

RAPESEED MARKET IN ROMANIA. THE DETERMINANTS REGARDING THE DECISION TO CULTIVATE RAPESEED

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Abstract

The paper presents an analysis on market elements that can influence the decision to cultivate rapeseed. We have studied the market features as estimators on market supply-demand ratio (the annual production, imports and exports of rapeseed) and the area under rapeseed production as concrete estimator on decision to cultivate. Inter-conditionality analysis between estimators of market and the estimators of decision to cultivate, made for a time interval of 12 years (2002-2013) emphasized that, in the Romanian market of rape, one of the significant factors influencing the decision to growth (taken in the previous year at seeding) is the value of exports of rape in the harvest year. It also revealed that in recent years, it has generated a system of specialized farms in rapeseed production associated to the international market requirements. It also highlighted the fact that domestic market of rapeseed (understood as internal consumption) does not influence the decision to cultivate rapeseed, it behaving more as a residual market in relation to the export market.

Key words: rapeseed, decision, crop, area, export.

INTRODUCTION

The decision to cultivate is recognized under the Common Agricultural Policy as an inalienable right of the farmer, in relation to which there are generated strategies and policies for agricultural development in Member States. As an indirect result, that right is recognized for the surface subsidy to which the farmer calls in a voluntary manner, so that his right of decision to be respected as a fundamental right derived from the economic freedom. The decision to cultivate is essential to start the production. At conceptual level, the decision to cultivate derived from the paternalism of agricultural production (Snedecor and Cochran, 2010). Decision to cultivate as individual expression of a person is caused by some attributes: experience, knowledge, education, financial capacity, expectations, risks and opportunities, level of psychic and material satisfaction of the decision maker in relation to the result of a

previous decision of the similar nature and level, etc. (Snedecor and Cochran, 2010). Once adopted, the decision to cultivate becomes a partly irreversible exercise in the production process. The significant increase areas sown with rapeseed in the range of 2002-2013 showed a decision of Romanian farmers caused by the demand on the market rape, this being characterized mainly as a commercial culture par excellence.

In this paper we intend to analyze how the elements of the market, understood as estimators of supply-demand ratio (volume of supply, the volume and value of exports and imports), influencing the decision of the Romanian farmer to cultivate, as rape cultivator. Because the volume of cargo offered the market is a complex variable generated by acreage, crop technology applied, conditions eco-climate of the growing season, it is clear that the main estimator for the decision to grow is cultivated area, as an expression of free will of the farmer.

MATERIALS AND METHODS

To highlight which of the elements of the rape market can influence the crop decision, there were analyzed the variations in sown area, total production, imports and exports of rapeseed, during 12 years (2002-2013).

Concerning the data, the area and production were retained from the Statistical Yearbooks of

NIS (National Institute of Statistics), Section 14 – Agriculture; cross-border transactions (imports / exports in quantities and value) came from statistics of Ministry of Agriculture and Rural Development (MARD), Romania, and volume to the domestic market was obtained by addition the productions with the imported quantities, and then, decreased with the exported quantity (Table 1).

Table 1. Variability of the rape market in Romania during the period 2002-2013

Year	Surface	Production	Import	Export	Imports value	Exports value	Domestic market
	thou ha	thou tons	thou tons	thou tons	thou \$	thou \$	thou tons
2002	74.6	35.9	0.68	10.33	731.82	2,091.56	26.25
2003	17.1	8.1	0.45	2.73	1,005.34	724.90	5.82
2004	49.7	98.7	0.41	37.26	687.38	9,486.05	61.84
2005	87.8	147.6	0.72	111.67	773.48	28,407.18	36.65
2006	110.1	175.1	4.66	130.93	4,175.24	39,627.56	48.83
2007	364.9	361.5	9.70	279.13	10,731.34	107,016.26	92.08
2008	365	673	76.36	564.03	53,806.97	363,804.71	185.33
2009	419.9	569.6	70.47	782.19	39,883.02	312,880.10	-142.1
2010	537.3	943	241.04	1052.37	113,316.81	435,280.10	131.68
2011	392.7	739	70.68	577.21	71,316.51	383,361.78	232.48
2012	105.3	157.5	59.47	68.25	53,531.38	53,971.27	148.72
2013	276.6	666.1	26.84	471.93	28,259.84	255,190.33	221.01

Source: NIS, MARD Romania

For data analyze, there were used specific statistical methods for string variation with a small number of variables: the arithmetic mean, the standard deviation, variability of mean, median, trend of strings variation (Scorepa, 2011). To highlight the extent to which the market variation elements influencing the decision to cultivate in its direct expression (acreage) it preferred to be used the correlation coefficient, as a robust estimator for the way in which the change of sequence of values is associated to the variation of another set of values, assumed to be in interdependent relationship (Snedecor and Cochran, 2010). In this context, given the specificity of the growing season for autumn rape crop (this one mostly cultivated in Romania), there have modeled a number of correlations on possible association with acreage, namely: annual correlation expressions (AA in the text), the correlation between the variations of the previous years with the changes in the posteriori years (AA-AP in the text). In temporal timing of autumn rape crop, the decision to culture should be expressed and assumed in September of the current year, for the market of the following year, verifying the

reliability decision to culture as a result of the game demand/supply can be highlighted after around nine months (June/July, a year later). Analyzing the dependencies between area variability and variation in the market elements might reveal which of these contribute significantly to the decision to culture.

RESULTS AND DISCUSSIONS

A first analysis of variation in cultivated areas confirms the exponential growth of cultivated surfaces for rape, with sharp rise in the 2005-2007 period, probably under the direct influence of "biodiesel fever" (Stelian, 2005) which generated a significant demand for rapeseed in the EU market (see Figure 1 below). This sharp increase, more exponential than linear ($y = 3E-176e^{0.2039}$, $R^2 = 0.476$ vs. $y = 30.048x - 60.088$; $R^2 = 0.375$) confirms that the market demand influenced directly and irreversible the farmers' decision to cultivate. Consequently, analyzing product market transactions is likely to find out which market characteristics influenced the decision crop of farmers. One should also note that the range of analysis is divided in at least three sub slots

2002-2006, 2007-2010 and 2011-2013, suggesting a change in the Romanian Rape market mechanisms, probably due to specific relationships resulting from linking national market to the Community market.

Statistical analysis can be made on the intervals between 2002-2006 and 2007-2010, the period 2011-2013 remaining outside the statistical

analysis, due to the small number of variables (Scorepa, 2011 and Snedecor & Cochran, 2010).

For this reason, and because this range is found under the influence of CAP 2007-2013 programming, it was associated with the previous one, resulting in a statistically assured interval 2007-2013.

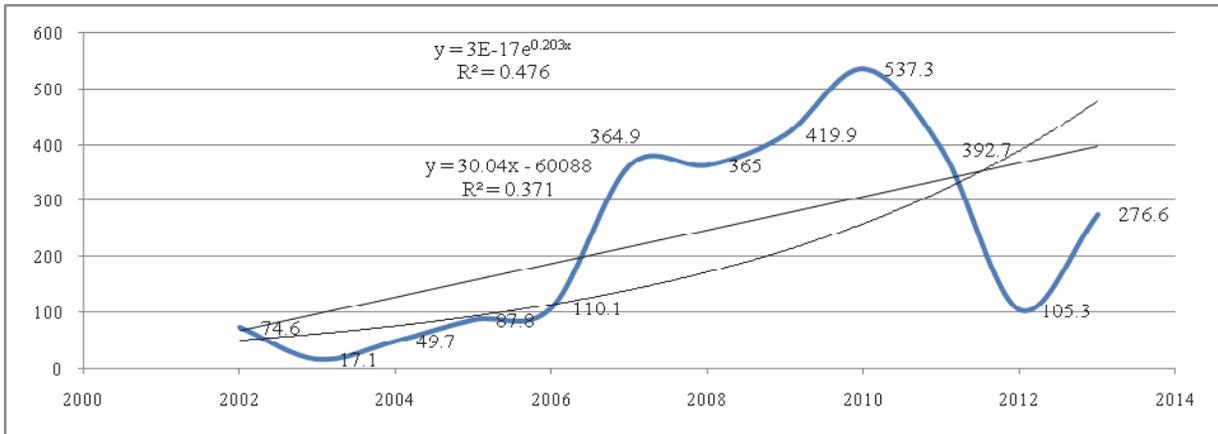


Figure 1. Changes in surfaces with rapeseed, Romania, 2002-2013, thou hectares
Source: own representation, 2017

Variance analysis of the market strings estimators indicating (Table 2) that the analyzed interval confirms the trend of increasing cultivated areas, with a similar increase in trend for the rest of the analyzed parameters. The variation registered during

2011-2012 period is in fact a decrease in area under rapeseed, probably due to the significant decrease in farmers' incomes in the decision year and this, at its turn, probably due to the significant fall of the market in terms of volume and value.

Table 2. Analysis of variation of rapeseed market in Romania, 2002-2013 period

	Surface thou ha	Production thou tons	Imports thou tons	Exports thou tons
Trend	+0.0124* 10 ³	+0.0081* 10 ³	+0.0267* 10 ³	+0.0062* 10 ³
Median	193.35	268.30	18.27	205.03
Average	233.42	381.26	46.79	340.67
Deviation	177.75	320.68	68.75	345.67
Deviation %	76	84	146	101
Median-Average	-40.07	-112.96	-28.52	-135.64
		Value of Imports thou \$	Value of Exports thou \$	Domestic consumption thou tons
Trend		+0.0001* 10 ³	+0.00001* 10 ³	+0.0189* 10 ³
Median		19,495	80,493	76.96
Average		31,518	165,986	87.38
Deviation		36,044	170,032	105.32
Deviation %		114	102	120
Median-Average		-12,022	-85,493	-10.42

Source: own calculation

In the table above, it is noted a great variation (76%/surface, 146%/imports) around the mean value of all analyzed parameters, which indicates a production sector extremely dynamic and extremely sensitive in terms of decision of culture, to the variations induced by the economic environment, respectively by the market. It is more than obvious that the analysis

of variation in relative values indicate that the sown area (the material expression of the decision to cultivate) showed the lowest variability (76%), followed by production (84%), in comparison with other market estimators (100-120%), which confirms that culture once decided, by its irreversible nature, likely consequences induced by market

fluctuations are less predictable. The trend of increasing variables expression for next time interval is relatively small, and it is confirmed by the fact that the average is higher than the median, being on the right side of the curve of variation (Scorepa, 2011). The discrepancies recorded between the two main sub slots time, statistically relevant, 2002-2006 and 2007-2013 (as we already mentioned, the period 2011-2013 cannot be accepted as statistically relevant being held for two years, to three minimum acceptable for statistical processing of strings variation) was carried out in Table 3. We note that in the second subinterval time (2007-2013), variability of surface and rapeseed production is significantly reduced, suggesting some stability to the decision to culture and consequently for the areas and annual productions.

In absolute terms both elements (surface and production), grow in a significant manner, which induces an increase in supply in the market and obviously in the revenues obtained by sale of products. Thus, it was noticed a significant increase in quantities of rape exported and consumed in the domestic market, with a significant increase in imports of rapeseed. This paradox suggests that for Romanian farmers demand in foreign markets is a priority in the economy of culture. This increase of imports conduct to the statement that on the internal market there are not operators able to buy and to provide the necessary processing immediately after harvest culture, ensuring their consumption needs through purchases from the international market, off-season harvest.

Table 3. Analysis on the variation of characteristics in rape's market between subperiods

	Area thou ha	Production thou tons	Imports thou tons	Exports thou tons
sub-period 2002-2006				
Average	67.86	93.08	1.38	58.6
Deviation	35.8	71.1	1.8	59.1
Variab.	52.8	76.4	132.8	100.8
sub-period 2007-2013				
Average	351.7	587.1	79.2	542.2
Deviation	133.8	257.9	75.6	321.0
Variab.	38.1	43.9	95.5	59.2
Analysis of differences between sub-periods				
Dif.	283.8	494.0	77.8	483.6
SD	53.1	102.5	28.6	124.2
DL 5%	114.6	221.5	61.8	268.2
Semnif.	*	*	*	*
		Value of Imports thou \$	Value of Exports thou \$	Domestic consumption thou tons
sub-period 2002-2006				
Average		1,474.66	16,067.46	35.9
Deviation		1,514.7	17,185.6	21.4
Variab.		102.7	107.0	59.8
sub-period 2007-2013				
Average		52,978.0	273,072.1	124.2
Deviation		33,028.6	143,870.2	127.4
Variab.		62.3	52.7	102.6
Analysis of differences between sub-periods				
Dif.		51,503.3	257,004.6	88.3
SD		12,502.0	54,918.3	49.1
DL 5%		27,004.3	118,623.5	106.1
Semnif.		*	*	*

Source: own computation, 2017

The discrepancies between sub slots indicate a much more important aspects than simple quantitative variations and their significations. The fact that area and production externalize significantly lower coefficients of variation in relation with the exports and domestic market (38.1%/43.9% versus 59.2%/102.6%) suggests a certain islanding decision for cultivate. In other words, it was created in Romania a

system of specialized farms in the culture of rape which is constituted as net commercial crop, producing profit in any situation fluctuation of the market product (ratio supply / demand and values / prices traded). Analysis of linear correlations between the changes in market characteristics in relation to the cultivated area (Table 4) performed within the calendar year (AA) or in the gap between

calendar years (AA-AP) highlights that in both cases the decision expressed by the occupied area is strongly and significant associated with the expression of market characteristics variation throughout the 12 years of analysis (excluding consumption in the domestic market). In terms of reliability the two approaches, namely the correlations within the same year and correlations between the year of the decision of crop (previous year) and the

marketing year related with that decision (next year), the differences between the correlation coefficients are statistically insignificant for probabilities higher than 95% (P value% <5%). If the case when it has been used a probability of 90% (P% values <10%), significant correlations emerges within the year between area and production, respectively export quantity and its value.

Table 4. Correlation between cultivated area and the characteristics of the rape market during 2002-2013

	AA	Sig.	AA-AP	Sig.	Δr	P%
Annual occupied area vs.:						
Annual production	0.935	*	0.683	*	1.781	7.2
Imports - quantity	0.755	*	0.701	*	0.240	84.1
Exports -quantity	0.945	*	0.673	*	1.988	5.7
Imports- value	0.780	*	0.874	*	-0.622	55
Exports - value	0.922	*	0.773	*	1.182	23
Domestic consumption	0.240	NS	0.301	NS	-0.136	92

$r^* > 0.55$

Source: own computations, 2017

The most likely explanation of these determinations is that in order for the currently crop (which is taken generally in August-September, at the end of the annual sales period) farmer has the recent image of how capitalized the decision to cultivate for the previous year. Regarding the role of domestic consumption in the farmer' decision to grow, analysis reveals that it is not participating even with 10% ($r = 0.240$; $R^2 = 5.76\%$) while assuming AA-AP relationship with the internal market, it proves to have a slightly negative influence ($r = - 0.136$; $r^2 = 1.84\%$) of the decision of culture.

The analysis conducted in the case of two intervals statistically significant confirmed that the decision to culture is significantly influenced by exported production in the crop year ($r = 0.897$; $R^2 = 80.5\%$) for 2007-2013, while for the time range 2002-2013, domestic

consumption has a slightly negative influence not significant ($r = - 0.247$; $r^2 = 6.1\%$). The analysis allowed us to confirm the hypothesis that in fact rape crop was strengthened after EU accession, increases surface area and production is largely generated by the mechanisms of the CAP. The loss registered by domestic consumption as a mechanism for the decision of crop stands out even in the conditions of insufficient size of statistical strings analyzed. Thus between 2002-2006, the decision to produce stood in a direct relationship with the internal market ($r = 0.505$; $R^2 = 25.5\%$), while in 2007-2013, is reflected in an inverse relationship to it ($r = - 0.247$; $r^2 = 6.1\%$), the difference between them ($\Delta r = 1,551$) being provided for a probability of $P\% = 86.8\%$ (statistical insufficient), but suggests that domestic market acts as a residual market.

Table 5. Changes in correlations between the area under production and characteristics of the rapeseed market in the sub-periods 2002-2006 or 2006-2013 (hypothesis AA)

Cases studied	I 2002-2006		II 2006-2013	
	5	Sig.	6	Sig.
Annual occupied area vs.:				
Annual production	0.822	NS	0.817	*
Imports - quantity	0.704	NS	0.608	NS
Exports -quantity	0.828	NS	0.897	*
Imports- value	0.614	NS	0.461	NS
Exports - value	0.831	NS	0.794	NS
Domestic consumption	0.505	NS	-0.247	NS
r^*_{\geq}	0.880		0.810	

Source: own calculations

In the above table (Table 5) there were presented the changes that occurred between

the area under production and the characteristics of the rapeseed market in the

two sub-period settled in this paper, as being properly to be analysed.

CONCLUSIONS

The findings of the study are listed below. The decision to cultivate the rapeseed in the period 2002-2013, was directly and significantly influenced by the volume of transactions and financial satisfaction to capitalize production in the ongoing crop year. In the timeframe 2007-2013 in Romania was created a network of specialized farms in rapeseed crop for export. The rape domestic market behaved as a residual market from 2002 - 2013 for data that he provided to us in order to realize this paper.

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REFERENCES

- Scorepa M., 2011. A behaviooral Economical Aproach. Inst. of Econ. Studies, Charles Univ., Prague: 19.
- Scorepa M., 2011. A behaviooral Economical Aproach. Inst. of Econ. Studies, Charles University, Prague: 7-13.
- Snedecor G.W., Cochran W.G., 2010. Methodes Statistiques. Ed. VIII, Edit. du Fond National de Developement agricole, Paris: p. 287-330.
- Snedecor G.W., Cochran W.G., 2010. Methodes Statistiques. Ed. VIII, Edit. du Fond National de Developement agricole, Paris: p. 100-128.
- Snedecor G.W., Cochran W.G., 2010. Methodes Statistiques. Ed. VIII, Edit. du Fond National de Developement agricole, Paris: p. 190-217.
- Stelian N., 2005. Rapița pe zeci de mii de hectare pentru biodiesel. Ziarul financiar, 1 iunie, ed. on line, <http://www.zf.ro/companii/rapita-pe-zeci-de-mii-de-hectare-pentru-biodiesel-3020959>.