Filon TODEROIU

Institute of Agricultural Economics, Romanian Academy, Bucharest
filitod@yahoo.com; filon@eadr.ro

THE ROMANIAN AGRI-FOOD ECONOMY – PERFORMANCE REDUCTIVE EFFECTS AFTER FIVE YEARS OF EU MEMBERSHIP

ABSTRACT

Starting from Romania's economy position on the global competitiveness scale (on which Romania dropped by ten places in the last year), the agri-food sector being an important economic driving factor of the economy, the paper attempts to identify certain sets of macroeconomic variables determining non-performant generation of value added (as level and annual dynamics), which induced radical structural changes in the share of the main branches (agriculture, industry and constructions) in the essential resources of the economy (employment, fixed capital stock and net investment) and in its results (gross value added).

The first set of variables is of correlative type, at macro-economic level (energy intensity of the economy; "real wages – productivity" correlation; intra-component ratios of the consumer price index). The second type of variables is of sectoral type, at the agri-food economy level (disintegrative "double fracture"; upstream and downstream economic driving effects). The third set of performance reductive variables is of structural type, in the so-called "agri-food" chain (tri-dimensional structure of the agri-food chain – economic operators, employed persons and generated gross value added; average agri-food commercial openness).

Key words: global competitiveness, agri-food integration, upstream and downstream driving effects, agri-food commercial openness.

JEL Classification: C22, D57, O11, O47, Q43.

1. INTRODUCTION

Both *per se*, and considered as subsystem of other "challenges" at world level (globalization, poverty, sustainable development, competitiveness, and recently, the financial-economic crisis under way), the agricultural and food issue has been and continue to be of global and European interest.

As main "consumers" of the Community budgetary pie, for which a new multi-annual programming (2014–2020) is submitted to debates, agriculture and food need adjustment reforms, both to the international trade rigors, formulated by WTO, and to the real convergence requirements of the European economies.

Romania's European economic convergence need depends, to a considerable extent, on the agri-food sector performances, which, at five years after accession, are still a desideratum.

As introductory benchmarks for any medium or long-term development strategic approach, which targets the increase of competitiveness and European convergence level, the previously formulated premises cannot overlook the agri-food sector presence and future, as an important subsystem of national economy.

Starting from the external "positioning" of Romania's economy (in which the agri-food sector represents a significant economic driving factor) on the global competitiveness scale (where it fell ten places, in the last year), the paper attempts to identify certain sets of macro-economic variables determining the non-performant generation of value-added (as annual level and dynamics), which induced radical structural changes of the share of main branches (agriculture, industry and constructions) in the main resources of the economy (employment, fixed capital stock and net investments) and in its results (gross value added).

2. GLOBAL CONTEXT OF ROMANIA' S ECONOMY COMPETITIVENESS

Any evaluation of Romania's economy situation cannot overlook the external positioning, on the global competitiveness scale, of Romania's economy, as a practical reflection of each country in the competition "concert" of the world economy.

According to the most recent evaluations on the global scale, five development stages of economies are identified[1]: **Stage 1** – factor-driven; **Transition** from stage 1 to stage 2; **Stage 2** – efficiency-driven; **Transition** from stage 2 to stage 3; **Stage 3** – innovation-driven. Each economy is characterized on the basis of certain "batteries" of indicators, and further on, through the aggregation of partial "scores", it is "positioned" in one of the five economic development stages.

Out of simplification reasons, I tried to configure the place held by Romania's economy in the global competitiveness, by revealing the rank on this scale and the development stage in which it is placed (Table 1).

In essence, on the global competitiveness scale, Romania's economy went down 10 places (from the position 67 in the year 2010, to position 77 in 2011). More surprisingly, Romania is placed after Bulgaria on this scale, which "went down" by only 3 places (from position 71 in 2010, to position 74 in 2011).

On the other hand, it should be mentioned that out of the four countries placed outside the "block" of the first ten competitive economies in the world (innovation-driven), three countries (China, Bulgaria and Romania) are part of stage 2 of economic development (efficiency-driven), and Poland is in the stage of transition from the efficiency-driven stage to the innovation-driven stage.

The partial conclusion derived from the analysis of economies positioning on the global competitiveness is that five years from the accession to the European

---

[1] See: The Global Competitiveness Report 2011–2012, WEF, Geneva, 2011.

Union, Romania's economy has not fructified this status, in the sense of acceleration and deepening of its real economic convergence with the performant economies from the European Single Market.

Out of this reason, we shall next try to identify the presence of certain phenomena and processes with reductive performance effects in Romania's economy and mainly in its agri-food sector, at five years after the accession.

Table 1
Global Competitiveness Index (GCI) 2011–2012

	Score	GCI Rank 2011–2012	GCI Rank 2010–2011	Stages of Development
Switzerland	5.74	1	1	Stage 3 - Innovation-driven (35 economies)
Singapore	5.63	2	3	Stage 3 – Innovation-driven (35 economies)
Sweden	5.61	3	2	Stage 3 – Innovation-driven (35 economies)
Finland	5.47	4	7	Stage 3 – Innovation-driven (35 economies)
United States	5.43	5	4	Stage 3 – Innovation-driven (35 economies)
Germany	5.41	6	5	Stage 3 – Innovation-driven (35 economies)
Netherlands	5.41	7	8	Stage 3 – Innovation-driven (35 economies)
Denmark	5.4	8	9	Stage 3 – Innovation-driven (35 economies)
Japan	5.4	9	6	Stage 3 – Innovation-driven (35 economies)
United Kingdom	5.39	10	12	Stage 3 – Innovation-driven (35 economies)
….	….	….	….	….
China	4.9	26	27	Stage 2 – Efficiency-driven (28 economies)
….	….	….	….	….
Poland	4.46	41	39	Transition from Stage 2 to Stage 3 (18 economies)
….	….	….	….	….
Bulgaria	4.16	74	71	Stage 2 – Efficiency-driven (28 economies)
….	….	….	….	….
Romania	4.08	77	67	Stage 2 – Efficiency-driven (28 economies)

Source: Own processing of data based on "The Global Competitiveness Report 2011–2012", World Economic Forum, Geneva, Switzerland 2011.

## 3. MACROECONOMIC FRAMEWORK OF AGRI-FOOD ECONOMY

3.1. Economic growth – before and after the accession

At the end of 2006 (considered as reference year in the present study, as preceding Romania's accession to the European Union), namely after 17 years of economic-social transformations, national production (measured by GVA of main activities and total GDP) was up by 18.5% compared to that of 1989, in total GDP and up by 20.1% in total GVA, with great dynamic discordances between the three main activities (according to NACE classification), from rebound by 12.7% in GVA–industry, to 105.9% increase in GVA–constructions and 16.0% in GVA–agriculture (Graph 1).

The post-accession evolution of economic growth, after half of decade, features a few interesting characteristics, from the perspective of manifest tendencies:

• Total GDP (*YqT06f*) would be, at the end of this year, by 6.2% higher than in 2006, due to slightly higher growth of total GVA (*YqW06f*) (by 8.1%) which, in its turn, was induced, among others, by certain industrial activities (*Yqind06f*) (+14.9%) and by constructions (*Yqcons06f*) (+31.6%);

• Agricultural GVA (*Yqavspp06f*) would be, at five years after the accession, by 7.2% lower than in the reference year 2006, after a sinuous evolution (three decreases and two increases), which reflects not only the relative high instability of agriculture (weather-dependence), but also the functional non-assimilation of the Community management mechanisms of the agri-food markets.
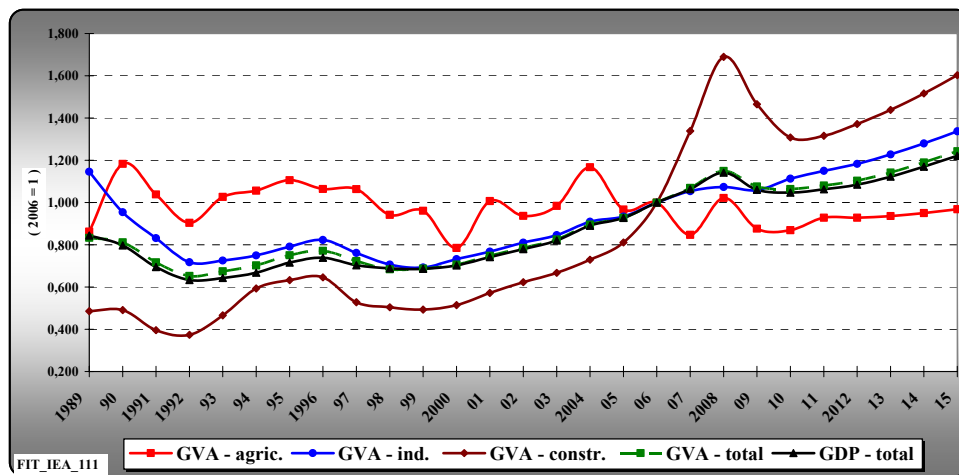
Source: own calculations, for the period 2008–2014, NCP, Autumn Prognosis 05.11.2010; for the period 2009–2015, NCP, Autumn Prognosis, nov-2011;

Graph 1. GDP – total and GVA in Romania's economy, 1989–2015 (2006 = 1).

3.2. Sectoral real relative prices – before and after the accession

As it is known that the movement of the values of material goods is mainly determined by the simultaneous modifications of their volume and prices, it becomes necessary to know the dynamics of real relative prices of value-added from different economic activities, as expression of inter-sectoral competitiveness through price of national economy.

In the year 2006, the real prices (deflated by the implicit deflator of GDP) in overall economy (*YpW06fr*) were by only 3.4% lower than in 1989, yet with high discrepancies between the three investigated branches (agriculture by 43.4%, industry by 27.9% and constructions by 22.3%) (Graph 2).

A few intermediary conclusions can be drawn with regard to the dynamics of sectoral real relative prices:

- At five years after the accession, agriculture (*Ypavspp06fr*) is still "working" with the lowest real prices, and their level is expected to be by 13.1% lower in 2011 compared to 2006;
- The sector constructions (*Ypcons06fr*) also operates with real prices less than unit, yet of lower order (-2.6%);
- The real prices of industrial activities (*Ypind06fr*) slightly increased, by 4.0%.

Hence it results that from the overall rebound by 56.5% of real relative prices of agriculture in the period 1990–2011 (1989 = 1), 13.1 pp (23.2%) is the "contribution" of the first five years after the accession to EU.
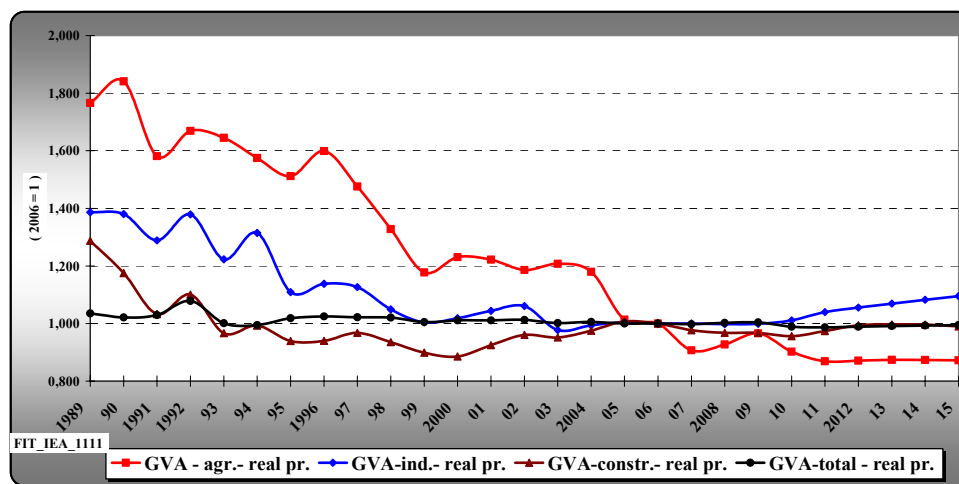
Graph 2. Real relative prices in Romania's economy, 1989–2015 (2006 = 1).

3.3. Yearly average increase of GDP – before and after accession

In comparable terms (2010 prices), the asymmetric evolution of GVA (GDP) corresponding to the five economic aggregates, more strongly revealed by the absolute yearly average modification (increase or decline) of the newly created value, throughout the period 1990–2011 and by different periods considered as relevant, reaffirm the relative instability as persistent phenomenon (Table 2).

Practically, throughout the period 1990–2011, the yearly average of GDP absolute modification ($\Delta YvT'10$) reached about 4.9 billion RON, which can be explained by the differential (107.0 billion RON) between the GDP cumulative increase – total (283.4 billion RON), obtained in the 14 years of economic growth and the cumulative decline of the same indicator (of 176.4 billion RON), in the 8 years of economic decline, against the 22 investigated years (Graph 3).

Table 2

Yearly average change of GDP (GVA) in Romania's economy, 1990–2011 (bln. RON, pr. 2010)

	ΔYvT'10	ΔYvW'10	ΔYvavspp'10	ΔYvind'10	ΔYvcons'10
90–91	-36.786	-24.985	3.121	-19.109	-1.567
92	-30.126	-27.493	-4.765	-13.934	-0.768
93–96	12.989	12.838	1.421	3.200	2.366
97–00	-4.510	-6.998	-2.470	-2.739	-1.142
01–04	23.070	20.242	3.380	5.394	1.870
05–08	30.832	27.185	-1.284	4.997	8.346
05–06	26.988	22.387	-2.956	5.505	4.706
07–08	34.677	31.982	0.389	4.490	11.986
09–11	-12.944	-9.766	-1.109	3.071	-4.330
90–11	4.863	4.832	0.106	0.021	1.312
09–12	-6.971	-4.892	-0.832	3.318	-2.767
13–15	22.343	19.852	0.477	6.253	2.680

Source: Own calculations, based on NIS data, updated with NCP, Nov. 2011 forecast.

Among the other 4 aggregated indicators taken into consideration, only GVA – industry (*ΔYvind'10*) had an yearly average increase of about 0.02 billion RON throughout the whole period, while agriculture *(ΔYvavspp'10)*, constructions and overall economy had an yearly average increase ranging from 0.11 billion RON to 4.8 billion RON.
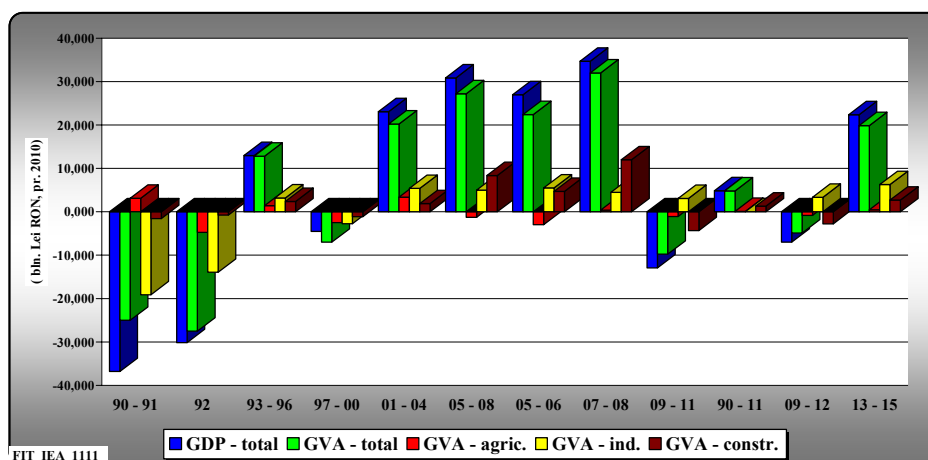
Graph 3. Yearly average changes of GDP (GVA) in Romania's economy, 1990–2011 (bln. Lei RON, pr. 2010).

3.4. GVA relative instability – agriculture

A persistent economic phenomenon, with noticeable reductive performance effects in overall national economy and in the agri-food sector in particular, is the relative instability of the variables measuring the results, which can be quantified by the so-called variation coefficients.

The simultaneous presentation of the relative variation of the annual volume index (*Yqavspp89a*) and of yearly real price index (*Ypavspp89ar*) of the gross value added in agriculture is relevant in this respect (Graph 4).
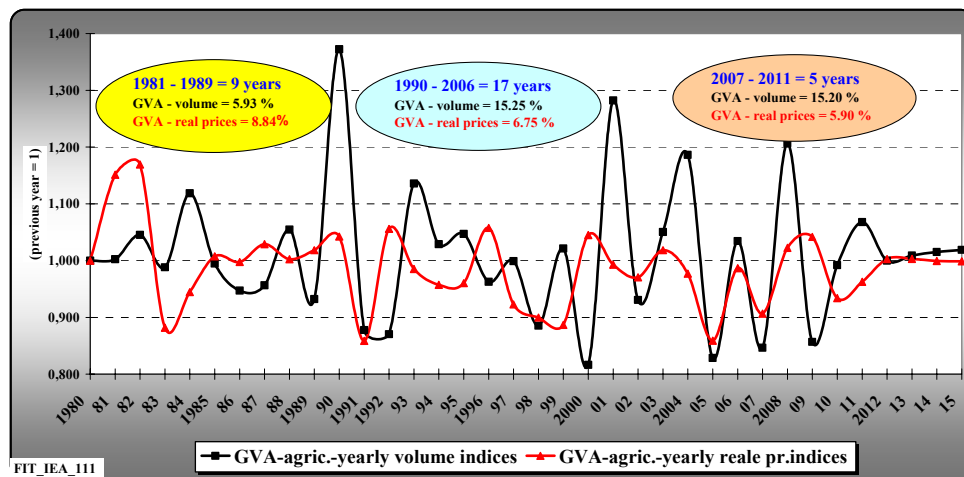

Source: own calculations, for the period 2008-2014, NCP, Autumn Prognosis 05.11.2010; for the period 2009-2015, NCP, Autumn Prognosis, nov-2011;

Graph 4. Relative instability of GVA – agriculture (yearly volume and real price indices), 1980–2015.

From the perspective of this indicator as well, it has to be noticed that Romania's five years of EU membership mitigated the relative instability phenomenon only to a lesser extent.

Thus, the relative variation of the volume index of GVA – agriculture (*Yqavspp89a*), in the accession period (2007–2011) taken into consideration was 15.2%, quite similar to that in the 17 years prior to accession (1990–2006).

On the other hand, the yearly index of GVA – agriculture real prices (*Ypavspp89ar*) has a 5.90% variation coefficient, in the years 2007–2011, compared to 6.75%, in the 17 previous years (1990–2006).

Hence, it results that Romania's presence on the European Single Market meant a slight diminution of relative instability, rather in prices than in quantities.

3.5. Productivity and fixed capital coefficient

In any approach to this issue, it is important to know how much value added is generated by one unit of fixed capital stock (productivity or capital efficiency) or, reversely, what is the investment effort for obtaining a unit of effect (value added) (capital coefficient).

As the bibliographic references for such determinations (made in our country) are relatively scarce, we tried to quantify the level of fixed capital productivity by the ratio of gross value added to fixed capital stock, in two respects (average productivity and marginal productivity) (Graph 5).
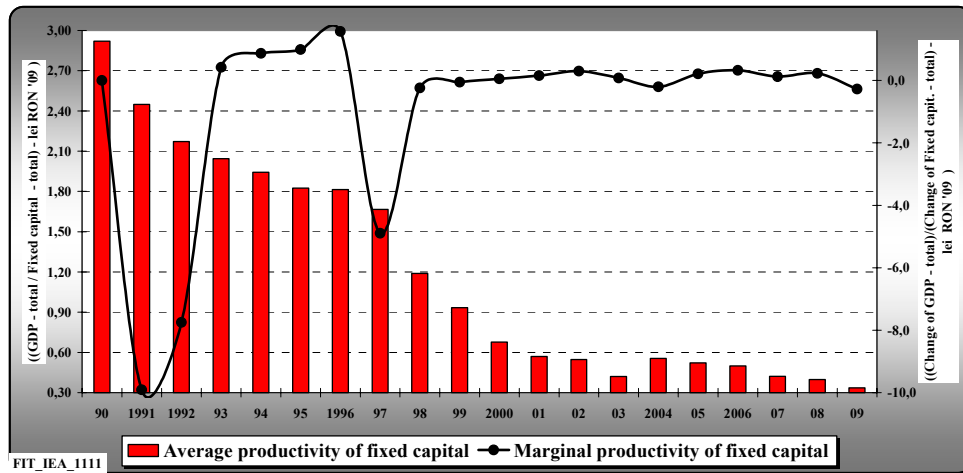
Graph 5. Average and marginal fixed capital productivity in Romania's economy, 1990–2007.

The average productivity of fixed capital ($KWmed = YvT'07 / KvT'07$) in Romania's economy had a steady decreasing tendency, from 3.15 RON total GVA ('07 prices) to one RON fixed capital stock ('07 prices), in the year 1990, at the level of 0.45 RON / RON, in the year 2007.

In its marginal expression, the fixed capital productivity (calculated as ratio of yearly modifications of GVA and fixed capital ($KWmarg = \delta YvT'07 / \delta KvT'07$) has a variation range from – 10.7 RON '07 (1991) to 1.69 RON'07 (1996).

The capital coefficients, both in average and marginal expression, have reverse values compared to capital productivity (Graph 6).
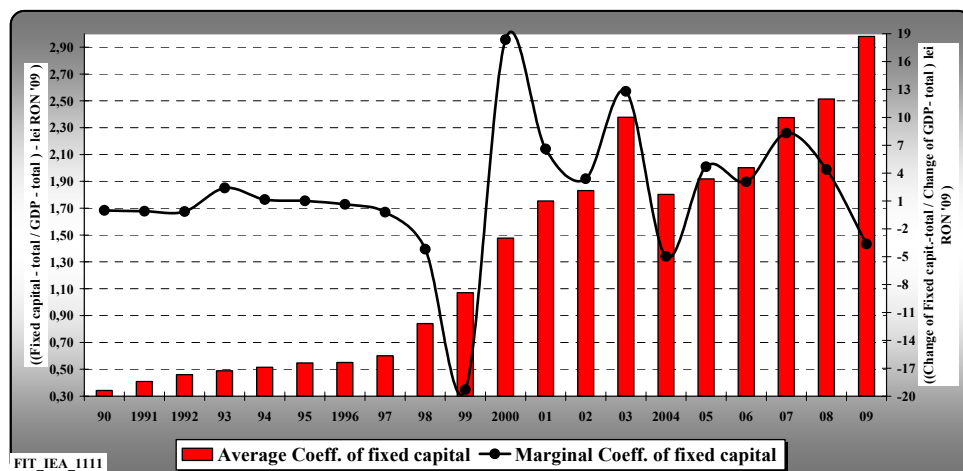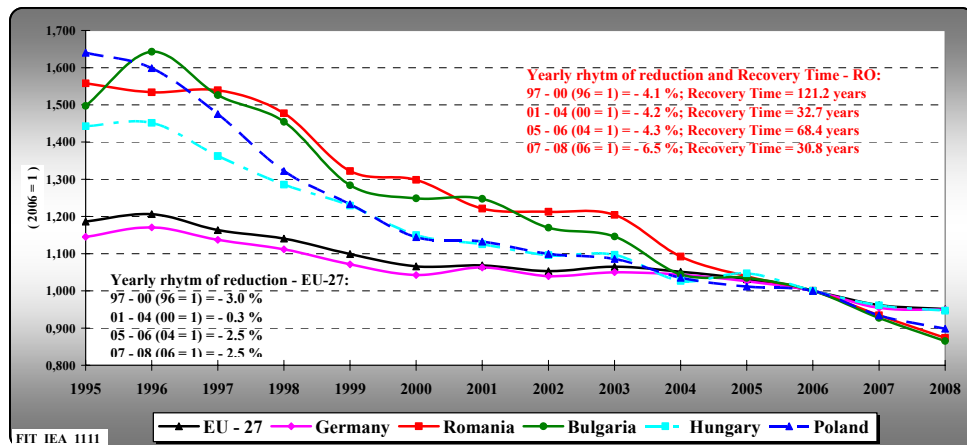
Graph 6. Medium and marginal coefficient of fixed capital in Romania's economy, 1990–2007.

3.6. Energy intensity of the economy – before and after accession

As reference macro-economic variable in revealing convergence through competitiveness, the energy intensity of the economy has had a strong regressive trend in Romania compared to the EU-27 average (Graph 7).

Source: own calculations, on the Eurostat data, http://epp.eurostat.ec.europa.eu/tgm/table.

Graph 7. Energy intensity of the economy in Romania, compared to EU-27, 1995–2008 (2006 = 1).

Thus, while in EU-27 on the average the decline of the energy intensity of the economy was 21.2% in 2008 compared to 1996, in Romania, the degression of the energy intensity of the economy (measured as kg oil equivalent / 1000 euro GDP) was twice as strong (43.0%).

Yet, dissimilitude subsists from the perspective of the average yearly diminution of the energy intensity of the EU and Romanian economies, in the sense that the "cruise speeds" in Romania are increasingly reductive (from -4.1 % in the period 1997–2000, to -4.2% in the period 2001–2004), -4.3% in the period 2005–2006 and -6.5% in 2007–2008) compared to the decreasingly reductive speeds in EU-27 on the average (from -3.0% in the period 1997–2000, to -0.3% in the period 2001–2004, -2.5% in the period 2005–2006 and -2.5% in 2007–2008).

One of the main consequences of the significant differences in the energy intensity levels, both at the beginning of the investigated period (1996), and at the end of this period (2008), and of the different rates of energy intensity diminution consists in unusual large periods of time needed for the 2008 level gap recovery.

Thus, with the diminution rates from the period 1997–2000, Romania could reach the average EU level of 2008 after 121.2 years, with the "pair" of rates from the period 2001–2004 full convergence could be reached in 32.7 years; with the "rates" of the period 2005–2008, 42.4 years would be needed for the recovery of energy performance gap between Romania and EU-27.

And if we have in view that up to the present moment, in the intensity of the national economic aggregate, the problem of the strong weather dependency of agriculture did not count very much, it is expected that the reconsideration of the irrigation role will imply additional energy consumption in agriculture; as this means an increase of the energy intensity of the Romanian economy, it will prolong the gap recovery period and consequently, will delay the convergence through performance.

3.7. "Real wages – productivity" correlation before and after accession

As it is considered in all the functional market economies as one of the "pillars" of macro-economic competitiveness, the correlation between real wages and labor productivity can reveal – to the extent it evolves in the economic rationality limits – the tendency towards economic convergence and social cohesion in the respective country (zone, region).

Determined as ratio of total GVA to the active population employed in the economy (values deflated by the implicit GDP price deflator), labor productivity is correlated with the real wages (net nominal average wages deflated by the general deflator of consumer prices); normally, in this correlation, labor productivity should outstrip, as growth rate, real wages.

In the period 1990–2011 (2006 = 1), the dynamic correlation between real wages and labor productivity in Romania' economy generally evolved within the economic rationality limits, in the sense that in the 22-year period, only in two years (1990 and 1991), the real wages index was greater than the productivity index, while after 1992, the ratio of the two terms of the correlation was reversed (Graph 8).
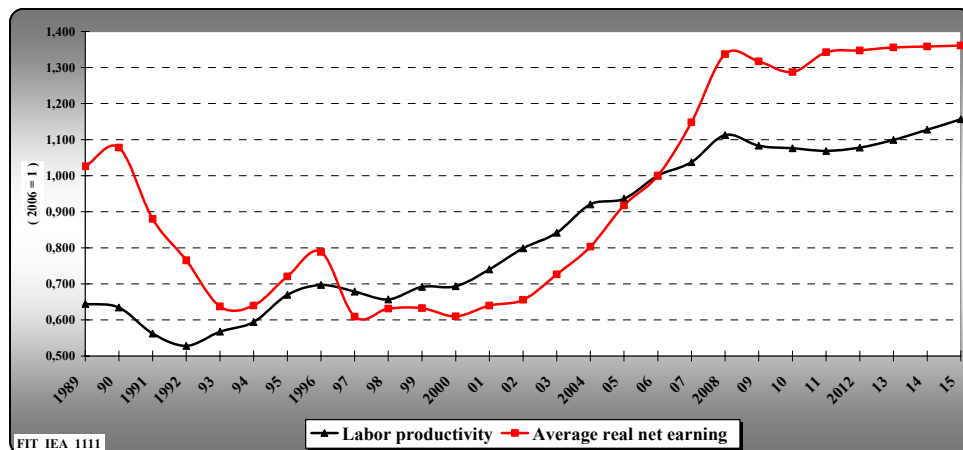
Source: own calculations, for the period 2008-2014, NCP, Autumn Prognosis 05.11.2010; for the period 2009-2015, NCP, Autumn Prognosis, nov-2011;

Graph 8. Dynamics of correlation between labor productivity and the average net real earning
in Romania's economy, 1989–2015 (2006 = 1).

Considering the year 2006 as reference year (end of pre-accession), labor productivity (*WqT06f*) in Romania's economy was by 35.6% higher than in 1989, with the maximum decline being noticed in 1992 (index = 0.528), while the average net real wages (*CSMNr06f*) was by 2.6% lower than in 1989, to reach a maximum decrease of 49.1% in 1997.

At the same time, it can be easily noticed that in the first 17 years of transition to the market economy (1990–2006), starting with the year 2003, the difference between the productivity dynamics and the real wage dynamics gets lower in trend, due to productivity outstripping as growth rate by the average real wages; this means the beginning of a non-rational correlation, strongly reductive of performance and domestic and foreign competitiveness of Romania's economy.

The governmental decision-makers should be rather concerned with the fact that in the five of EU membership, the same "defective" correlation of the Romanian economy is maintained, i.e. the faster increase of the real average wages (+34.2%) compared to labor productivity (+6.9%), the most intense increase being noticed in the period 2007–2008, followed by that estimated for this year.

To sum up, the fact that out of the eight time periods, convened as relevant for comparative judgments, only in two of them (1993–1996 and 2001–2004) the "real wages – productivity" correlation was within the limits of economic rationality, reflects the mostly fragile tendency of Romanian economy for the sustainable setting up of one of its "engines" generating performance and competitiveness, as support to real social cohesion.

3.8. Inflation and consumer price ratios – before and after accession

As a macro-economic variable with general competitiveness reductive effect, inflation (reflected by the consumer price index) erodes the purchasing power of incomes in the economy, which in its turn induces a narrowing of the solvent demand for goods and services.

As not all the consumer prices evolved with the same intensity in the period of transition, it is worth presenting the dynamics of ratios between the three main components of the CPI index and the aggregate itself (Graph 9).

The reference year 2006 marks two tendencies of the 'parts / whole' ratio: the decreasing tendency of the ratio between the consumer price indices of the 'food commodities / total commodities and services', by 26.9% compared to 1990, on one hand, and the increasing tendency of the other two ratios – slower, by only 3.8% for 'non-food commodities / total commodities and services' and much stronger, by 1.74 times for 'services / total commodities and services' – on the other hand.

Romania's accession to the European Union has not modified the nature of tendencies signaled out for the period 1990–2006, namely slight decline of the 'food commodities / total' ratio and increase of the other two ratios.
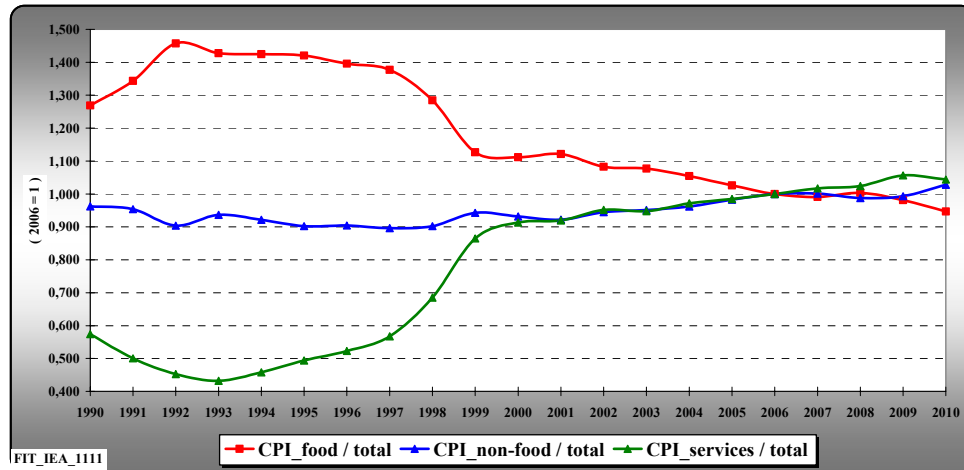
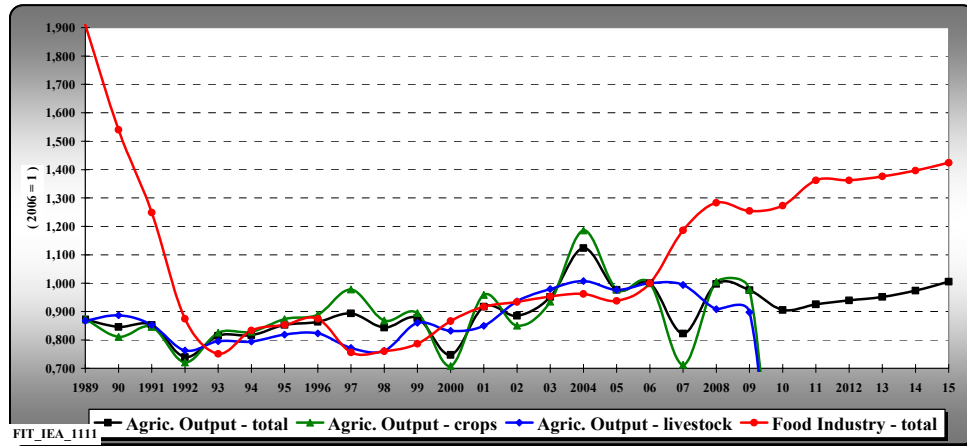Graph 9. Dynamics of ratios between the CPI components, 1990–2015 (2006 = 1).

The partial conclusion, which derives from the analysis of tendencies for the three consumer price ratios, can be formulated in the sense that, considered from the agri-food economy perspective, the contribution of the evolution of food commodity prices to 'feeding' the general increase of consumer prices has an obvious diminution tendency, compared to the other two components of the total aggregate. The explanation, be it a partial explanation, may be that the agri-food commodities still have a domestic production base, which, in the conditions of little remunerating producer prices, largely attenuate the inflationary effects of the agri-food imports and exchange rate.

4. PERFORMANCE REDUCTIVE FACTORS
IN THE AGRI-FOOD ECONOMY

4.1. Agri-food disintegration – before and after accession

The way in which the two main components of the agri-food economy (agricultural production and food processing) contributed to the creation of the domestic supply of agri-food products can be revealed by the dynamic correlation between the agricultural production and food production (Graph 10).

In the year prior to Romania's accession to the European Union (2006), the agricultural production (*VPAqT89f*) was by 12.8% lower compared to that in 1989, in only one year (2004) throughout the transition and pre-accession period the agricultural production index was larger than unit. At the same time, in 2006, the food production (*VPqIABPT89f*) was down by almost 91% compared to 1989, yet by 24.9 % up the maximum decline level (1993 = 0.751).

Graph 10. Correlation between the agricultural production and food production in Romania,
1989–2015 (2006 = 1).

Five years of EU membership meant the maintenance of agricultural production rebound (by 7.4% in 2011 *versus* 2006), yet a consistent advance of food production (by 36.2%), which can only make up for less than one half of the decline compared to 1989.

4.2. "Agricultural production – food processing" interrelations

The synthetic expression of the presence of an agri-food disintegration process in Romania's economy, throughout 1989–2007, results from the analysis of the intensity of economic flows between the general aggregate "agriculture" and the "food industry" aggregate, both from the perspective of intermediary deliveries (destinations) (**LI**) and from the perspective of intermediary acquisitions (origins) (**AI**).

Thus, from the perspective of intermediary deliveries a diminution by over 35% of the intensity of intermediary deliveries of agriculture to the food industry can be noticed (from 65.1% in 1989 to only 29.9% in 2007, with maximum 67.0% in 1990 and a variation coefficient of 27.6 %) (Graph 11).

At the same time, the intensity of intermediary deliveries flows from the food industry to agriculture was down by over 14.5 percent (from 19.1% in 1989 to 4.6% in 2007, with maximum 28.4% in 1993 and a variation coefficient of 60.7%).

The manifested regressions have multiple causes, which can be found both in the development pattern of the agri-food sector in the command economy period and in the failures of the transition period, among which the following stand out:

• Asymmetry in the destructuring process from agriculture (much faster and more radical) compared to that in food industry (slower and more superficial);

• Narrowing the population's final agri-food consumption demand, following the general economic rebound, under the background of persistent hyperinflation.
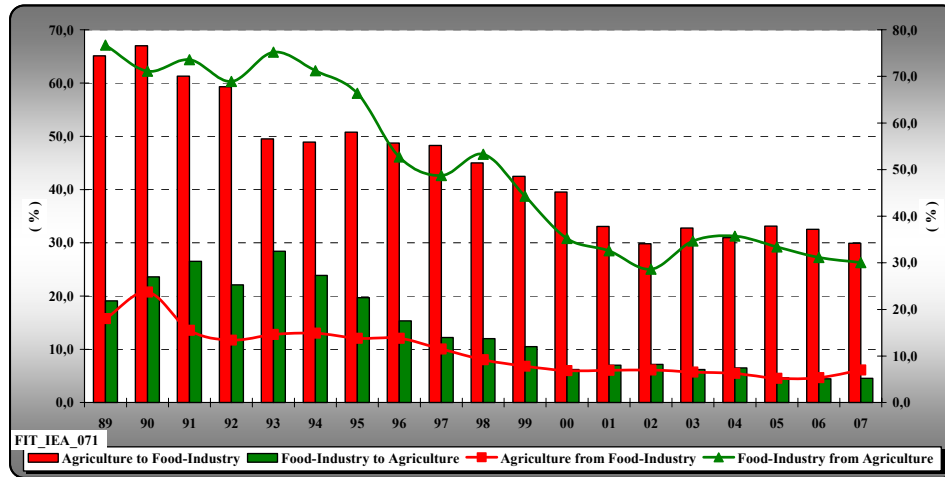
Source: own calculations, on the data from Nat. Accounts, 1990 - 2007, National Institute of Statistics, Bucharest;

Graph 11. Evolution of interrelations between agriculture and food industry, 1989–2007.

On the other hand, from the perspective of intermediary acquisitions, it is worth mentioning a stronger diminution (by 46.7%) of the intensity of intermediary purchases flows of the food industry from agriculture (from 76.7% in 1989, to 30.0% in 2007, with a variation coefficient of 35.8%).

At the same time, the intermediary acquisitions of agriculture from the food industry diminished their intensity by 11% (from 18.0% in 1989 to 7.0% in 2007, with maximum 23.7% in 1990, with a variation coefficient of 46.7%).

One of the explanations for the emergence and persistence of the agri-food disintegration phenomenon in the Romanian economy resides in the situation created by the excessive increase of the number of suppliers of agricultural raw materials, compared to the relatively low number of agri-food processors, an asymmetric "atomization" generating very high variation coefficients.

The other modality to reflect the internal agri-food economy convergence consists in measuring the intensity of intermediary deliveries (**LI**) and of inter-mediary acquisitions (**AI**) respectively, of each of the two component aggregates (agriculture – **a** and food industry – **ia**) in the corresponding total (Graph 12).

A few comments can be formulated with regard to the persistence of the agri-food disintegration phenomenon in the Romanian economy:

• The highest relative instability (measured by the variation coefficient) is found in the aggregate "agriculture", its shares ranging from 18.2% (1994) to 6.2% (2007), with a variation coefficient of 26.2%, in the intermediary deliveries and from 18.1% (1993) to 7.5% (2007) respectively, with the variation coefficient 21.2%, in intermediary acquisitions;

• The "food industry" aggregate presents lower decreasing shares, from 14.9% (1997) to 7.4% (2007), with an average variation of 15.2%, in the intermediary deliveries and from 13.2% (1998) to 7.0% (1991) respectively, with a variation coefficient of 16.8%, in the intermediary acquisitions.
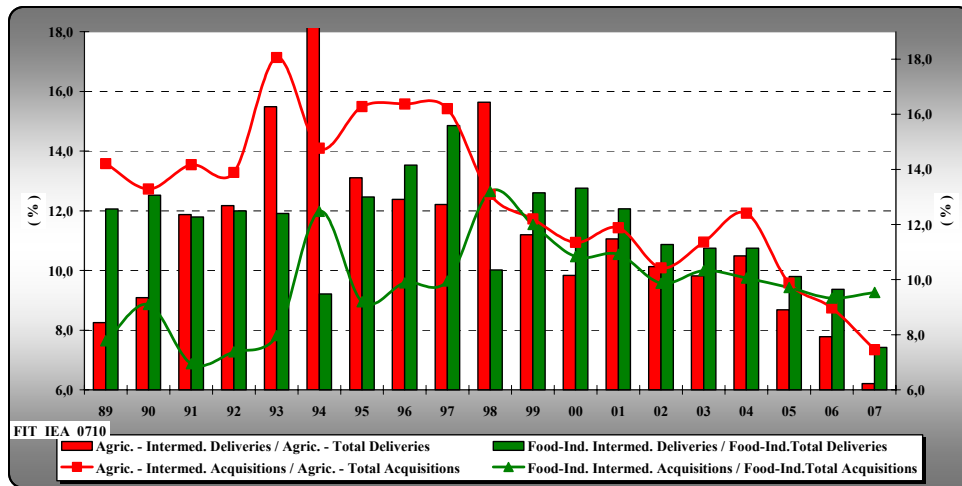
Source: own calculations, on the data from Nat. Accounts, 1990 - 2007, National Institute of Statistics, Bucharest;

Graph 12. Evolution of the share of agriculture and food industry in total intermediary deliveries (LIt) and total intermediary acquisitions (AIt), 1989–2007.

It obviously results that reaching economic convergence through agri-food integration is endangered by the relatively high instability of intermediary deliveries of agriculture, as a cumulative reflection of the weather-dependence influences and economic-organizational risks in this field.

4.3. Agri-food chain – Romania versus EU-27

In principle, a performant agri-food economy presupposes the existence of certain functional agri-food chains, in which each link (segment) should retain, out of the total productivity gain (measured by the valoric differential between the producer of agricultural raw materials and the final consumer), what it deserves on the basis of the effort made to generate value added.

In order to reveal the extent to which the organization of the agri-food economy features potential to generate internal or external competitiveness, we consider it useful to present a brief comparative diagnosis between Romania and EU-27 average, from the perspective of multicriterial structure of the agri-food chain, in two reference years (2005 and 2008) for which the most recent relevant statistical data are available (Graph 13).

From the perspective of the criterion "number of enterprises" (economic operators), at EU-27 level, structural changes of the agri-food chain can be noticed

in 2008 compared to 2005, in the sense of the absolute decrease (from 14.4 mil. to 13.7 mil.) and relative decrease (from 83.2% to 81.8%) of the economic operators in agriculture, while the shares of the other three links in the chain (wholesale trade, retail trade and public food consumption) increased, on a cumulative bases, by 1.6 percent. The first post-harvest segment (agri-food processing) also lost 0.2 percent; thus, we can say that practically the relative decline of the cumulative share (by 1.6 percent) of the economic operators in agriculture and processing was transferred to the other three segments.
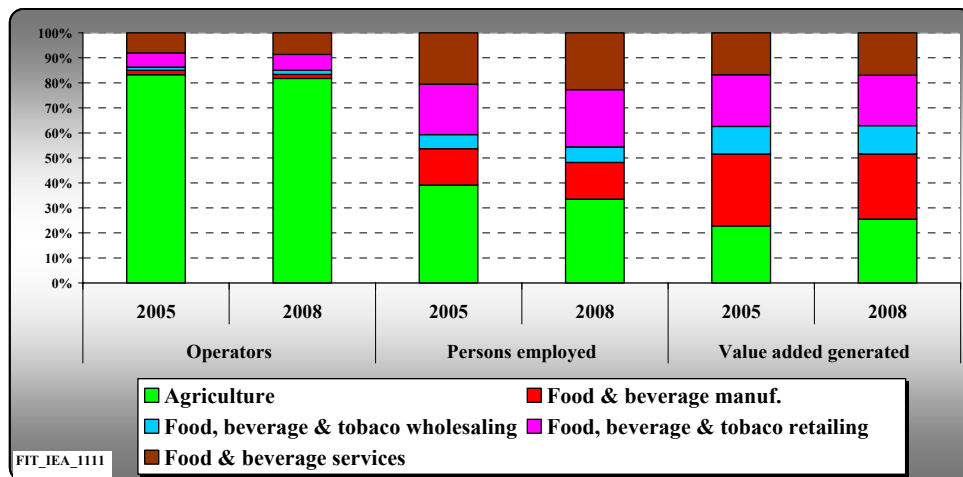
Graph 13. Multicriterial structure of the agri-food chain in the European Union, 2005–2008.

From the perspective of the criterion "number of employees", in three years' time (2006–2008), the share of the segment "agriculture" decreased by 5.7 percent, and these percentage points are distributed to the other four segments of the agri-food chain.

The diminution in number of the economic operators from the first segment of the chain (agriculture), in the conditions of a likely relative release of labour force, on the basis of productivity increase, induced a favourable effect in the EU agri-food system, i.e. the primary production of agricultural raw materials generates value added gain, which leads to the increase of this segment share (by 2.8 percent in 2008 compared to 2005) in the third criterion of analysis ("generated value added").

Romania went through the transition and pre-accession period with a very rudimentary "agrarian structural endowment", the excessive land fragmentation and the still unclear land tenure or land ownership status representing constraints to the plenary manifestation of the technical, organizational and managerial progress factors; the unrestricted manifestation of these factors would also make it possible for our country to experience the situations characteristic to countries with modern

economies and agricultural sectors, in which a decreasing number of holdings and labour input are able to increasingly provide the necessary agri-food products for the population, under increasingly restrictive competitiveness conditions.

Unfortunately the multi-structural structure picture of the agri-food chain in Romania looks entirely different from the overall picture of EU-27 (Graph 14).
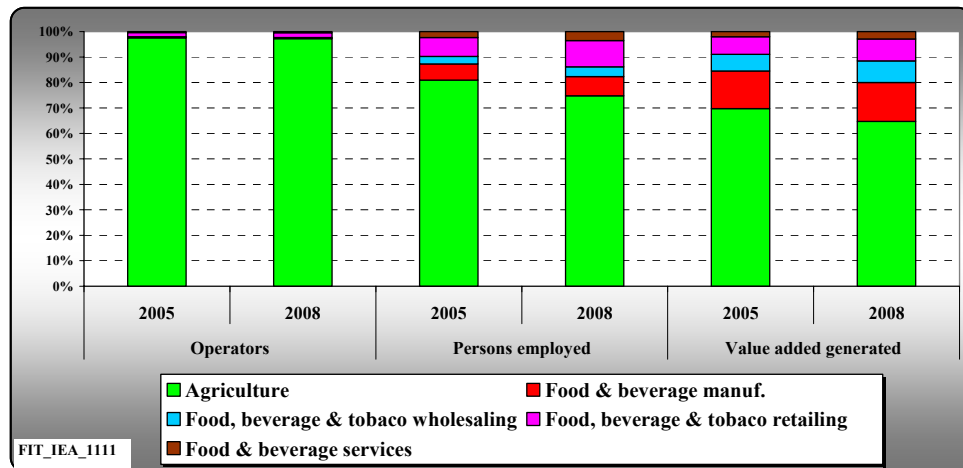
Source: own calculations, on the data from "Food - from farm to fork statistics", Eurostat Poketbooks, 2011 edition

Graph 14. Multicriterial structure of the agri-food chain in Romania, 2005–2008.

Briefly, between the two reference years (2005 and 2008), the structural changes in the configuration of certain performant agri-food chains through competitiveness were not produced yet; we rather experience the persistence of certain trends that reduce the multiplying effects of value added generated by the sector throughout the national economy. Otherwise, no full explanation could be found for the diminution of the share of agriculture in total economic operators of the agri-food chain from 97.5% to 97.2% in three years' time, i.e. a non-significant decrease.

Furthermore, the problem is that the diminution of the share (by 0.3 percent) of the segment agriculture in total operators of the agri-food chain was "outflanked" by a simultaneous diminution by 6.2 percent of the share of this segment in total labour input that consequently led not to a plus of value-added generation, but rather to a minus (of 5.0 percent).

The other four segments of the agri-food chain, whose cumulated shares with regard to the economic operators, accounted for 2.5% (2005) and 2.8% (2008), i.e. a very small number of non-agricultural economic operators put to work 19.1% of the employees from the entire chain, in the year 2005, and 25.3% in the year 2008, these generating 30.3% (2005) and 35.3% respectively (2008) of the value added from the Romanian agri-food chain.

Therefore, the brief diagnosis of the structural changes produced in the agri-food chains confirm certain partial conclusions formulated in other previous segments of our scientific approach.

4.4. Average degree of agri-food economy commercial opening

Simultaneously with the reductive effects of Romania's agri-food economy domestic competitiveness, in our opinion, it is quite interesting to reveal certain aspects linked to the external competitiveness of this important sector of national production, mainly in the conditions of Romania's EU membership.

The determination of the average degree of commercial opening[2] of the agri-food economy is based on a panel of indicators, calculated on the basis of National Accounts data, the most relevant being the export and import propensity of an economic entity (Graph 15).
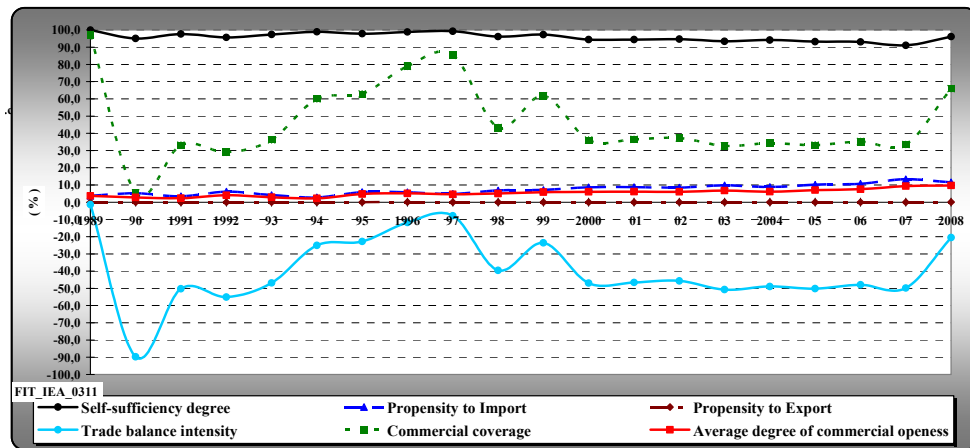
Source: own calculations on the base of Methode Bologne (1992), and data from National Accounts, NIS, Bucharest

Graph 15. Average degree of agri-food economy commercial openness in Romania, 1989–2008.

A few conclusions can be formulated from the analysis of the determinative indicators of the average degree of commercial openness:

• The radical and asymmetrical destructuring processes that took place in the agri-food sector after 1989 certainly induced strong reductive effects of the capacity of expression of Romania's agri-food economy on the foreign market, revealed by the almost non-existing export propensity throughout the transition and pre-accession period;

• The disintegration phenomenon, present in the Romanian agri-food economy and pointed up by the so-called "double fracture" (between the crop and livestock production, inside agriculture, on one hand, and between the agricultural

---

[2] Method developed by INEA Bologna, in the year 1991.

production and the agro-processing, inside the agri-food economy, on the other hand), made the import propensity of this sector to reach relative values ranging from 2.8% (1994) to 13.4% (2007) in the period 1980–2008;

   • Consequently, the very low export propensity, corroborated with the very strong import propensity determined an average commercial openness ranging from 2.2% (1994) to 9.7% (2008).

   The conclusion is that practically, Romania's agri-food economy connection to the foreign market was achieved almost exclusively through imports of agricultural products, which unfortunately do not create jobs and value added in the domestic agri-food sector.

4.5. Structure of farms and concentration level

   Inside agriculture, a factor that generates economic performance, at least at theoretical level, is considered to be the concentration of land resources, known in the specialty literature as "land consolidation".

   Certain signals are provided, in this direction, by the concentration process of agricultural holdings, which can be measured by the changes in the size structure of agricultural holdings, produced in the period between the two general agricultural censuses (GAC – 2002 and GAC – 2010) (Table 3).

Table 3
Basic data on the agrarian structure and concentration coefficients
in Romania's agriculture, 2002–2010

Hectares	GAC – 2002				GAC – 2010			
	Total holdings		Total Utilized Agricultural Area		Total holdings		Total Utilized Agricultural Area	
	'000	%	thousand ha	%	'000	%	Thousand ha	%
< 0.10	539,893	12.56	23,899	0.17	384,064	10.32	19,476	0.15
0.11 - 0.30	581,365	13.52	103,709	0.74	661,727	17.78	120,392	0.91
0.31 - 0.50	323,452	7.52	124,745	0.90	354,545	9.53	135,973	1.02
0.51 - 1.00	724,547	16.85	506,461	3.64	617,296	16.59	431,454	3.24
1.01 - 2.00	897,891	20.88	1272,610	9.14	712,243	19.14	1010,528	7.60
2.01 - 5.00	952,395	22.15	2907,957	20.87	727,155	19.54	2229,032	16.76
5.01 - 10.00	218,88	5.09	1440,944	10.34	182,218	4.90	1208,941	9.09
10.01 - 20.00	37,408	0.87	471,097	3.38	43,526	1.17	570,231	4.29
20.01 - 30.00	5,527	0.13	131,584	0.94	9,716	0.26	233,510	1.76
30.01 - 50.00	3,95	0.09	149,588	1.07	8,192	0.22	314,573	2.37
50.01 - 100.00	3,85	0.09	258,047	1.85	7,547	0.20	525,210	3.95
> 100.00	10,203	0.24	6540,068	46.95	13,656	0.37	6498,872	48.87
TOTAL	4299,361	100.00	13930,710	100.00	3721,885	100.00	13298,191	100.00
	Concentr. Coef. Ginni - Lorenz 2002 = 0.952				Concentr. Coef. Ginni - Lorenz 2002 = 0.960			

Source: Own calculations based on NIS data, 2011.

The data from the synoptic table above reveal, on one hand, that out of the 12 farm size groups, two "packages" of sizes are noticeable whose shares significantly changed in the year 2010 compared to 2002:

• In the first place, in four farm size groups, ranging from 0.51 to 10.00 ha, diminution of cumulative shares can be noticed, both in number (-4,8%) and in utilized agricultural area (-7.3%);

• In the second place, in other five farm size groups, ranging from 10.01 -> 10.00 ha, an increase of cumulative shares are noticeable, both in number (+0.8%), and in area (+7.05%);

• Under the background of a general diminution of the number of agricultural holdings, by 13.4% in 2010 compared to 2002, of a "loss" of utilized agricultural area of 4.5%, and in the context of above-mentioned structural changes, the Ginni-Lorenz concentration coefficients were determined, which range from 0.952 (2002) and 0.960 (2010) respectively.

The increase of Ginni-Lorenz concentration coefficient in the period between the two agricultural censuses, by an annual average rate of 0.105% reflects the existence of a true process of farm consolidation.

5. CONCLUSIONS AND OPENINGS

1. On the global competitiveness scale, Romania's economy dropped by 10 positions (from position 67 in the year 2010, to position 77 in 2011). More surprising is the fact that we are below Bulgaria, which "dropped" by only 3 positions (from position 71 in 2010, to position 74 in 2011);

2. GVA in agriculture, five years after the accession, is by 7.2% lower than in 2006, after a sinuous evolution (three drops and two growths), reflecting both the relative high instability of agriculture (weather dependency) and the non-functional assimilation of the EU agri-food market management mechanisms;

3. At five years after accession, agriculture continues "to work" with the lowest real prices and their level is expected to be by 13.1% lower in the year 2011 compared to the year 2006;

4. Romania's presence on the European Single Market meant a slight process of relative instability diminution, more in prices than in quantities.

5. The average productivity of fixed capital in Romania's economy had a steady decreasing trend, from 3.15 RON GVA-total ('07 prices) to one RON fixed capital stock ('07 prices), in the year 1990, to 0.45 RON / RON, in the year 2007;

6. Thus, with the diminution rates in the period 1997–2000, of the energy intensity of the economy, Romania could reach the average 2008 Community level after 121.2 years, with the "pair" of rates from 2001–2004, full convergence could be reached in 32.7 year, while with the "rates" of the period 2005–2008, 42.4 years would be needed in order to recover the energy performance gap between Romania and the EU-27 community average;

7. In the half decade of existence of the European Single Market, there is still the same "defective" correlation of the Romanian economy – faster growth of the real average wages (+34.2%) compared to labour productivity (+6.9%), the sharpest increase being signaled out in the period 2007–2008, followed by that estimated for this year;

8. The analysis of trends in the three consumer price ratios, seen from the agri-food economy perspective, reveals the fact that the contribution of the food commodity price movement to 'feeding' the general growth of consumer prices experienced an obvious diminution tendency, compared to the other two components of the total aggregate;

9. Five years of EU membership practically meant a persistence of agricultural production rebound (by 7.4% in the year 2011 compared to 2006), but also a consistent advance of food production (by 36.2%), which can make up for less than half of the decline compared to 1989;

10. The structural changes in the configuration of certain agri-food chains that generate performance through competitiveness have not been produced yet; we rather witness the persistence of reductive trends of value added multiplying effects generated by the sector in overall national economy;

11. The very low export propensity, corroborated with the very strong import propensity, determined in essence an average commercial openness level ranging from 2.2% (1994) to 9.7% (2008);

12. Under the background of a general diminution of the number of agricultural holdings by 13.4% in 2010 compared to 2002, and of a "loss" of utilized agricultural area of 4.5%, and in the context of the previously mentioned structural changes, the Ginni-Lorenz concentration coefficients were determined, which reached 0.952 (2002) and 0.960 (2010) respectively.

REFERENCES

1. Artis M. *et al*. (1994), *El sistema agroalimentario catalan en la tabla Input-Output de 1987*, Investigation Agraria-Economia (IAE), INITAA, Vol. 9, No. 1.
2. Barro R.J. and Sala-i-Martin X. (1995), *Economic Growth*, McGraw-Hill.
3. Enciso J.P. *et al*. (1995), *Una vision del complejo de producccion agroalimentario espanol en la decada de los ochenta*, Investigation Agraria-Economia (IAE), INITAA, Vol. 10, No. 3.
4. Toderoiu F. (2001), *Sectorul agroalimentar în România – mutaţii structurale multicriteriale comparative*, IEA – INCE, Bucureşti.
5. Toderoiu F. (2002) *Agricultura – resurse şi eficienţă – o retrospectivă semiseculară*, Ed. Expert, Bucureşti;
6. Toderoiu F. (2003), *Sectorul agroalimentar în România – corelaţii macroeconomice ale compe-titivităţii*, IEA – INCE, Bucureşti.
7. Toderoiu F. (2009), *Real Economic Convergence – European and National Dimensions*, Agricultural Economics and Rural Development, Volume 6, No. 2, Romanian Academy Publishers, Bucureşti, pp. 159–180; ftp://www.ipe.ro/RePEc/iag/iag_pdf/AERD0902_159-180.pdf.