillips-Perron test. For ADF test, we used SIC criteria for the selection of lag length. The p-values for both tests are Mackinnon (1996) p-values. The results for consumption series are presented in Table I and the results for income series are presented in Table II.

[Table I here]

In Table I, we see the results of ADF test and Phillips-Perron test for consumption for both level data and 1^{st} differenced data, as well. Also the table presents results for the models with intercept, models with both intercept and trend and also models with no intercept nor trend. Considering the results for consumption level data in Table I, we can conclude that, for all the countries studied, we can not reject the null hypothesis that the consumption data have unit root. Also, the results for 1^{st} differenced consumption data, we can reject the null hypothesis that the 1^{st} differenced consumption data have unit root. In other words, we can conclude that the consumption series are non stationary at levels and stationary at 1^{st} difference and have the property of I(1).

[Table II here]

In Table II, we see the results of ADF test and Phillips-Perron test for income for both level data and 1^{st} differenced data. Again, the table presents results for the models with intercept, models with both intercept and trend and also models with no intercept nor trend. When we examine the results for income level data in Table I, the results are similar to the results for consumption and we can conclude that, for all the countries studied, we cannot reject the null hypothesis that the income data have unit root. Also, the results for 1^{st} differenced income data, we can reject the null hypothesis that the 1^{st} differenced income data have unit root. In other words, we can conclude that the income series are non stationary at levels and stationary at 1^{st} difference and have the property of I(1).

Since we can suggest that both consumption and income are I(1) for all the countries studied, next, we estimate the long run relationship between the variables. The estimated long run relationships are (with t-statistics in the parenthesis):

Austria: $C_t = 0.909172 + 0.882373\ Y_t + e_t$
(15)
(4.752023) (39.80908)

Belgium: $C_t = 1.481334 + 0.814023\ Y_t + e_t$
(16)
(11.86872) (55.59973)

Denmark: $C_t = 1.836535 + 0.823816\ Y_t + e_t$
(17)
(15.51358) (75.24223)
Finland: $C_t = 0.700603 + 0.904583\ Y_t + e_t$
(18)
(3.917897) (42.45613)

Germany: $C_t = 3.155409 + 0.624650\ Y_t + e_t$
(19)
(5.921179) (10.11736)

Italy: $C_t = -0.572913 + 1.059035\ Y_t + e_t$
(20)
(-4.162716) (64.50094)

UK: $C_t = -0.030129 + 0.998165\ Y_t + e_t$
(21)
(-0.293330) (78.25378)

USA: $C_t = -0.234095 + 1.013488\ Y_t + e_t$
(22)
(-6.432353) (272.1518)

The next step is to determine whether the residuals from the regressions above are stationary or not, to suggest that consumption and income are co-integrated. Following Engel and Granger, we use ADF in this step. The results are presented in Table III.

[Table III here]

The results of the ADF test for the residuals in Table III suggest that the residuals for Austria, Belgium, Finland and Germany, at 5 % significance level, have unit roots. In other words, the residual series for these countries are non stationary and I(1). Thus, we can conclude that consumption and income are not co-integrated for these countries. Therefore, we do not need to proceed with the ECM for these countries. The results in Table III suggest that the residuals for Denmark, Italy, UK and USA, at 5 % significance level, do not have unit roots because we can reject the null hypothesis. In other words the residual series for these countries are stationary and I(0). Since both variables are I(1) and also the residuals are stationary for these countries, we can conclude that the series are co-integrated of order (1,1).

Next, we estimate the error correction model (ECM), for the countries, for which the previous results suggest that their consumption and income series are co-integrated. These countries are Denmark, Italy, UK and USA. And the ECMs for these countries are (with t-statistics in parenthesis):

Denmark: $\Delta C_t = 0.003396 - 0.102387\ \hat{e}_{t-1} - 0.037880 \Delta C_{t-1} + 0.000055\ \Delta Y_{t-1} + \varepsilon_{Ct}$ (23)

(3.348714) (-1.246699) (-0.327023) (0.000852)

$\Delta Y_t = 0.003806 + 0.402164\ \hat{e}_{t-1} + 0.139013\ \Delta C_{t-1} - 0.111962\ \Delta Y_{t-1} + \varepsilon_{Yt}$ (24)

(2.004902) (2.6155745) (0.641061) (-0.915328)

Italy: $\Delta C_t = 0.006660 - 0.357140\ \hat{e}_{t-1} - 0.413371\ \Delta C_{t-1} - 0.054459\ \Delta Y_{t-1} + \varepsilon_{Ct}$ (25)

(3.932770) (-4.149278) (-5.180254) (-0.598935)

$\Delta Y_t = 0.005415 + 0.223490\ \hat{e}_{t-1} + 0.019752\ \Delta C_{t-1} - 0.178694\ \Delta Y_{t-1} + \varepsilon_{Yt}$ (26)

(2.604638) (2.114749) (0.201597) (-1.600619)

UK: $\Delta C_t = 0.010668 - 0.590445\ \hat{e}_{t-1} - 0.161059\ \Delta C_{t-1} - 0.173111\ \Delta Y_{t-1} + \varepsilon_{Ct}$ (27)

(4.417896) (-7.662044) (-2.189058) (-1.985477)

$\Delta Y_t = 0.010254 + 0.337318\ \hat{e}_{t-1} - 0.341040\ \Delta C_{t-1} - 0.227330\ \Delta Y_{t-1} + \varepsilon_{Yt}$ (28)

(4.103917) (4.230169) (-4.479517) (-2.519715)

USA: $\Delta C_t = 0.004429 - 0.045759\ \hat{e}_{t-1} + 0.013040\ \Delta C_{t-1} + 0.151188\ \Delta Y_{t-1} + \varepsilon_{Ct}$ (29)

(4.846754) (-2.060774) (0.194818) (2.673804)

$\Delta Y_t = 0.004342 + 0.039006\ \hat{e}_{t-1} + 0.362198\ \Delta C_{t-1} - 0.141073\ \Delta Y_{t-1} + \varepsilon_{Yt}$ (30)

(5.811331) (1.520670) (4.684471) (-2.159788)

The above regression estimations give the ECM for the countries, for which co-integration was detected to exist previously. For all the cases, when we consider the DW values, not represented here, the models do not seem to suffer from auto correlation. For Denmark, the estimated coefficient for the error correction term in (23) is negative but not significant. Thus even though we can state that the dependent variable adjusts in the short run to its long run equilibrium value but, the evidence is not statistically significant. For Italy, the estimated coefficient for the error correction term in (25) is negative and significant. Therefore, we the evidence suggests that the dependent variable adjusts in the short run to its long run equilibrium value. In other words, the error term will correctly act to correct deviations from the long run equilibrium and if the actual equilibrium value is too low, then the error correction term will correctly raise it and vice versa. Also for UK, the estimated coefficient for the error correction term in (27) and for USA, the estimated coefficient for the error correction term in (19) are both negative and significant. Therefore, we can have make the same conclusion and suggest that, the error term will correctly act to correct deviations from the long run equilibrium. However for income, we see for all the four countries that even though the variables are co-integrated, the error correction term does not act as it does for the consumption case.

IV. CONCLUSIONS

In this study, we applied Engle and Granger methodology of co-integration and error correction model, for consumption and income series for Austria, Belgium, Denmark, Finland, Germany, Italy, UK and USA.

In the first step, we tested the consumption and income series for the existence of unit roots applying both ADF and Phillips-Perron tests. The evidences suggest that both series for all the countries studied have unit roots. Next, we estimated the long run relationship between consumption and income for all the countries and examined whether the residuals from these estimation regressions have unit roots or not by using ADF test. The evidences suggest that while the residuals for Austria, Belgium, Finland and Germany have unit roots, the residuals for Denmark, Italy, UK and USA do not have unit roots, suggesting that for the later group of countries, consumption and income series are co-integrated. As the last step, we estimated the error correction model for these later groups of countries and derived coefficients in accordance with the expected signs for Italy, UK and USA, suggesting that the consumption adjusts in the short run to its long run equilibrium value.

TABLES

Table I: ADF Unit Root test results for Consumption series with level and 1st differenced data

CONSUMPTION

	ADF with levels		
	with intercept	**with intercept and trend**	**with no intercept or trend**
Austria	-2.129179 (0.2341)	-3.196142 (0.0930)	4.777411 (1.0000)
Belgium	-0.552870 (0.8754)	-2.286138 (0.4378)	4.444051 (1.0000)
Denmark	-0.972337 (0.7608)	-2.551406 (0.3034)	3.614552 (0.9999)
Finland	-0.739746 (0.8319)	-2.786953 (0.2048)	2.063702 (0.9907)
Germany	-1.849599 (0.3540)	-5.332932 (0.0002*)	1.958691 (0.9874)
Italy	-2.507065 (0.1167)	-1.393290 (0.8573)	2.388281 (0.9959)
UK	-0.096099 (0.9465)	-3.369288 (0.0606)	6.423357 (1.0000)
USA	-0.631696 (0.8598)	-2.871065 (0.1738)	4.910467 (1.0000)

	ADF with 1st Differences		
	with intercept	**with intercept and trend**	**with no intercept or trend**
Austria	-10.91218 (0.0001*)	-11.11605 (0.0000*)	-3.015356 (0.0030*)
Belgium	-19.38578 (0.0000*)	-19.30753 (0.0000*)	-17.48783 (0.0000*)
Denmark	-10.62734 (0.0000*)	-10.59386 (0.0000*)	-9.526502 (0.0000*)
Finland	-19.74430 (0.0000*)	-19.66377 (0.0000*)	-2.259078 (0.0236*)
Germany	-8.999231 (0.0000*)	-9.038592 (0.0000*)	-8.609256 (0.0000*)
Italy	-3.557688 (0.0084*)	-11.26822 (0.0000*)	-2.509941 (0.0124*)
UK	-12.89846 (0.0000*)	-12.83975 (0.0000*)	-1.503712 (0.1238*)
USA	-7.659821 (0.0000*)	-7.656401 (0.0000*)	-5.576167 (0.0000*)

Mackinnon (1996) P-values in paranthesis, *Denotes significance at 5 % level.

Table II: Phillips-Perron Unit Root test results for Consumption series with level and 1st differenced data

CONSUMPTION

	PP with levels		
	with intercept	with intercept and trend	with no intercept or trend
Austria	-2.167326 (0.2198)	-5.260698 (0.0002*)	3.778743 (0.9999)
Belgium	-0.451528 (0.8953)	-4.402399 (0.0032*)	4.493233 (1.0000)
Denmark	-0.975661 (0.7597)	-2.796845 (0.2019)	3.738904 (0.9999)
Finland	-0.899282 (0.7860)	-3.155898 (0.0979)	4.218650 (1.0000)
Germany	-2.382685 (0.1501)	-5.558900 (0.0001*)	2.899937 (0.9990)
Italy	-2.874055 (0.0518)	-2.943410 (0.1534)	3.248380 (0.9997)
UK	-1.013785 (0.7470)	-6.323055 (0.0000*)	5.032590 (1.0000)
USA	-0.586408 (0.8699)	-2.318075 (0.4222)	7.943325 (1.0000)

	PP with 1st Differences		
	with intercept	with intercept and trend	with no intercept or trend
Austria	-18.96853 (0.0001*)	-17.05985 (0.0001*)	-13.66720 (0.0000*)
Belgium	-20.29551 (0.0000*)	-20.20628 (0.0000*)	-15.92683 (0.0000*)
Denmark	-10.61852 (0.0000*)	-10.58567 (0.0000*)	-37.55683 (0.0001*)
Finland	-19.74430 (0.0000*)	-19.66377 (0.0000*)	-17.04224 (0.0000*)
Germany	-26.05869 (0.0001*)	-31.95843 (0.0001*)	-18.03093 (0.0000*)
Italy	-21.17322 (0.0000*)	-21.73203 (0.0000*)	-16.47779 (0.0000*)
UK	-19.83179 (0.0000*)	-19.73150 (0.0000*)	-15.39930 (0.0000*)
USA	-14.93125 (0.0000*)	-14.91414 (0.0000*)	-13.15271 (0.0000*)

Mackinnon (1996) P-values in paranthesis, *Denotes significance at 5 % level.

Table III: ADF Unit Root test results for Income series with level and 1st differenced data

INCOME

	ADF with levels		
	with intercept	**with intercept and trend**	**with no intercept or trend**
Austria	-0.649840 (0.8523)	-2.784878 (0.2073)	3.563647 (0.9999)
Belgium	-0.788382 (0.8184)	-0.873599 (0.9547)	2.674632 (0.9982)
Denmark	-1.570797 (0.4938)	-3.186639 (0.0929)	2.367074 (0.9956)
Finland	-0.789150 (0.8187)	-1.956903 (0.6190)	1.884085 (0.9856)
Germany	-1.129049 (0.7001)	-3.760771 (0.0244*)	0.712296 (0.8668)
Italy	-2.897112 (0.0491*)	-1.819354 (0.6884)	2.877827 (0.9990)
UK	-0.192949 (0.9351)	-3.792945 (0.0202*)	1.949811 (0.9876)
USA	-1.052766 (0.7345)	-1.470520 (0.8372)	8.278749 (1.0000)

	ADF with 1st Differences		
	with intercept	**with intercept and trend**	**with no intercept or trend**
Austria	-12.22194 (0.0001*)	-12.13763 (0.0001*)	-10.88154 (0.0000*)
Belgium	-13.72756 (0.0000*)	-13.70330 (0.0000*)	-7.084442 (0.0000*)
Denmark	-12.46446 (0.0000*)	-12.55094 (0.0000*)	-11.95894 (0.0000*)
Finland	-7.288628 (0.0000*)	-7.238447 (0.0000*)	-6.965714 (0.0000*)
Germany	-12.98879 (0.0001*)	-12.88014 (0.0001*)	-13.01490 (0.0000*)
Italy	-14.20872 (0.0000*)	-14.74792 (0.0000*)	-13.42144 (0.0000*)
UK	-3.436262 (0.0116*)	-3.428062 (0.0525)	-2.882729 (0.0042*)
USA	-16.84424 (0.0000*)	-16.92103 (0.0000*)	-5.910377 (0.0000*)

Mackinnon (1996) P-values in paranthesis, *Denotes significance at 5 % level.

Table IV: Phillips-Perron Unit Root test results for Income series with level and 1st differenced data

INCOME			
	PP with levels		
	with intercept	with intercept and trend	with no intercept or trend
Austria	-1.172241 (0.6827)	-4.006563 (0.0123)	3.779582 (0.9999)
Belgium	-0.727706 (0.8347)	-1.573632 (0.7976)	2.374105 (0.9958)
Denmark	-1.562513 (0.4980)	-3.179657 (0.0943)	2.301166 (0.9948)
Finland	-0.500707 (0.8864)	-2.578871 (0.2907)	1.622700 (0.9743)
Germany	-1.692423 (0.4308)	-3.777674 (0.0234*)	0.911073 (0.9017)
Italy	-2.567112 (0.1031)	-1.633609 (0.7731)	2.827973 (0.9988)
UK	-0.299280 (0.9207)	-4.315140 (0.0041*)	3.559338 (0.9999)
USA	-1.135613 (0.7021)	-1.343932 (0.8744)	9.009483 (1.0000)
	PP with 1st Differences		
	with intercept	with intercept and trend	with no intercept or trend
Austria	-12.59339 (0.0001*)	-12.49999 (0.0001*)	-10.74209 (0.0000*)
Belgium	-13.47377 (0.0000*)	-13.49989 (0.0000*)	-12.87848 (0.0000*)
Denmark	-12.42881 (0.0000*)	-12.51958 (0.0000*)	-11.85257 (0.0000*)
Finland	-13.54345 (0.0000*)	-13.50572 (0.0000*)	-13.41409 (0.0000*)
Germany	-13.01229 (0.0001*)	-12.90116 (0.0001*)	-13.01494 (0.0000*)
Italy	-14.42215 (0.0000*)	-15.92043 (0.0000*)	-13.02273 (0.0000*)
UK	17.90422 (0.0000*)	-17.84298 (0.0000*)	-14.99300 (0.0000*)
USA	-16.89578 (0.0000*)	-17.05650 (0.0000*)	-14.61296 (0.0000*)

Mackinnon (1996) P-values in paranthesis, *Denotes significance at 5 % level.

Table V: ADF test results for the residuals of the long run relation regression of Consumption and Income

	ADF Test
Austria	-2.623231 (0.0927)
Belgium	-1.858246 (0.3509)
Denmark	-5.374690 (0.0000*)
Finland	-2.201717 (0.2067)
Germany	-2.095347 (0.2472)
Italy	-2.921460 (0.0463*)
UK	-9.503298 (0.0000*)
USA	-3.248611 (0.0184*)

Mackinnon (1996) P-values in paranthesis, *Denotes significance at 5 % level.

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