

RESEARCH ON CONCENTRATION OF PORK PRODUCTION IN ROMANIA

Agatha POPESCU

University of Agricultural Sciences and Veterinary Medicine Bucharest, 59 Marasti, District 1, 11464, Bucharest, Romania, Phone: +40213182564, Fax:+40213182888, Email: agatha_popescu@yahoo.com

Corresponding author: agatha_popescu@yahoo.com

Abstract

The paper aimed to analyze the concentration of pig livestock and pork production in Romania between 2007-2014 based on the empirical data provided by National Institute of Statistics. Pork production declined due to the continuous pig livestock decrease. Pig distribution is relatively uniform by micro region of development. The West region is in the top for the pig livestock and pork production. It is followed by South Muntenia and South East regions. In all the other regions, pork production declined. The lowest pork production is in Bucharest-Ilfov area. The values of Herfindahl-Hirschman Index varied between $HHI=0.137$ in 2007 and $HHI=0.154$ in 2014, while the Gini-Struck coefficients ranged between $GS=0.119$ in 2007 and $GS=0.159$ in 2014, reflecting a good uniformity of production distribution but also a slight trend to a moderate uniformity to the end of the period. As long as domestic production is not enough to cover consumption, pig breeders should be supported to increase production, otherwise they will fail and imports will continue to cover market demand because of the overproduction in the Western countries.

Key words: concentration, Gini-Struck Coefficient, Herfindahl-Hirschman Index, pork production, Romania

INTRODUCTION

Pork meat represents 22.6 % of meat output. With 6.6 million pigs, Romania comes on the 8th position in the EU. About 79 % of pigs are raised in small family farms practicing an extensive growing system and only 19.2 % are grown in commercial holdings with vertical integration. (Moldovan, M., 2010) [3] About 45 % of meat production is represented by pork, because pork is traditional in Romanian's diet. As meat production does not cover consumers' need, imports have deeply grown and about 70 % of the domestic demand is covered by import (Nistor, et al, 2010)[4], Soare, E. et al., 2015) [8].

In meat consumption per inhabitant, pork comes on the 1st position (34.18 kg), poultry meat on the 2nd position (21 kg), and beef on the 3rd position (Popescu Agatha, 2013) [5]. The distribution of pork production is different from a region to another being influenced by a large range of factors: number of pigs per farm, extensive or intensive growing technology, quality of the biological material, feeding, and live weight at delivery,

local technical and economical conditions.

In this study, pork production was considered only depending on pig livestock and its distribution in the territory of Romania, all the other factors being considered constant.

The purpose of the paper was to analyze the trend of pig livestock and pork production in the eight micro regions of Romania, the dispersion in the territory of these two indicators using Gini-Struck coefficient and Herfindahl-Hirschman Index which are commonly used when concentration is studied.

MATERIALS AND METHODS

In order to set up this paper, the following indicators were taken into account: number of pigs at national level and by micro regions and pork production at national level and its distribution by micro region. Also, it was presented the situation of the share of pork production in total meat production at national level, pork consumption and its share in meat consumption per inhabitant, and also the dynamics of meat price per kg live weight.

The empirical data were collected from Romania's Statistical Yearbooks, 2008-2015[6], and also from Tempo-online Data base of the National Institute for Statistics[9]. The period of reference was 2007-2014. The Herfindhal-Hirschman Index was calculated according to the formula:

$$H-H = \sum_{i=1}^n g_i^2 \quad (1)$$

where n is the number of micro regions of development, in Romania $i=1, \dots, 8$, and g_i^2 is the square of the share of each micro region in the total value of the analyzed indicator, in this case, pig livestock and respectively, pork production. The H-H Index values $\in [0,1]$.

The Interpretation of the H-H Index is the following one: (i) H below 0.01 indicates a high uniformity among the micro regions regarding either pig livestock or pork production; (ii) H below 0.15 indicates an unconcentrated status of pig number or production; (iii) H between 0.15 to 0.25 indicates a moderate concentration; (iv) H above 0.25 a relative high concentration and (v) H over 0.5 means a high concentration of production, producing high discrepancies among regions. (Hirschman, A.O., 1964)[1]

The Gini-Struck coefficient was determined using the formula:

$$GS = \sqrt{\frac{n \sum_{i=1}^n g_i^2 - 1}{n-1}} \quad (2)$$

The values of GS coefficient $\in [0,1]$. Therefore, a similar interpretation could be given to the results. If the GS value is close to zero, it is equity regarding the dispersion of pigs or pork production among the micro development regions. If the GS value is close to 1, this means a huge inequality among regions.

In general, when the value exceeds 0.5, it is about a high concentration. When, the value is higher than 0.3, it is about a relative concentration (Iosifescu, et al., 1985[2], Săvoiu, G., 2009 [7].

The results were tabled and graphically represented and the corresponding comments were made.

RESULTS AND DISCUSSIONS

The pig livestock in Romania declined by 23.2 % from 6,564.9 thousand heads in 2007 to 5,041.7 thousand heads in 2014. Among the main causes of this declined have been the following ones: the high price of farm inputs, the high production cost, the small price per kilogram live weight offered by meat processors and the lack of support for the Romanian pig farmers, the cheaper pork imports in the market, the orientation of consumers to chicken meat, a healthier and cheaper sort of meat. (Fig.1.)

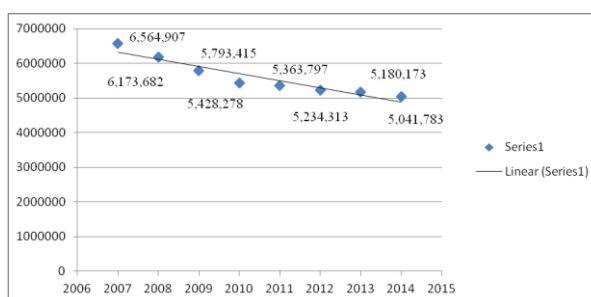


Fig.1. Dynamics of Pig Livestock, Romania, 2007-2014 (heads)

Source: Romania's Statistical Yearbook, 2008-2015[6], Own design.

Pork production also declined, being determined by the number of slaughtered pigs, and their live weight at slaughter. In 2014, pork production accounted for 535 thousand tons, being by 16.67 % less than in 2007, when it accounted for 642 tons.(Fig.2.)

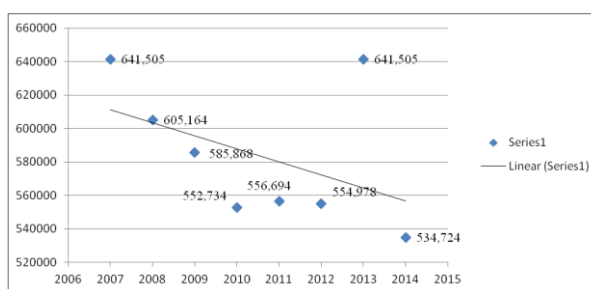


Fig.2. Dynamics of Pork Production, Romania, 2007-2014 (tons)

Source: Romania's Statistical Yearbook, 2008-2015 [6], Own design.

The share of pork production in total meat production in Romania varied from a year to another, between the minimum 40.51 % in 2009 and the maximum 49.44 % in 2013. In

2014, its weight accounted for 40.64 % compared to 42.68 % in 2007. Therefore, it was noticed a slight decreasing trend. (Table 1).

Table 1. The share of pork production in total meat production, Romania, 2007-2014 (%)

2007	2008	2009	2010	2011	2012	2013	2014
42.68	42.43	40.51	42.34	41.02	41.65	49.44	40.64

Source: Romania's Statistical Yearbook, 2008-2015 [6], Own calculations.

The average pork consumption/inhabitant declined by 10.5 % from 33.4 kg/capita in 2007 to 29 kg/capita in 2014, due to the high pork price at consumer level and orientation of consumers to chicken meat which is cheaper and with less cholesterol.

The weight of average pork consumption in the total meat consumption varied from a year to another, with a maximum 57.3% in 2010 and the minimum 50 % in 2007. In 2014, pork consumption represented again 50 % in the total meat consumption like in the year 2007. (Table 2).

Table 2. Average pork consumption compared to meat consumption/inhabitant in Romania, 2007-2014 (kg/capita)

	2007	2008	2009	2010	2011	2012	2013	2014	2014/2007 %
Average pork consumption	32.4	34.6	34.3	33.3	30.5	29.6	29.1	29	89.50
Average meat consumption	64.7	66	67.3	59.9	56	55.3	54.4	57.8	89.33
Share of pork (%)	50.0	52.4	50.9	57.3	54.5	53.5	53.5	50.2	-

Source: Own calculations based on National Institute of Statistics, Tempo-online Database, 2008-2015 [9]

The average farm gate price per kg live weight increased by 75 % from Lei 3.55/kg in 2007 to Lei 6.20/kg in 2014. However, the acquisition price is still very low compared to production cost, whose level is deeply determined by the cost of the farm inputs.(Fig.3.)

(16.12%), North West region (13.38 %0 and South West Oltenia region (12.41 %).

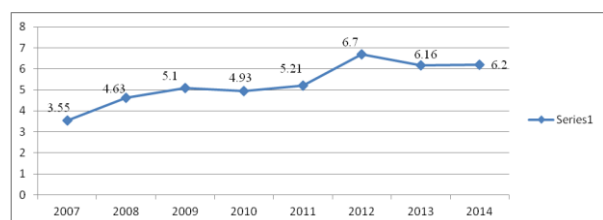


Fig.3. Dynamics of average farm gate price for pig live weight (Lei/kg)

Source: Own calculations based on National Institute of Statistics, Tempo-online Database, 2008-2015[9]

The dispersion of pig livestock in the territory by micro regions of development reflects theta the most numerous pigs are in the West region (18.77%, followed by South Muntenia region (17.72 %), South East region

The lowest share pig livestock in the total pig livestock is recorded in Bucharest-Ilfov area (1.13 %).

The share of pig livestock has continuously increased in the West region from 14.75 % in 2007 to 18.77 % in 2014. Also, increased shares were noticed in the analyzed period in the South East region from 13.48 % in 2007 to 16.12 % in 2014 and in South Muntenia from 17.25 % in 2007 to 17.72 % in 2014.

In all the other micro regions: North West, Centre, North East, Bucharest Ilfov and South West Oltenia, the share of pig livestock in the total number of pigs in the country declined. (Table 3).

The concentration of pig livestock in terms of Herfindahl-Hirschman Index and Gini-Struck Coefficient confirms the same relatively uniform distribution of pigs on Romania's territory by micro regions. Gini-Struck Coefficient varied between 0.119 in 2007 to 0.159 in 2014, reflecting a slight trend of loss in pig livestock concentration. Its

value ranged between the minimum value GS= 0,110 in the year 2009 and the maximum value GS= 0.159 in 2014.(Fig.4.)

Table 3. The distribution of the number of pigs by micro regions of development, Romania, 2007-2014 (%)

	2007	2008	2009	2010	2011	2012	2013	2014
Pig livestock (heads)	6,564,907	6,173,682	5,793,415	5,428,272	5,363,797	5,234,313	5,180,173	5,041,788
North West	13.48	13.67	13.01	12.67	12.69	12.95	13.14	13.38
Centre	11.58	10.43	10.49	9.78	9.96	9.78	9.45	9.59
North East	12.28	12.05	11.98	10.53	10.83	10.52	10.78	10.88
South East	13.48	14.01	14.97	16.72	16.22	15.92	16.24	16,12
South Muntenia	17.25	16.94	16.88	17.48	17.68	17.74	17.65	17.72
Bucharest-Ilfov	2.93	2.99	3.14	3.00	2.36	2.01	1.40	1.13
South West Oltenia	14.25	14.83	13.67	12.78	12.88	12.82	12.52	12.41
West	14.75	15.08	15.86	17.04	17.38	18.26	18.76	18.77

Source: Own calculations based on National Institute of Statistics, 2008-2015, [6]

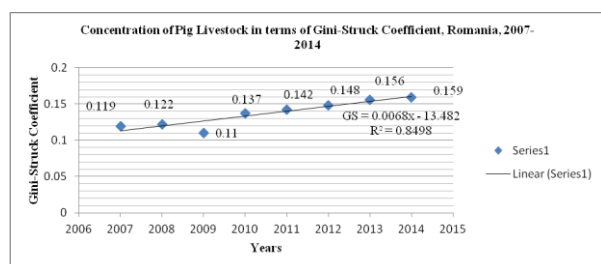


Fig.4. Concentration of pig livestock in terms of Gini-Struck Coefficient, Romania, 2007-2014

Source: Own calculations and design.

Herfindahl-Hirschman Index varied between HHI= 0.1375084 in the year 2007 and HHI= 0.1470814 in the year 2014, with the minimum value HHI= 0.1355987 recorded in the year 2009.

The values are small with a slight increasing trend like in the case of Gini-Struck Coefficient, reflecting a relative uniform dispersion of pig livestock on Romania's territory. (Fig.5.)

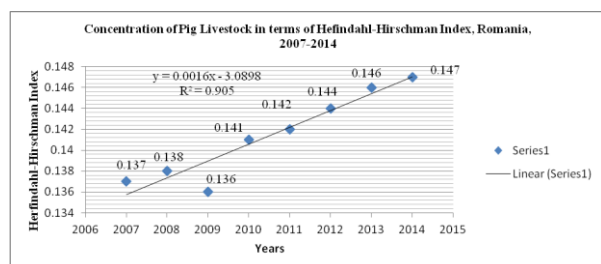


Fig.5. Concentration of pig livestock in terms of Herfindahl-Hirschman Index, Romania, 2007-2014

Source: Own calculations and design.

The dispersion of pork production in the territory by micro regions of development reflected that the most pork is produced in the West region with a share of 24.03 % in 2014 compared to 16.58 % in 2007 in the total pork production achieved in the country. In this area, pork production has continuously increased due to the pig number growth and also of a good pig live weight at slaughter.

Pig farming is deeply influenced by cereals production in the West Plain of Romania.

An ascending trend was also noticed in the South East region from 13.24 % in 2007 to 15.49 % in 2014.

In all the other regions, the pork production declined.

Bucharest-Ilfov area recorded the lowest share in total pork production, 3.1 % in 2007 and 1.3 % in 2014.(Table 4).

The concentration of pork production in terms of Herfindahl-Hirschman Index and Gini-Struck Coefficient is small, as the values of these indicators are closer to zero, reflecting a relative good uniformity in producing this sort of meat.

However, the evolution of Gini-Struck coefficient from 0.119 in 2007 to 0.159 in 2014 reflected a slight loss in pork production uniform dispersion in the territory.

The lowest Gini-Struck coefficient was GS= 0.109 recorded in 2008 and the highest one was GS= 0.195 registered in the year 2012.(Fig.6).

Table 4.The distribution of the pork production by micro regions of development, Romania, 2007-2014 (%)

	2007	2008	2009	2010	2011	2012	2013	2014
Pork production (tons)	641,505	605,164	584,868	552,734	556,694	554,978	641,505	534,724
North West	13.33	12.85	13.81	11.09	12.46	11.70	13.33	12.43
Centre	12.51	12.41	11.18	10.45	9.76	10.41	12.51	11.97
North East	11.65	11.40	10.86	10.49	9.99	10.62	11.65	10.17
South East	13.24	13.62	14.30	15.87	17.94	16.35	13.23	15.49
South Muntenia	17.13	17.29	16.82	17.71	14.51	14.47	17.12	15.52
Bucharest-Ilfov	3.18	4.05	3.38	2.31	2.06	1.82	3.19	1.31
South West Oltenia	12.38	13.15	10.74	9.57	9.07	8.74	12.39	9.08
West	16.58	15.23	18.91	22.51	24.21	25.89	16.58	24.03

Source: Own calculations based on National Institute of Statistics, 2008-2015[6]

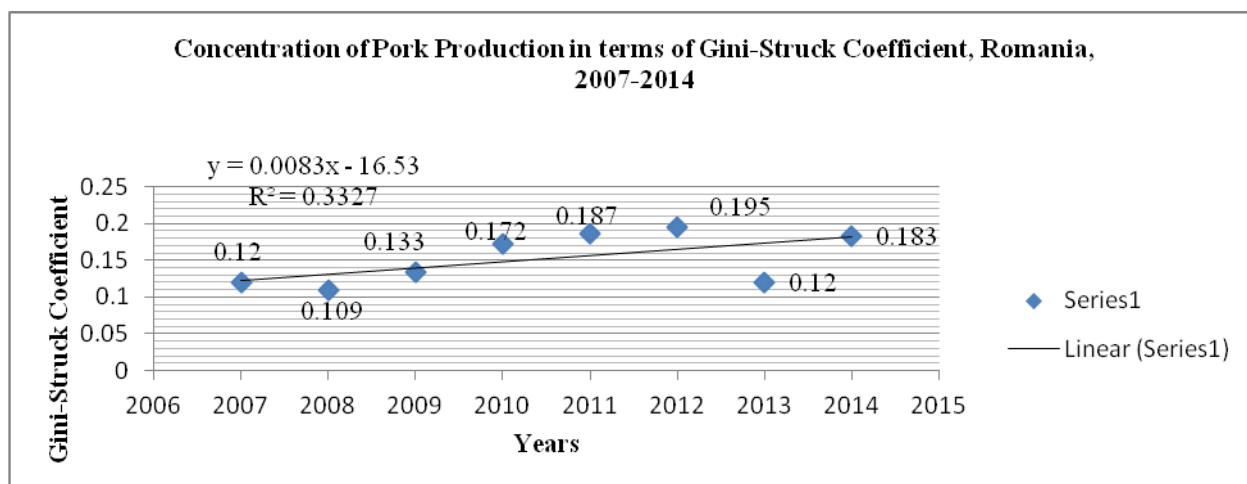


Fig.6. Concentration of pork production in terms of Gini-Struck Coefficient, Romania, 2007-2014 Source: Own calculations and design.

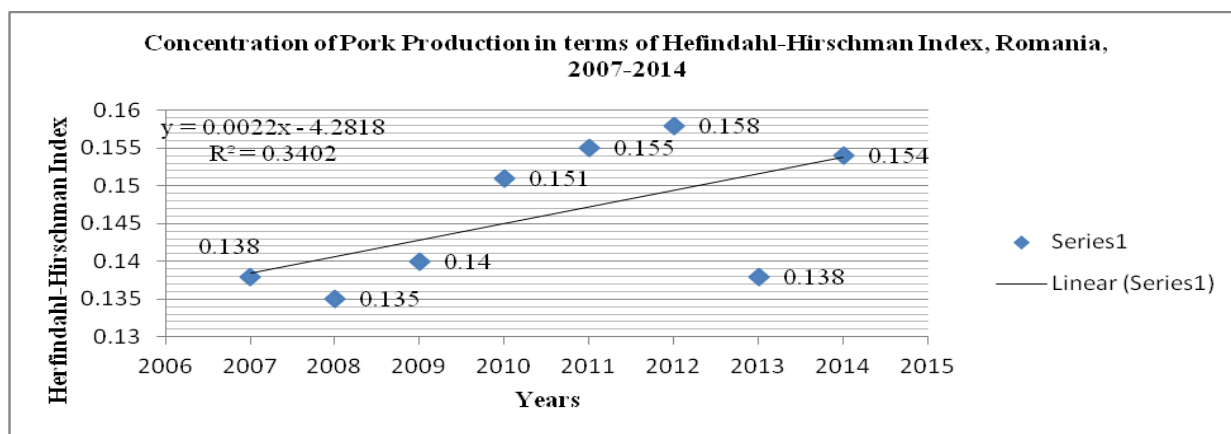


Fig.7. Concentration of pork production in terms of Herfindahl-Hirschman Index, Romania, 2007-2014 Source: Own calculations and design.

Herfindahl-Hirschman Index varied between $HHI= 0.1376915$ in the year 2007 and $HHI= 0.1543624$ in the year 2014, with the minimum value $HHI= 0.1354814$ recorded in the year 2008. The small values, close to zero, like in case of Gini-Struck Coefficient, showed a good dispersion of pork production on Romania's territory. (Fig.7.)

CONCLUSIONS

In Romania, pork production declined due to the continuous decrease in pig livestock. This is a consequence of high price of the farm inputs, the high production cost, the low acquisition price per kg live weight at slaughter, consumers' orientation to a lean meat like chicken meat, which is also cheaper than pork in the market, the lack of support for pig breeders and the embargo imposed by the EU-28 to Russia, which led to an overproduction in the community.

Pig dispersion in the territory is relatively uniform among the micro regions of development. The West region is in the top for the number of pigs, as here there are good conditions for raising this species favored by cereals production. Also, in South Muntenia region and South East regions the pig livestock increased for the same reason. In all the other regions, pork production decreased.

In Romania, pork production dispersion by micro regions reflected a relatively uniform cover of the population's meat demand. However, the highest pork production is produced in the West area and the lowest one in Bucharest-Ilfov area.

This trends were confirmed by the values of Herfindahl-Hirschman Index and Gini-Struck coefficients. They showed a good uniformity of production distribution but also a slight trend to a moderate uniformity mainly to the end of the period which is expected to continue in the future as illustrated by the trend slope and linear regression.

REFERENCES

- [1]Hirschman, A.O., 1964, The paternity of an Index, în American Economic Review, p.761-762.
- [2]Iosifescu, M., Mineagu, C., Trebici, V., Ursianu, E.,

1985, Small Statistics Encyclopedia, Scientific and Encyclopedic Press House, Bucharest, pp.172-174, 179-181

[3]Moldovan, M., 2010, The Romanian meat sector-characteristics and post-accession assessment, Agricultural Economics and Rural Development, New Series, Year VII, no. 1, p. 141–159, 2010,

[4]Nistor, E., Bampidis, V., Pet, L., Ciolac, V., 2010, Impact of EU Enlargement on the Romanian Meat Industry, Scientific Papers: Animal Science and Biotechnologies, 2010, 43 (2), 364-368

[5]Popescu Agatha, 2013, Research on consumer behaviours on Bucharest meat market, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol. 13(1):301-307

[6]Romania's Statistical Yearbooks, 2008-2015,

[7]Săvoiu, G., 2009, Statistica. Mod de gândire și metode, Ed. Universitară, București, pag.130-134.

[8]Soare, E., Balan, A., David, L., 2015, Research on pork market in Romania, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 15(1):483-491

[9]Tempo-online Data base, National Institute for Statistics, 2015