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Determination of Relative Advantages in the Cattle Production of Milk and Meat by Using the Comparative Analysis of Production in the Osijek-Baranja County and Krapina-Zagorje County

Dragan Dokić[1], Maja Gregić[2], Vesna Gantner[2]

[1]Municipality of Erdut, Bana Josipa Jelačića 4, Dalj, Croatia
[2]University of Josip Juraj Strossmayer in Osijek, Faculty of Agrobiotechnology, Croatia

Abstract

The use of relative advantages in practice implies that one area concentrates on the products for which there is lower opportunity cost. The Osijek-Baranja County is rich in arable agricultural land. Compared with the Krapina-Zagorje County, where the agricultural land is less represented, it could be said that the Osijek-Baranja County has an advantage in terms of agricultural production. Using the comparative model of production opportunities, this paper analyses that it is necessary to use natural resources and put them into operation after profit. Free trade increases the overall production and consumption of all participants in trade because it enables production specialization in which specific areas have more relative and not absolute efficiency (products with fewer relative marginal costs). The comparative model of production opportunities is the model that points to the production orientation of the goods achieving maximum benefit.

Key words: agricultural production, relative advantage, opportunity cost, labour productivity, limit of production possibilities

Introduction

Relative advantage refers to the production of those goods that are produced with lower costs. The starting point in defining the relative advantage is the opportunity cost that is defined as the fictitious gain or loss generated by the investment of funds in one particular and not another project (Krugman, 2009).

The difference in opportunity costs makes it possible to redesign production from one region to another (Golub and Hsieh, 2000). Decision makers, in order to calculate the average cost per benefit are interested in measuring the costs and benefits of different interventions or production orientations (Torgerson and Spencer, 1996). Production orientation focuses on the specialization of the production of those goods where the opportunity cost is lower than the production of other goods, where the resources can be utilized at a lower cost (Jones, 1965). Furthermore, accordingly to Wang and Xiang (2007) sustainable development requires the enrichment and development of traditional international trade theory, in particular by integrating environmental elements into the current framework of relative comparative advantage analysis. The agricultural production in the Osijek-Baranja County is a strategic economic branch because it is a region with abundant, quality cultivable land. Similar can be said for the Krapina-Zagorje County, with a difference that mostly manufacturing industry makes this county's GDP.

Since every economy has limited resources and thus limited production possibilities, concessions have to come to fruition (Porter, 1990), that is, those goods that bring greater benefit are produced more than other goods where the benefit is less pronounced. Such movements are shown through the limits of production possibilities. The limit of production possibilities is determined on the basis of limited availability of resources (Saxenian, 1994).

The aim of this study was to determine relative advantages in the cattle production of milk and meat by using a comparative analysis of production in the Osijek-Baranja County and Krapina-Zagorje County.

Material and Methods

Research on production possibilities was performed by comparing cattle production of milk and meat in the Osijek-Baranja County in relation to the Krapina-Zagorje County. These regions are, by natural resources, quite similar and therefore comparable. The data presented in the following Table 1 were obtained from the Agency for Payments in Agriculture, Fisheries and Rural Development and refer to the period 2015 – 2018.

From the Table 1 it can be noticed that the Osijek-Baranja County has a significantly larger volume of cattle production of milk and meat than the Krapina-Zagorje County. Further analysis will be used to calculate labour productivity and the amount of costs that are an integral part of the production process.

Tab. 1. Comparative view of cattle production of milk and meat in the Osijek-Baranja County and Krapina-Zagorje County

County	Osijek-Baranja		Krapina-Zagorje	
Year	Milk (l)	Meat (N of animals)	Milk (l)	Meat (N of animals)
2015	148,930,366	87,867	17,327,559	21,411
2016	146,861,750	84,258	15,233,014	20,959
2017	142,859,149	86,292	17,886,553	21,787
2018	145,321,857	86,331	17,366,411	22,414

Unit costs of labour for milk and cattle production are expressed as average labour consumed in the analysed period, expressed in Euros. The value of opportunity cost is computed as the ratio of the unit value of labour costs in milk production and the unit value of labour costs in meat production separately by county.

Results and Discussion

Labour costs account for about 10 - 15% in the total costs of cattle milk production since, irrespective of the level of technical equipment of milk production compared to the other, production requires a lot of work. The efficiency of labour depends on the number of cows in the herd, the level of cow's production, housing system and milking system, the level of technical equipment, production technology, work organization and other elements of production (Haluška and Cube, 1999).

Furthermore, results obtained by Pandian et al. (2014) suggest that labour use efficiency is better on the farms having large herd size, more family labours, and young, averagely educated staff that rise the quantum of milk production which indirectly rise the net profit from dairy farming.

Table 2 shows that the Osijek-Baranja County has a lower opportunity cost in the production of both products, giving it advantage over the Krapina-Zagorje County.

When the limit of production possibilities is a straight line, the opportunity cost of production of one cow expressed in litres of milk is constant (Coren, 1971). The PF curve shows the maximum amount of milk that can be produced by the OBC (Osijek-Baranja County) producers in terms of meat production and vice versa. The PF curve represents the ratio of unit costs in milk production in relation to the unit cost of meat production.

Furthermore, the FP curve represents the maximum amount of milk that can be produced by producers in the KZC (Krapina-Zagorje County) in regard to meat production. Since unit labour costs for milk production are higher in the KZC than in the OBC, producers in the KZC should drop meat much more units in order to produce a litre of milk more. Therefore, the limit of production potential (FP curve) is steeper.

Tab. 2. Comparison of unit costs of labour (in Euro) and opportunity costs of cattle milk and meat production in the Osijek-Baranja County and Krapina-Zagorje County

County	Unit costs of labour in milk production (Euro)	Unit costs of labour in meat production (Euro)	Opportunity costs OBC/KZC
Osijek-Baranja	0.420	0.380	1.105
Krapina-Zagorje	0.475	0.411	1.156

The limit of production possibilities for both counties is shown in the Figure 1. The opportunity cost of milk production in relation to meat production is equal to the absolute value of the curve presented in Figure 1.

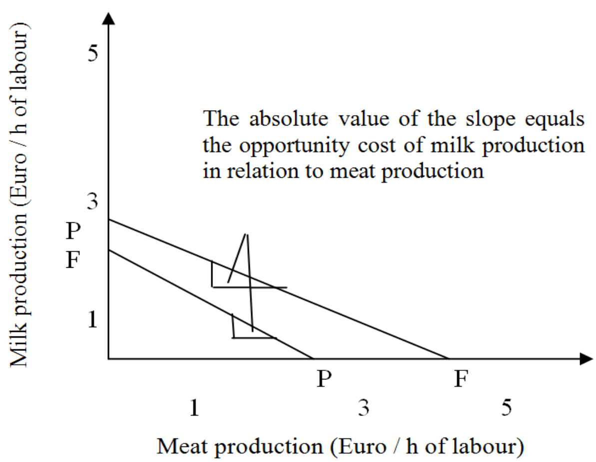

Figure 1. Limit of production possibilities

If we convert the values from the previous Table 2 from Euros into hours of labour, and multiply them by the average production of milk and meat in both counties (Osijek-Baranja and Krapina-Zagorje), we get the following values presented in Table 3.

Tab. 3 Comparison of unit costs of labour (in hours, h) and relative advantage in labour productivity of cattle milk and meat production in the Osijek-Baranja County and Krapina-Zagorje County

County	Unit costs of labour in the Osijek-Baranja County (h)	Unit costs of labour in the Krapina-Zagorje County (h)	Relative advantage in labour productivity in the OBC
Milk production	0.420	0.475	1.131
Meat production	0.380	0.411	1.082

The relative advantage in labour productivity in the OBC represents the ratio of unit costs of labour by producers in the Osijek-Baranja County (OBC) and unit costs of labour by producers in the Krapina-Zagorje County (KZC) for both types of cattle production that is the relative advantage in productivity of producers in the OBC in relation to the producers in the KZC (Varijan, 2008). Hence, agricultural producers in the OBC have an advantage in the production of any goods.

The comparison of total labour costs of cattle milk and meat production in the Osijek-Baranja County and Krapina-Zagorje County (that was determined based on wage of 2.67 Euro/h and the production volume of 10.000.000 units of each product) is presented in Table 4. It is apparent that there is a saving in labour costs regarding the production volume in milk production in the amount of 550,000 Euros, and in the meat production in the amount of 310,000 Euros. The difference in costs could be explained by the difference in relation to the volume of production of both products.

Tab. 4. Comparison of total labour costs of cattle milk and meat production in the Osijek-Baranja County and Krapina-Zagorje County

County	Total labour costs in cattle milk production (Euro)	Total labour costs in cattle meat production (Euro)
Krapina-Zagorje	4,750,000	4,110,000
Osijek-Baranja	4,200,000	3,800,000
Cost difference	550,00	310,000

Figure 2 shows that point *a* is an equilibrium point where, for the amount of 2.67 Euro wage, 10,000,000 units are produced. If the wage is raised by one Euro, the volume of production is reduced by 5,000,000 units, and vice versa, if the wage is reduced by 1 Euro in relation to the equilibrium price, the production volume increases to 15,000,000 units.

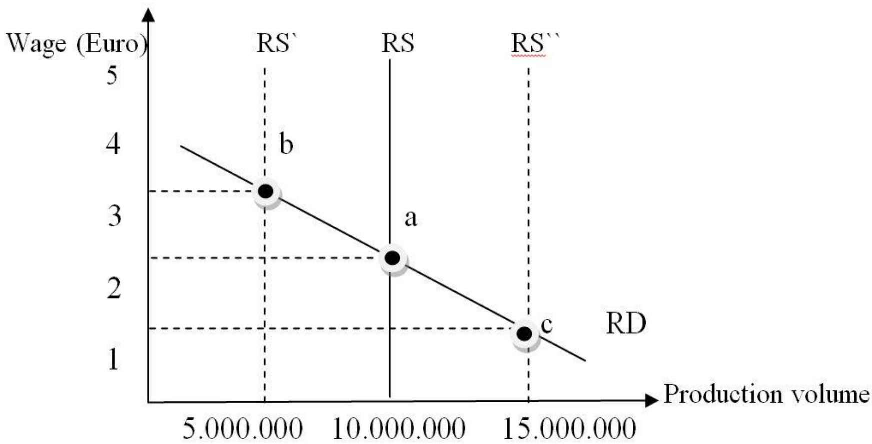

Figure 2. Ratio of wage and production volume

Relative demand for labour decreases rapidly if wages increase. Furthermore, this allows moving of the production to other regions (Orsag, 2002). The equilibrium price is determined on the basis of the cross section of the RD and RS curves, and as indicated the equilibrium wage amounts 2.67 Euros.

Conclusion

The results of the conducted research indicate that in modern business conditions, labour costs as a factor of production are the starting point for determining the relative advantage. In addition, it has been shown that the wage in two regions is a reflection of relative productivity. The basic assumption of this model is that each region needs to specialize in the production of the goods with lower opportunity cost. By applying this, lower costs and specialization of production have a relative advantage over the competition. However, the role of trade that allows the exchange of manufactured goods should not be neglected.
Also, the cost of labour that must be balanced should not be neglected. The higher cost of labour reduces the volume of production and shifts the production to other areas where wages are lower.

But also, low labour costs, although increasing the volume of production, have a disincentive effect on the labour supply, that is stimulate the migration of working-age people into areas where wages are higher.

Thus, it can be concluded that a region that realises high productivity in the production of certain products has lower costs and achieves greater social benefit.

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Утврђивање релативне предности у говедарској производњи млијека и меса примјеном компаративне анализе производње у Осјечко-барањској жупанији и Крапинско-загорској жупанији

Драган Докић[1], Маја Грегић[2], Весна Гантнер[2]

[1]Општина Ердут, Бана Јосипа Јелачића 4, Даљ, Хрватска
[2]Универзитет Јосипа Јураја Штросмајера у Осијеку, Факултет агробиотехничких наука, Хрватска

Сажетак

Дефиниција релативне предности се у пракси примјењује у смислу да се један простор концентрише на производњу оне врсте робе за коју има мањи опортунитетни трошак. Осјечко-барањска жупанија обилује обрадивим пољопривредним земљиштем. У поређењу са Крапинско-загорском жупанијом, гдје је површина обрадивог земљишта знатно мања, може се рећи да Осјечко-барањска жупанија има предност у погледу пољопривредне производње. У овом раду је анализирано, примјеном компаративног модела производних могућности, на који начин је могуће искористити природне ресурсе и ставити их у функцију остваривања профита. Слободна трговина повећава укупну производњу и потрошњу свих учесника у размјени јер омогућује специјализацију у производњама у којима одређени простори имају већу релативну, а не апсолутну ефикасност (производе уз мање релативне граничне трошкове). Компаративни модел производних могућности представља модел који указује не производну оријентацију оног добра од којег остварује највећу корист.

Кључне ријечи: пољопривредна производња, релативна предност, опортунитетни трошак, продуктивност рада, граница производних могућности

Corresponding author: Dragan Dokić
E–mail: dragan.dokic79@gmail.com

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