Structural Changes of Romanian Economy on Long Run

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Abstract: In this article we have as main goal to highlight the structural evolution of Romanian economy from a long run perspective. Knowing the trend is necessary for anticipating future evolutions of different economic sectors and for developing adequate policies for economic growth/development. Economical turbulences from the past decade were bringing into actuality the structural analysis of an economy, in a context where economic models based mainly on services have encountered major problems in the post-crisis period, translated through a very slow recovery of the overall economy.

Key words: structural changes, added value, restructuring, output, industry.

Introduction

According to Nouriel Roubini opinion, in the history of modern capitalism, crisis periods are the rule, and not the exception. The problem is not strictly conjectural and unexpected, but for some economists has been even predictable. Even before any manifestation of crisis signs, they signaled the necessity of an economic restructuring at EU level, considering that without serious, profound and clear reforms, Europe will end up in an inevitable decline situation, and a relative decline can easily become an absolute one. The economic crisis changed the perception on the manufacturing role in the EU economy. The industry has regained the reputation, in the sense that a relatively high industrial sector is not anymore looked as being part of an overcome structure, inadequate for a post-industrial economy, based on services, such as the EU one. On the contrary, the economies that kept a consistent industrial base were better handling the crisis and post-crisis periods, and a dynamic manufacturing sector is now considered a prerequisite for an innovative economy and with rapid growth potential. The debate for the most appropriate models of development has in our times a new approach, as the crisis affected on a larger or smaller extent all the interconnected economies across the world.

Materials and Methods

By utilizing data published by United Nations for the global economic structure, we can notice in the set of graphs below (fig 1) the evolution of the main aggregated sectors of Romanian economy in the period 1970-2012, values being reflected in million USD at constant prices of year 2005.

The main activities taken into consideration are:
- Agriculture;
- Industry, divided into:
  o Extraction and utility industry (energy, gas, water)
  o Manufacturing industry
- Services;
- Constructions.

By OUTPUT we note the sum of gross value added created in all activities.
For evaluating the structure changing impact on gross value added, we developed a function that has as dependent variable the economic output, and as independent variables we have 5 aggregated sectors of the economy: AGR, CONSTR, IND_Prel, IND_Extract, SERV.

Also, for highlighting the structural evolution of Romanian economy in the period 2000-2010, a period marked by both positive events (EU and NATO adhesion), but also negative events (crisis and her propagated effects), we will use the data published by Eurostat.

**REZULTS AND DISCUSSIONS**

![Graphs showing value added evolution for main economic activities in Romania in the period 1970-2012](image_url)

**Figure 1.** Value added evolution for main economic activities in Romania in the period 1970-2012. (million USD constant prices of year 2005)

Source: National Account database- United Nations, graph made in E-Views
In the period 1970-2012, agriculture had an oscillating evolution, due to the dependency for exogenous factors (clime), but also due to structural changes through which Romanian economy passed after 1989.

Manufacturing industry represented the main pillar of Romanian economy until 1989. In the period 1989-2000, due to heavy restructuring process and inconsistent policies we can observe in Figure 2 an obvious decrease of manufacturing share in the total economy, a similar trend being captured in the mining and energy industries case.

![Figure 2. Main economic activities share in total Output in Romania, period 1970-2012](image)

Source: National Account database- United Nations, own manipulation

Until the year 2000, the services sector had a slow ascending trend, and in the period 2000-2008, due to the convergence of Romanian economy to the European model, based on services, their level almost doubled.


A more detailed analysis on the structural changes after the year 2000 will be continued in this chapter, highlighting the decisive role of industry in the attenuation of negative growth and economic revitalization.

For evaluating the structural changes impact on different activities through gross value added, we developed a function that has as dependent variable the economic output, and as independent variables we have 5 aggregated sectors of the economy:

- AGR- this variable represents the sum of gross valued added sub-fields agriculture, forestry, hunting and fishing;
- CONSTR- this variable is representing the gross value added of Construction field;
- IND_Prel- this variable represents the gross value added of manufacturing industries;
- IND_Extract- this variable represents the sum of gross value added for extraction industry and utility industries (water, gas, energy);
- SERV- this variable includes the gross value added generated by commerce, hotels and restaurants, transport and warehouse, communications and other activities.

Variable grouping has been done by taking into account the grouping methodology of sub-field grouping used by United Nations, which is offering the necessary set of data on a

The objective of this multiple regression (having as independent variable the 5 main economic fields) is to determine which of them had a positive influence from a long run perspective (1970-2012) and to verify if the industry, a field on which decision makers are putting accent more and more in the European post-crisis space, had a positive effect on the overall economic trend.

Using the least squares method, and considering as reference period 1970-2012, we estimated the equation which determines the influence of the 5 aggregated fields above mentioned (agriculture, manufacturing industry, extractive industry, constructions and services) on the gross value added evolution.

**Table 1.**

**Regression results E-views- influence of Romanian sectors on gross value added,**

**period 1970-2012**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGR</td>
<td>1.167322</td>
<td>0.022284</td>
<td>52.38293</td>
<td>0.0000</td>
</tr>
<tr>
<td>CONSTR</td>
<td>0.927417</td>
<td>0.016403</td>
<td>56.54029</td>
<td>0.0000</td>
</tr>
<tr>
<td>IND_Prel</td>
<td>1.047195</td>
<td>0.008997</td>
<td>116.3888</td>
<td>0.0000</td>
</tr>
<tr>
<td>IND_Extract</td>
<td>0.811720</td>
<td>0.029584</td>
<td>27.43800</td>
<td>0.0000</td>
</tr>
<tr>
<td>SERV</td>
<td>0.974961</td>
<td>0.003436</td>
<td>283.7531</td>
<td>0.0000</td>
</tr>
<tr>
<td>C</td>
<td>40.01232</td>
<td>161.5883</td>
<td>0.247619</td>
<td>0.8058</td>
</tr>
</tbody>
</table>

R-squared: 0.999965  Mean dependent var: 71202.63
Adjusted R-squared: 0.999960  S.D. dependent var: 19023.90
S.E. of regression: 119.8384  Akaike info criterion: 12.53895
Sum squared resid: 531365.9  Schwarz criterion: 12.78470
Log likelihood: -263.5875  Hannan-Quinn criter.: 12.62958
F-statistic: 211675.8  Durbin-Watson stat: 0.866712
Prob(F-statistic): 0.000000

Source: own manipulation- E-views

The estimated equation has the form:

\[ \text{OUTPUT} = C(1) \times \text{AGR} + C(2) \times \text{CONSTR} + C(3) \times \text{IND}_\text{Prel} + C(4) \times \text{IND}_\text{Extract} + C(5) \times \text{SERV} + C(6) \]
By substituting the coefficients we obtain:
\[
\text{OUTPUT} = 1.16732211628 \times \text{AGR} + 0.927417300367 \times \text{CONSTR} + 1.0471948098 \times \text{IND}_\text{Prel} + 0.811719954 \times \text{IND}_\text{Extract} + 0.974961184204 \times \text{SERV} + 40.0123237898
\]

Therefore, by considering a long run horizon of time, in which the Romanian economy faced multiple structural changes, we can conclude, by using the estimated equation, that the agriculture and manufacturing industry sectors are representing the main sources for economic growth, their coefficients being higher than 1.

The sustained GDP growth in the period 2000-2008 has been mainly due to the absolute and relative increase of services (commerce, hotels and restaurants, transportation, financial and real estate transactions) and the constructions boom in the period 2006-2008 (figure 3). Therefore, during one decade the sector structure changed inside the national economy through an increased share of services, and especially through the reduction of agriculture share in GVA, from 10.2% in 2000 to 7.4% in 2009-2011.

![Figure 3. Main sectors contribution on gross value added, period 2000-2010](image)

- million Euros, reference year 2005

Source: Eurostat

In 2012, the share of agriculture dropped to 5.6%, but increased back to 6.4% in 2013, having a positive contribution on GDP increase of +1.1%, while the share of industry in total GVA increased from 32% in 2012 to 34% in 2013.
CONCLUSIONS

On the base of a simple regression model we can appreciate that for a long run horizon of time, respectively 1970-2012, during which several structural changes occurred, the main sources of growth have been the manufacturing industry and agriculture, sectors that have coefficients of 1.05 and respective 1.17, while the other sectors have a coefficient with value under 1. In the manufacturing industry case, with a share of 24% from GVA in 2012, an increase with 1% of his GVA will determine an increase of approx. 0.252 percentages of the output.

After 1990, the massive economic restructuring and the production structure settlement through the services share diminished the relative position of industry in the economy. In 2013, the share of industry in GVA represented 34% and contributed to GDP increase with 2.2%, while the services and construction sector contributed with 0% to GDP increase. Also, agriculture contributed with 1.1% to GDP increase. The main activities that influencing in 2010 in a positive way the trend of industrial production were: food industry, wood manufacturing and auto industry.

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