International Journal of Academic Research in Accounting, Finance and Management Sciences
Vol. 7, No.3, July 2017, pp. 151–156
E-ISSN: 2225-8329, P-ISSN: 2308-0337

www.hrmars.com

Structural Analysis of the Final Consumption of Households: Evidence from Romania, Estonia and Latvia

Mihai PĂUNICĂ

The Bucharest University of Economic Studies, Bucharest, Romania, E-mail: mihai.paunica@cig.ase.ro

Abstract *This paper is focused on the study of the final consumption of households from the viewpoint of the impact of goods-related components on its evolution. The data used in the analysis are taken from the official database of the Eurostat. The subjects of the research are Romania, Estonia and Latvia, allowing a comparative analysis between these countries, as all were once part of a centralized economic system, the two Baltic States belonged to the Soviet Union until the beginning of the last decade in the previous century and Romania switched to the market economy system approximately at the same time. Also, the selected countries are recent members of the European Union.*

Key words Consumption, expenditure, households, goods, regression, durability

DOI: 10.6007/IJARAFMS/v7-i3/3283 URL: http://dx.doi.org/10.6007/IJARAFMS/v7-i3/3283

1. Introduction

In this paper, the author considers the structure of the goods-related final consumption of households, and the influence of the structural factors on this indicator. The final consumption is a factor of economic growth, whose influence on the Gross Domestic Product of any country must be taken into account. According to Eurostat, *„The final consumption expenditure of households encompasses all domestic costs (by residents and non-residents) for individual needs. Among other things, it includes expenditure on goods and services, the consumption of garden produce and rent for owner-occupied dwellings."*[1] The author has chosen to analyze the structure of this indicator based on the durability of goods criteria, as specified by Eurostat in the metadata associated with the source data drawn from the Eurostat database. This classification breaks down the final consumption into the following categories: durable goods, semi-durable goods, non-durable goods and services. We shall analyze, in this paper, the influence of the components related to goods, excluding the services factor.

2. Literature review

Anghelache *et al*., (2015c) have developed on the use of multiple regressions in the analysis of final consumption indicators. Gerstenberg and Yaneva (2013) appreciate that "*Consumption is a key indicator of citizens' wellbeing, with housing, energy, transport and food accounting for about half of total household expenditure*". They analyze the consumption expenditure trends in the EU27 area for a dataset covering ten years, outlining also the relative size of different final consumption expenditure components, the situation per inhabitant, and the impact of crisis on the final consumption, a valuable conclusion drawn from the study is that the "*… Baltic economies and Greece were the most severely affected, with loss of actual individual consumption (in volume terms) of 12% to 15% between 2008 and 2011.*" Studies on the impact of final consumption on the economic growth were published by Anghelache *et al*., (2015b), Anghelache *et al*., (2015a), for Romania, and Motofei (2017), who took into consideration a panel of countries and has considered the final consumption of households as a separate factor. Friedman (2016) is a reference book on the consumption economy. Ivanova *et al*., (2016) has discussed the environmental impact of the

[1] http://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Household_consumption_expenditure_-_national_accounts, accessed September 26th, 2017

household consumption. Adkins (2014) is preoccupied with the use of *gretl* software in econometric analyses.

3. Methodology of research and data

We shall analyze at first the evolutions and structural measures for the main indicator and the influence factors, then we shall apply principles of the regression method, trying to observe the overall influence of each factor for an extended interval, encompassing the period during which all selected countries were members of the European Union (Estonia and Latvia were admitted in May 2004, while Romania became part of EU in January 2007)[2], that is the 2007Q1 – 2017Q2 time reference. The code of the data source in the Eurostat database is *namq_10_fcs*.

The regression model we aim to design and substantiate is based on the following factors:

- Main indicator: *Final consumption expenditure of households* (FCH);
- Factor 1, *Final consumption expenditure of households, durable goods* (CDG);
- Factor 2, *Final consumption expenditure of households, semi-durable goods* (CSG);
- Factor 3, *Final consumption expenditure of households, non-durable goods* (CNG).

Therefore, the general structure of the model will be compliant with the following formula:

$$FCH = \alpha + \beta_1 * CDG + \beta_2 * CSG + \beta_3 * CNG \quad (1)$$

Each β_i quotient shall reveal the influence of the corresponding variable on the final consumption of the households. The *gretl*[3] software package was used for the analysis of the dataset.

4. Results and discussions

The evolution of the analyzed indicators is represented graphically in the figures below, and discussed for each country. The graphs for the three countries show similar patterns of evolution for the three countries. The trends display oscillatory dynamics and, also, the weight of the factors on the entire period is similar. Thus, it can be observed that the most significant factor is the *Final consumption expenditure of households, non-durable goods*, for all three countries. In Estonia and Latvia, the *Final consumption expenditure of households, semi-durable goods* has a higher impact than the *Final consumption expenditure of households, durable goods*, while in Romania the order of the factors changes across time.

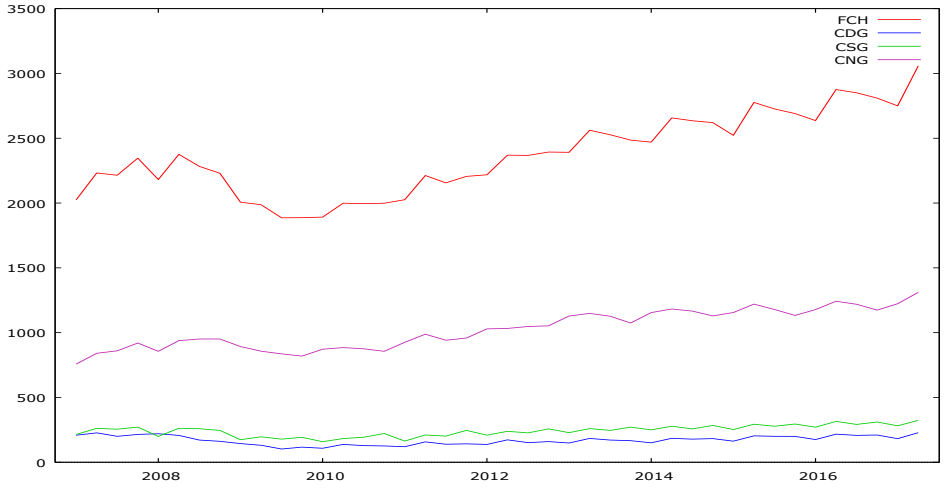

Figure 1. The evolution of the final consumption components (goods only), Estonia

Data source: Eurostat online database, dataset *Final consumption aggregates [namq_10_fcs],* extracted on September 25th, 2017, graphical representation by the author, using the software tool specified.

[2] See https://europa.eu/european-union/about-eu/countries_en#tab-0-1, accessed September 26th, 2017
[3] http://gretl.sourceforge.net/

Regarding the total amount recorded by the indicators, in Estonia, the *Final consumption expenditure of households, non-durable goods* holds a weight of more than 43% of the total final consumption expenditure of households (again, we have not included the services component in the analysis). The weight of the *semi-durable goods* is 10.25%, while the third factor accounts for 7.16%. The total contribution of goods is 60.70%.

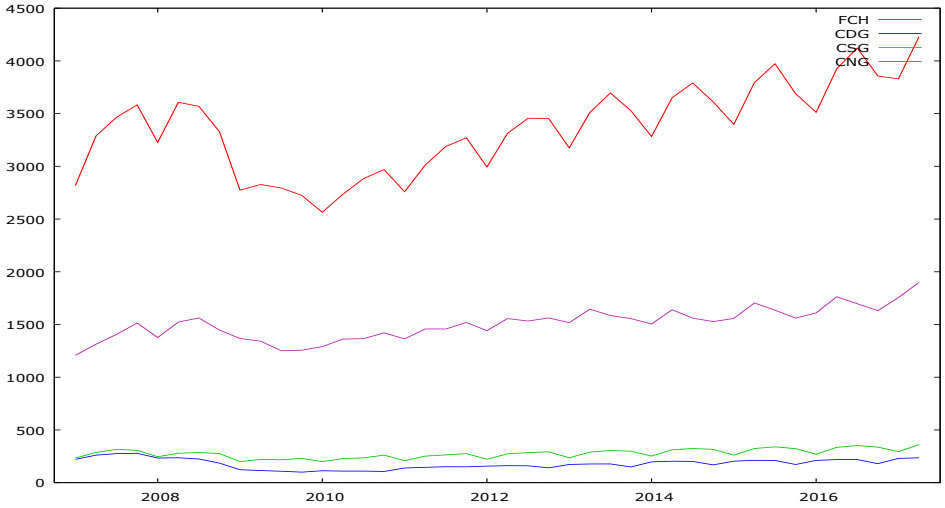

Figure 2. The evolution of the final consumption components (goods only), Latvia

Data source: Eurostat online database, dataset *Final consumption aggregates [namq_10_fcs],* extracted on September 25th, 2017, graphical representation by the author, using the software tool specified.

In Latvia, the most significant factor records a share of almost 45%, the *semi-durable goods* have a percentage of 8.24%, and the *durable goods* 5.35%, for a combined weight of 58.39%.

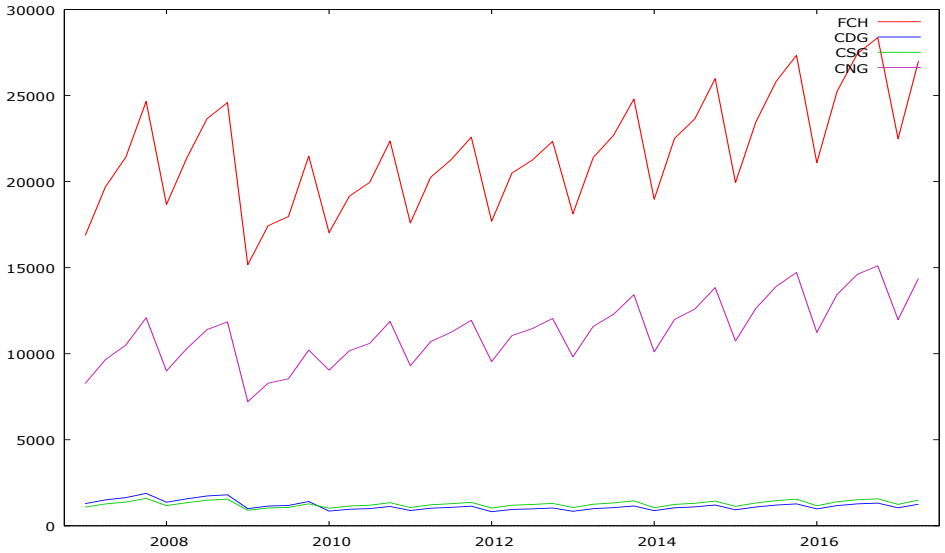

Figure 3. The evolution of the final consumption components (goods only), Romania

Data source: Eurostat online database, dataset *Final consumption aggregates [namq_10_fcs],* extracted on September 25th, 2017, graphical representation by the author, using the software tool specified.

In the case of Romania, the *non-durable goods component* has the most significant share of the all countries analyzed, covering more than half of the total final consumption expenditure of households. In turn, the contributions of the other two categories of goods have almost equal values, respectively 5.87% and 5.39%. The total share held by goods is 63.36%.

Econometric analysis of the final consumption expenditure

After the extraction of the datasets for the described indicators from the Eurostat online database, the data were arranged according to the requirements of the data processing software, and processed in order to achieve the estimation of the parameters for the model. A model was developed for each country, and the results will allow the comparison between the national contexts of the indicators involved.

The results of the estimations are presented in the following section.

```
Model 1: OLS, using observations 2007:1-2017:2 (T = 42)
Dependent variable: FCH

             coefficient   std. error   t-ratio    p-value
  ---------------------------------------------------------
  const       164.350      30.3791       5.410    3.67e-06  ***
  CDG           2.21041     0.199814    11.06     1.92e-013 ***
  CSG           1.55812     0.225789     6.901    3.35e-08  ***
  CNG           1.41515     0.0458240   30.88     1.59e-028 ***

Mean dependent var   2369.810   S.D. dependent var   310.1397
Sum squared resid    25093.71   S.E. of regression   25.69749
R-squared            0.993637   Adjusted R-squared   0.993135
F(3, 38)             1977.988   P-value(F)           9.30e-42
Log-likelihood      -193.8422   Akaike criterion     395.6844
Schwarz criterion    402.6350   Hannan-Quinn         398.2321
rho                  0.165646   Durbin-Watson        1.640163
```

Figure 4. The evolution of the final consumption components (goods only), multiple regression approach, Estonia

Data source: Eurostat online database, dataset *Final consumption aggregates [namq_10_fcs],* extracted on September 25th, 2017, data processed by the author, using the software tool specified.

In the case of Estonia, the model can be transcribed as follows:

$$FCH = 164.350 + 2.21041 * CDG + 1.55812 * CSG + 1.41515 * CNG \quad (2)$$

The values of the *R-squared* and *Adjusted R-squared* tests are well above 99%, showing that the model can be considered trustworthy and re-usable for further researches, including forecasts. If the *Final consumption expenditure of households, durable goods* factor increases by 1 Euro, the total final consumption expenditure can be expected to raise by 2.21041 Euros, considering the other factors constant, also this component has the highest regression coefficient associated, thus the most significant influence in the scope of our model. The increase of the *semi-durable goods* component by one Euro shall lead to the growth of the main indicator with 1.55812 Euros. The least significant influence is associated to the *non-durable goods*, with a regression quotient of 1.41515. The value of the free term is high enough in comparison with the three βs, testimony on the influence of other factors, not taken into consideration at this stage.

The model for the Latvian final consumption is characterized by the equation written below:

$$FCH = -1.27856 + 1.40818 * CDG + 5.30977 * CSG + 1.08864 * CNG \quad (3)$$

In this context, as the *R-squared* and *Adjusted R-squared* have values higher than 0.96 (96%), the model is sound enough from the viewpoint of our analysis' objective. The constant term has a value which is very close to the levels of the β quotients for the three factors, and also is negative, showing low amplitude, non-favorable influence of other potential factorial variables.

If the *durable goods* component increases by 1 Euro, the value of the main indicator will raise by 1.40818 Euros. The most significant influence in this model is associated with the *semi-durable goods*, whose regression quotient indicates an increase by 5.30977 Euros for a one Euro modification of the factor

itself. The third factor, *non-durable goods*, has the smallest influence in the scope of the present model, its β quotient being 1.08864.

```
Model 1: OLS, using observations 2007:1-2017:2 (T = 42)
Dependent variable: FCH

             coefficient   std. error   t-ratio     p-value
  ---------------------------------------------------------
  const       -1.27856     120.190      -0.01064   0.9916
  CDG          1.40818       0.299175    4.707     3.30e-05  ***
  CSG          5.30977       0.495537   10.72      4.84e-013 ***
  CNG          1.08864       0.127064    8.568     2.08e-010 ***

Mean dependent var   3361.419   S.D. dependent var   421.0411
Sum squared resid    206692.1   S.E. of regression   73.75138
R-squared            0.971563   Adjusted R-squared   0.969317
F(3, 38)             432.7551   P-value(F)           2.08e-29
Log-likelihood      -238.1231   Akaike criterion     484.2461
Schwarz criterion    491.1968   Hannan-Quinn         486.7938
rho                  0.118668   Durbin-Watson        1.723921
```

Figure 5. The evolution of the final consumption components (goods only), multiple regression approach, Latvia

Data source: Eurostat online database, dataset *Final consumption aggregates [namq_10_fcs],* extracted on September 25th, 2017, data processed by the author, using the software tool specified.

```
Model 1: OLS, using observations 2007:1-2017:2 (T = 42)
Dependent variable: FCH

             coefficient   std. error   t-ratio    p-value
  ---------------------------------------------------------
  const       754.539      301.725       2.501    0.0168    **
  CDG           4.45717      0.538875    8.271    5.04e-010 ***
  CSG          -4.09688      1.49348    -2.743    0.0092    ***
  CNG           1.85352      0.105145   17.63     6.93e-020 ***

Mean dependent var   21695.37   S.D. dependent var   3237.996
Sum squared resid     2360250   S.E. of regression   249.2225
R-squared            0.994509   Adjusted R-squared   0.994076
F(3, 38)             2294.298   P-value(F)           5.65e-43
Log-likelihood      -289.2642   Akaike criterion     586.5284
Schwarz criterion    593.4791   Hannan-Quinn         589.0761
rho                  0.639433   Durbin-Watson        0.615538
```

Figure 6. The evolution of the final consumption components (goods only), multiple regression approach, Romania

Data source: Eurostat online database, dataset *Final consumption aggregates [namq_10_fcs],* extracted on September 25th, 2017, data processed by the author, using the software tool specified.

For the Romanian dataset, the model has the following form:

FCH = 754.539 + 4.45717 * CDG + (−4.09688) * CSG + 1.85352 * CNG (4)

The model estimated in the case of Romania is characterized by significant values of *R-squared* and *Adjusted R-squared* tests, higher than 99%. Thus, the model is reliable for researches, analyses and prognoses.

The value of the constant term is very high, some 150 times greater than the top β coefficients. This indicates the existence of additional factors, not included in this model, whose influence is favorable and significant. The *durable goods* factor has the most sizable influence on the final consumption expenditure of households, that is, for an increase of one Euro of the independent variable, the main indicator shall increase by 4.45717 Euros. The factors corresponding to *semi-durable goods* have a less-than-favorable influence within this model, its quotient being almost equal to the CDG factor, but negative as sign. The *non-durable goods* pose a favorable impact on the Romanian final consumption expenditure of households, as one additional Euro in the value of the factor leads to an increase of the main indicator by 1.85352 Euros.

5. Conclusions

The structure of the final consumption expenditure of households (goods only) is relatively similar for the three analyzed countries. In Romania, there can be observed a higher contribution of the goods category, which is 63.36%, the values for Estonia and Latvia are lower, but the differences are not sizable.

The regression analysis for the three countries showed significant differences in the structure of the models and thus in the impact of each factor on the final consumption expenditure of households, allocated for goods. While in Estonia and Romania the constant term of the model is positive and has a comparatively high value, in the Latvian model, the value of this parameter is negative and relatively small. Also, the relative importance of the factors, depending on the value of the regression quotient, is different in the three cases. The final consumption expenditure of households for goods is influenced mostly by *durable goods* in Estonia and Romania, and by *semi-durable goods* in Latvia. On the other hand, the *R-squared* and *Adjusted R-Squared tests* associated with the three models have high values, above 0.96, demonstrating the reliability of the models.

We consider that the results of this study are useful and from the viewpoint of the shared historical political and economic background of the three countries.

References

1. Adkins, L. (2014). *Using gretl for Principles of Econometrics* (No. 1412). Oklahoma State University, Department of Economics and Legal Studies in Business.

2. Anghelache, C., Manole, A., Anghel, M.G. (2015a). Analysis of Final Consumption, Gross Investment, the Changes in Inventories and Net Exports Influence of GDP Evolution, by Multiple Regression. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, *5*(3), 66-70.

3. Anghelache, C., Soare, D. V., Popovici, M. (2015b). Analysis of Gross Domestic Product Evolution under the Influence of the Final Consumption. *Theoretical and Applied Economics*, *22*(4), 605.

4. Anghelache, C., Anghel, M. G., Popovici, M. (2015c). Multiple Regressions Used in Analysis of Private Consumption and Public Final Consumption Evolution. *International Journal of Academic Research in Accounting, Finance and Management Sciences, Volume (Year)*, *5*, 69-73.

5. Friedman, M. (2016). *A theory of the consumption function*. Pickle Partners Publishing.

6. Gerstberger, C., Yaneva, D. (2013). Analysis of EU-27 household final consumption expenditure—Baltic countries and Greece still suffering most from the economic and financial crisis. *Eurostat Statistics in focus 2/2013*.

7. Ivanova, D., Stadler, K., Steen-Olsen, K., Wood, R., Vita, G., Tukker, A., Hertwich, E. G. (2016). Environmental impact assessment of household consumption. *Journal of Industrial Ecology*, *20*(3), 526-536.

8. Motofei, C. (2017). Vectors of economic growth in the eastern area of the EU. *Theoretical and Applied Economics*, *24*(1 (610), Spring), 215-226.

Web sources

ec.europa.eu/eurostat