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## Product support estimate (PSE) for the beef meat production in Montenegro

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**Abstract:** Estimate of support to producers (PSE indicator), according to the OECD methodology, is the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, resulting from agricultural policy measures. It is very useful indicator for estimation of effectiveness of overall state support to specific agricultural sector or product. This paper presents the first quantification of this indicator for the agricultural primary production sector, beef in particular, given the significant share of livestock in generation of GDP in agriculture (30% and with dairy sector, about 60%; at the same time, beef production is almost 50% of the total value of meat production in Montenegro). The results of this study suggest that % PSE for beef sector is at 15.63, owing to higher subsidies and broader funding from other budgetary and credit lines. Comparative analysis shows that this value is higher than in China or Canada but also significantly smaller compared to the EU average (28,3), Switzerland (33,6) or Turkey (42,2).

**Key words:** Product support estimate (PSE), meat production, beef, agricultural budget, estimation, Montenegro.

### Procena podrške proizvođačima (PSE) u proizvodnji junećeg mesa u Crnoj Gori {XE "PSE"}

**Apstrakt:** Procena podrške proizvođačima (PSE indikator), prema metodologiji OECD, je godišnja monetarna vrednost bruto transfera od potrošača i poreskih obveznika ka poljoprivrednim proizvođačima, kao rezultat mera agrarne politike. To je veoma koristan pokazatelj procene efikasnosti ukupne državne podrške konkretnom sektoru poljoprivrede, odnosno proizvodu. Ovaj

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*rad predstavlja prvu kvantifikaciju ovog pokazatelja za sektor primarne poljoprivredne proizvodnje, a posebno govedine, s obzirom na značajan udeo stočarstva u stvaranju BDP-a u poljoprivredi (30% a sa mlečnim sektorom oko 60%; istovremeno, proizvodnja goveđeg mesa predstavlja gotovo 50% ukupne proizvodnje mesa u Crnoj Gori). Rezultati ove studije ukazuju da je %PSE za sektor goveđeg mesa na nivou od 15,63, zahvaljujući višim subvencijama i širem finansiranju iz drugih budžetskih i kreditnih linija. Uporedna analiza pokazuje da je ova vrednost veća nego u Kini ili Kanadi, ali je značajno manja u poređenju sa prosekom EU (28,3), Švajcarskom (33,6) ili Turskom (42,2).*

**Ključne reči:** Procena podrške proizvođačima (PSE), proizvodnja mesa, govedina, poljoprivredni budžet, procena, Crna Gora.

## 1. Introduction

The economic importance of agriculture in Montenegro is evident, as its share in Gross Value Added (GVA) for 2012 is significant (primary production 7.4%), plus the food processing industry as important part of the industrial production estimated on 5.5% of GVA (Monstat, 2013). According to the Agricultural Census 2010, Montenegro has 48.884 farming households, using the abundant land, forest and water resources (17% of total population). Official number of registered employees in this sector is about 2 400 with the trend of decrease. However, estimate of Statistical Office is that Montenegro possesses 98 949 persons employed on agricultural holdings (Monstat, Agricultural Census, 2011).

Agricultural sector became even more important on the Montenegrin path towards the EU. The first legal framework for the institutionalization of relation between Montenegro (the smallest Western Balkan country) and the European Union - the Stabilization and Association Agreement entered into force in May 2010. The European Council of December 2010 granted the status of candidate country to Montenegro. Accession negotiations with Montenegro were opened in June 2012 and screening process was completed by June 2013. In the same year, market was fully liberalized in industrial sector for the EU companies and almost fully opened for agricultural products (only limited number of highly sensitive agricultural products kept 50% of tariffs). According to the Commission evaluation, Montenegro's limited administrative capacity represents a challenge in a number of areas and needs to be strengthened to ensure effective implementation of EU legislation (EC, Montenegro Progress report, 2013). Overall, Montenegro has reached a low level of alignment with the *acquis* in the chapter 11 - Agriculture and rural development. This will in particular require that Montenegro applies EU rules on direct payment

schemes and ensures the implementation of the common market organization for various agricultural products (EC, Screening report Montenegro, 2013).

This paper is focused on the measurement of important indicators of evaluation of scope and priorities of agricultural support. The OECD uses a comprehensive system for measuring and classifying support to agriculture – the Producer and Consumer Support Estimates (PSEs and CSEs) and related indicators. They provide insight into the increasingly complex nature of agricultural policy and serve as a basis for OECD's agricultural policy monitoring and evaluation (OECD, 2013). Empirical indicators of farm support by governments and their effects on consumer prices, (PSEs and CSEs), have been estimated in a consistent way since 1986 by the Secretariat of the OECD for its member countries. The indicators provide policy transparency, contribute to a better understanding of the various dimensions of agricultural support measures in high-income countries, and have been used extensively as inputs into economic models of agricultural markets (Anderson, Croser, 2011).

OECD developed this methodology and regularly reported about it in reports on monitoring and evaluation of agricultural policy. The 2013 report covered OECD member countries, and seven emerging economies: Brazil, China, Indonesia, Kazakhstan, Russia, South Africa and Ukraine. The 47 countries covered by this report account for almost 80% of global agricultural value added; they are also diverse in their levels of development, the characteristics of their agricultural sectors, and their choice of policy instruments and levels of policy support. However, their policy interests have a great deal in common: ensuring a reliable supply of safe, nutritious and affordable food, reasonable incomes for farms and farm households, a productive and competitive food and agriculture sector, and sustainable use of natural resources (OECD, 2013).

In the mentioned context, the producer support estimate indicator is an economic indicator created to measure and compares the domestic support received by farmers. It is evaluated every year using a rather simple method that takes into consideration the principal payments and support granted by countries to their farmers.

A recent global World Bank study (Anderson, 2009) complements and extends the OECD's efforts by providing similar estimates for a longer time period (back to 1955) and for individual member countries of the European Union. It also has comparable estimates for 45 other countries at different stages of economic development and includes a time series of rates of assistance to producers of non-agricultural goods, to compare with agricultural distortion estimates.

Quantification of the PSE indicators in Montenegro in line with the OECD methodology has not been made, except in the sense of comparing basic

data from PSE indicator of the Republic of Slovenia under the Strategy of food Production and European Integration of Montenegro 2007-2013. Due to lack of complete statistical data, especially updated producer prices, exact estimate of support to agricultural producers was not possible (Ministry of Agriculture, 2006). Also, sporadic general assessments of this indicator were performed in the framework of regional studies for the Western Balkans (Bogdanov, at all, 2008; Volk, 2010). Analysis of the PSE indicator is based on the OECD methodology which has been performed for Serbia (Marković, 2009).

Having in mind all above-mentioned, main aim of this paper is to calculate %PSE indicator for Montenegro with special focus on meat industry, i.e. beef production. Today, comparison of prices (difference between production value at domestic prices and production value at world reference prices) and budgetary support enables rough estimate on the level of aggregate support to agriculture and its specific sectors in Montenegro. The movement of this indicator could be tracked using the Producer Single Commodity transfer. It basically describes the participation of beef and veal, as a percentage of Total Commodity Transfers (SCT) for the chosen national economy (OECD, StatExtracts, 2013). This is basically the same indicator as the %PSE, for it takes in account the same elements of calculation. PSE indicator is useful economic indicator for the planning of future budget support for agriculture, including further investment in infrastructure and strengthening of the general service for agriculture.

Taking into account the relative size of the livestock breeding sector and contribution to the generation of the agricultural GDP of Montenegro, it is of the great importance to define the approximate % PSE value for the beef production which solely generates around one third of the livestock breeding output. It should serve as a benchmark for the future accession negotiations with the European Commission within the Chapter 11 (Agriculture and Rural Development), especially for direct subsidies (Pillar I). The amount of prospective support is based on officially available and approved statistical data. If domestic data are not available (for example those from FADN), the Eurostat will make its own predictions based on available data. Thereby, this analysis might serve as a starting point or a kind of benchmark for negotiations in order to prove the need for increased first pillar payment (direct payments).

## 2. Methodology

This paper contains (statistical and analytical) data that generally rely on official sources (OECD, The European Commission/DG Enlargement official data on the accession negotiation and progress achieved by Montenegro, MONSTAT - Statistical office of Montenegro, for data on economic, financial and

social indicators of Montenegrin economy, such as the data obtained from the Census of Agriculture in Montenegro, 2010, (farm structure, key variables-land and livestock) and the Ministry of Agriculture and Rural Development data related to past and current funding of agricultural policy in country.

Key strategic documents used in this work are based on key documents of the Ministry of Agriculture and Rural Development, such as the National Program for food production and rural development 2009-2013 and Agricultural budgets for the period 2010-2013. Implementation of the agriculture policy is detailed in the Government's decree (Agro-budget) – adopted annually at the end of the fiscal year. The overall growth of agricultural budget in the last few years can be attributed mostly to the implementation of IBRD loan for project titled “Montenegro Institutional Development and Agriculture Strengthening” (MIDAS, 2013) and Danish grant for “Organic agriculture development projects” (DANIDA, 2013). These two sources of funding created almost 30% of total sources for 2012 Agricultural budget and represented basis for gradual budget growth in the mentioned period (Agricultural budget of Montenegro 2007-12, 2013).

The statistical methods used include the OECD product support estimate methodology (PSE) as described in more details in the following part of the work, while budgetary and miscellaneous transfers to agricultural producers were retrieved from the agricultural budget for 2013. The world and domestic prices of the meat were retrieved from the Agricultural marketing information system (AMIS) data available for 2011 and OECD-FAO Agricultural Outlook 2013-2022, as well as Sector analyses for meat production in Montenegro 2010.

## 2.1. The OECD product support estimate methodology

The OECD indicators of agricultural support were developed in order to monitor and evaluate developments in agricultural policy, to establish common base for policy dialogue among countries, and to provide economic data to assess the effectiveness and efficiency of policies. According to OECD methodology, main set of indicators cover indicators of support to producers, indicators of support to general services to agriculture, indicators of support to consumers and indicators of total support to agriculture. For our discussion, selected indicators are as follows:

- *Estimate of support to producers (PSE)* is the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, expressed at the level of producers (farm-gate level), resulting from agricultural policy measures regardless of their nature, objectives and effects on production volume and income in agriculture; PSE does not represent an additional income as a result of the farm support policies. PSE shows

political effort to provide support, while manufacturer's revenue is the effect of support (and other factors). The extent, to which gross transfers can be translated into income of the farms, can vary considerably depending on the type of policies to encourage the development of agriculture, but it will always be less than the increase in gross transfers (OECD, 2013).

- *Producer Nominal Assistance Coefficient (producer NAC)*: the ratio between the value of gross farm receipts (including support) and gross farm receipts valued at border prices (measured at farm gate);
- *Producer Nominal Protection Coefficient (producer NPC)*: the ratio between the average price received by producers at farm gate (including payments per ton of current output), and the border price (measured at farm gate);
- *General Services Support Estimate (GSSE)*: the annual monetary value of gross transfers to general services provided to agricultural producers collectively (such as research, development, training, inspection, marketing and promotion), arising from policy measures that support agriculture regardless of their nature, objectives and impacts on farm production, income, or consumption. The GSSE does not include any transfers to individual producers;
- *Total Support Estimate (TSE)*: the annual monetary value of all gross transfers from taxpayers and consumers arising from policy measures that support agriculture, net of associated budgetary receipts, regardless of their objectives and impacts on farm production and income, or consumption of farm products (OECD 2010).

The PSE components, according to the OECD methodology are: (a) Support based on commodity output that includes MPS and payments based on output; (b) payments based on input use; (c) Payments based on current Area (A), Animal Numbers (AN), Receipts (R) or Income (I); (d) Payments based on non-current A/AN/R/I, production required; (e) Payments based on non-current A/AN/R/I, production not required; (f) Payments based on non-commodity criteria; (g) miscellaneous payments. From the above listed PSE components, only MPS, which is one component of support based on commodity output, indicates the transfers from consumers and taxpayers to producers, while the rest of components indicate the transfers from the state budget to producers of agricultural commodities (Khakimov, Pavlowski, Schmitz, 2014). In other words, support to producers (PSE) consists of market-price support and budget support (Budgetary transfers). This indicator is obtained by adding the value of budgetary and other transfers to manufacturers in the country (aggregate) MPS. In our analyses we will mark total budg-

etary payments with the BP. The procedures of calculating of the PSE indicators include two components:

MPS – Market Price Support, and

BP – Aggregate budgetary and other transfer to producers from policies for specific country,

i.e., mathematically:

$$\text{PSE} = \text{MPS} + \text{BP} \quad (1)$$

The first component, i.e. the market price support, is reduced to the calculation of the price difference or “price gap”. In other words, the market-price support is the difference in production value (Qd) at domestic prices (Pd) and production value by reference (world) prices (Pw). Calculated as the difference between domestic and world market (benchmark) price for the product, the market-price support can be illustrated by the following mathematical equation:

$$\text{MPS} = (\text{Pd} - \text{Pw}) \cdot \text{Qd} \quad (2)$$

$$\text{MPS} = \text{PdQd} - \text{PwQd} \quad (3)$$

Where:

MPS - market price support

Qd - The volume of domestic production

Pd - producer price for the product in the domestic market,

Pw - worldwide (reference) price for a given product.

The essence of the elaboration of MPS component is the fact that it is a support to producers that is, in fact, based on higher domestic prices in relation to the world and is paid by consumers of agricultural products. Given the content of mathematical expression of MPS, it is clear that the total production volume of a product depends on the amount of the total support.

MPS values are calculated for a set of individual commodities (“fifteen standard MPS group of commodities” which includes meat and beef). The OECD PSE methodology suggests that the list of commodities necessary for the MPS calculation and other support indicators should at least represent 70% of the total value of agricultural production.

The second component, budgetary payments (BP), can occur in various forms. The most common are: 1) Actual payments to producers, or 2) reduced budget revenues. If B represents payments based on output, C - Payments based on area planted / animal numbers, D - Payments based on historical entitlements, E - Payments based on input use F - Payments based on input constraints G - Payments based on overall farming income and H - Miscellaneous payments (OECD, 2010), we obtain the following equation:

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$$BP = B + C + D + E + F + G + H \quad (4)$$

Sum of the first and second component represents the total value of the PSE indicator for a particular product. Most often, this indicator shows the values in the form of so-called, percentage PSE. It provides information on the share of the gross income of the manufacturers as a result of agricultural policy measures. Percentage PSE (%PSE) is PSE as a share of gross farm receipts. This relative indicator is calculated using following form:

$$\% \text{ PSE} = \text{PSE} / (\text{PdQd} + \text{BP}) * 100 \quad (5)$$

Where:

% PSE – (Percentage PSE)

PdQd – production value expressed in producers prices,

BP – budgetary payments to producers.

PSE indicator can not quantify the impact of agricultural policies on agriculture, but it can provide information that may be in the form of quantitative illustration of this effect. If, for example, the PSE for the product is zero, it means that the domestic producers have realized their products at world prices and do not receive any form of protection from the state. If the PSE is positive, then it indicates that the producers are subsidized, either on the basis of price support and / or the various budget payments.

However, if the PSE indicator has the negative value, it implies that the manufacturers are taxed; either based on the lower price relative to world prices and / or the taxation as a measure of agricultural and trade policies. Budgetary payments are the second component of PSE indicator. Budget support includes only those transfers to agriculture, which more or less directly affect the income of agricultural producers (excluding infrastructure and general services to agriculture).

We can conclude that PSE indicator provides a quantitative assessment of policy support to agriculture, based on an internationally accepted methodology. Consequently, the following theses were tested:

- Calculation of the PSE indicator (for Montenegro as country and specific agricultural sectors) is important for domestic decision-making process and the future EU accession negotiation in the area of agriculture and rural development,
- Calculation of the PSE indicator for beef will enable comparative analysis of agricultural policies and more targeted agricultural budget for meat sector in general. In addition, calculation of the PSE indicator for beef should support more effective and targeted use of pre-accession assistance instrument (IPA II) and related loans.



## **2.2. Recent comparative analysis: OECD's Agricultural policy monitoring and evaluation report and EU Beef production outlook**

The comparative analysis at the international level, as much trumpeted problem emphasized the inadequate level of harmonization of methodological procedures for identification of direct and indirect government transfers to farmers. In this regard, the results of such comparative analysis should be taken with a certain grain of salt and with the possibility of obtaining insufficiently realistic results. However, in addition to the existing difficulties in the application, one of the main advantages of this methodology, in the literature and practice, highlights the possibility of forming a sort of list of countries by level of protection of agriculture. In this way, viewed in a broader international scale, it is possible to assess the effects of liberalization by individual countries, which is one of the priorities in terms of multilateral trade negotiations (OECD, 2013).

According to the OECD 2013 report, government support to agriculture in OECD countries (PSE) has fallen to 18.5% of the total agricultural income in 2012 (\$ 252 billion or € 182 billion), a record low driven by developments in international commodity markets, confirming the long-term downward trend in farm support.

The report also shows that the total support to agriculture as a percentage of national income declined in OECD countries, from 3% of GDP on average over the period 1986-88 to less than 1% in the period 2009-2011. This downward trend was observed in all OECD countries over the long term. According to Eurostat, the price of cattle went up by 35 % but this calculation is based on aggregate prices and not values per animal as reported in FADN. In addition, farm-gate prices are not always equal to prices reported at the point of sale so the latter price may be higher (EC, DG Agri, 2012).

OECD projections show that the relatively high commodity prices will persist over the medium term, meaning that the market will provide income to farmers which many governments tried to provide through cash payments or artificially high prices, so far. Given the expectations of future demand growth and increasing pressure on limited resources, there is a clear opportunity that the farm policy might shift towards the most pressing policy objectives, such as encouraging innovation in the food and agriculture systems.

As can be seen in the Table 1, in the long term, agriculture in OECD countries receives fewer subsidies than before, but, it still makes up a significant part of the income of farmers. The trend of reduced subsidies has been supported by growing food prices. Policies are redirected to the consumers and protection of their position. Support to domestic food prices becomes less important for the preservation of farm income (with less evidence that it contributes to the increase of production). The advice of the OECD therefore is: to provide as-

sistance to farmers in case of natural disasters, while in the conditions of competition, they must have the freedom to respond to market signals and become more innovative and competitive (OECD; 2013). Talking about the EU, it is obvious from the table that the support is decreasing, especially from the mid-1990s. Furthermore, farmers in the EU are able to sell products 5 % more expensive than the world average (nominal protection coefficient of 1.05). Manufacturers of beef and lamb and sugar in the EU continue to sell its products about 20-30% more expensive than the world average (producers of poultry as much as 50%), while the prices of cereals, milk and eggs are at the world average. Total support to agriculture in the EU is at the level of 0.73 % of GDP – out of which 11% is in the area of support services (OECD, statistical data, 2014).

*Table 1. Support to agriculture in OECD and EU countries 1986-2012*

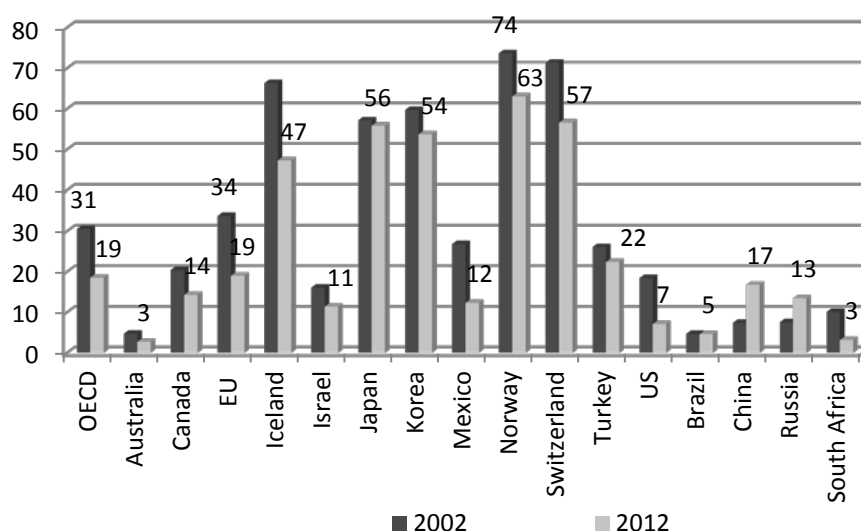
	1986-88	1995-97	2010	2012
<b>OECD</b>				
Total value of production (at farm gate, bill. €)	536,394	625,221	845,227	972,881
Producer support estimate (PSE) bill. €	217,302	205,271	182,553	201,225
<b>Percentage PSE</b>	<b>37</b>	<b>30</b>	<b>19,2</b>	<b>18,6</b>
Nominal Protection Coefficient (producer NPC)	1,5	1,31	1,11	1,10
Nominal Assistance Coefficient (producer NAC)	1,59	1,42	1,24	1,23
General Services Support Estimate (GSSE)	33,556	53,023	76,271	85,643
Transfer to consumers from taxpayers (net consumer support estimate)	18,024	20,098	30,597	36,03
Total support estimate (TSE, bill. €)	268,882	278,392	289,421	322,898
Percentage TSE (expressed as share of GDP)	2,96	1,62	0,93	0,94
<b>EU</b>				
Producer support estimate (PSE) bill. €	<b>39,2</b>	<b>33,6</b>	<b>21,8</b>	<b>19,04</b>
Nominal Protection Coefficient (producer NPC)	1,71	1,33	1,07	1,05
Percentage TSE (expressed as share of GDP)	2,56	1,50	0,73	0,73

*Source: Agricultural Policy Monitoring and Evaluation 2013, OECD, p.78;*

OECD report shows that the level of support still varies across OECD countries. Comparing 2002 with 2012, as presented on Fig. 1, appropriations are reduced in all countries except China and Russia. Nowadays the lowest level of support has New Zealand, Ukraine, Australia, South Africa and Brazil (0-5% PSE support in relation to farm income). The U.S. has 7% and Israel 11%. EU support dropped to about 19% of farm income in 2012. Support in Cana-

da is 14%, in Turkey 22%. The highest level of support is in Norway (63%), Switzerland (57%), Japan (56%), Korea (54%) and Iceland (47%).

Figure 1. Support to producers by country as a percentage of gross farm income in 2002-2012



Source: OECD, 2014 (<http://stats.oecd.org>)

European beef is produced in two categories of farms: i) specialized beef farms with suckler cows or young bovine cattle; and ii) dairy farms for which beef production is a by-product of milk production. In the EU-27, dairy farms make up two-thirds of the bovine cattle herd (it is sometimes more than 80% in northern countries or in some new member states). The heterogeneity of the European beef sector is reflected in terms of specialization, intensification, types of animals (suckler cows, calves, heifers, young cattle, bulls, and steers), and production systems (breeds of animals or feed systems (Thomas C., Scollan N. and Moran D., 2011).

The level of beef production will also depend heavily on price relationships between crop and animal production. The beef sector needs more stable prices, given the length of the beef production cycle (long) and the low return on capital. In this sense, it seems important that the future CAP maintains some instruments to regulate the market (public intervention when the price drops to a low level) and encourages young farmers to start up. It also seems necessary to build some new tools to help European producers to deal with price volatility. The fight against price volatility requires modifying tax policies,

adopting new risk management instruments and implementing a better coordination of agricultural policies at the international level (Pisani and Chatellier, 2011).

Finally, it is important to note that, due to the lack of complete statistical data on prices, 100% precise calculation of support to producers in Montenegro is not yet possible. Rough estimate of total agricultural %PSE has been made previously, using PSE calculation for Slovenia. The estimate is based on the comparison of prices between Montenegro and Slovenia according to products, and based on reasonable assumption that the prices in Montenegro on aggregate level are at least equal or five percent higher than those in Slovenia. Budget support for Montenegro, in 2005, was relatively solid, so rough calculation of PSE for Montenegro was estimated on the level of 28% (with equal price level) or 31% (with 5% higher price level) (Ministry of Agriculture and Rural Development, 2006),

Support from the Montenegrin agricultural budget in the period 2005-2012 was relatively solid. Simulation results and trend analysis show that aggregate PSE for Montenegro is about 28% (at equal price level in Slovenia). With all the necessary reserves for this rough estimate, we can claim with great certainty that the % PSE in Montenegro is higher than 25%, which is among the countries with medium level of support to farmers. Most of this support (over 95%) comes from the difference in prices relative to world prices (market-price support) and only partly comes as a result of budget support. The relatively high level of market-price support (relatively high prices in the domestic market) is only partly a result of tariff protection, but more a result of nature of market and undeveloped market infrastructure.

### **3. Result and discussion**

#### **3.1. Current situation in the Montenegrin meat production sector**

The most important sector in creation of the total agricultural production in Montenegro is animal husbandry (meat and milk, with almost 60% of the total agricultural output), while the fruit, vegetable and wine production accounts for about 30%). Other sectors (beekeeping, fishing, eggs) generate about 10% of the total production.

Structural characteristics of agriculture in Montenegro are small family farms, the average size being approximately 4.6 ha, with low productivity and low levels of use of chemicals (fertilizers and plant protection products) which is over ten times lower than in the EU.

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*Table 2. Participation of sectors in generation of agricultural output (2011, %)*

Meat	Milk	Eggs	Fish	Honey and its products	Fruits and grapes	Beverages	Other	Total
30%	28%	4%	3%	1%	15%	15%	4%	100%

Source: MIPA, 2013.

A substantial part of the Montenegrin agricultural output originates from live-stock production, in which the main products are milk, lamb and beef. When beef production is concerned, the most important categories are calves. In the past decade, breeding of poultry has been commercialized, while pork production sharply declined.

*Table 3. Production and consumption of meat in Montenegro (2009)*

Meat Product	Domestic production (t)	Import (t)	Domestic consumption (t)	Export (t)	Deficit (t)	Coverage of domestic needs (%)
Beef and veal	6.790	5.355	12.069	76	5.279	56
Lamb and goat	4.120	100	4.220	0	100	98
Pork	3.170	21.692	23.672	1.190	20.502	13
Poultry	3.030	4.756	7.631	155	4.601	40
Meat-TOTAL	17.110	31.903	47.592	1.421	30.482	36

Source: Meat production sector strategy in Montenegro, ADT and GTZ, Ministry of Agriculture and rural development, 2010.

The most important areas for the livestock breeding are the municipalities in the north of the country. Also, a large number of sheep is farmed in the northern, mountainous region. Goats are farmed particularly in the karsts regions of the country. With an annual production of about 190,000 tons of milk and 17,000 tons of meat, livestock sector has the largest share of agriculture in Montenegro. Major agricultural products include cow, sheep and goat milk and meat. Main domestic resources of fodder are meadows and pastures. Cereals production of 5,100 ha is low, even compared to neighboring countries. Meadows and pastures represent as many as 88% of the total agricultural land.

Montenegrin economy, in general, is very open, meaning that in addition to customs, it does not apply any other import barriers. Its trade deficit in the

area of food and beverages has a constant growth tendency in the period 2000-2012. During 2012, most imported products were meat and meat products, live animals (a total of 108.4 million €), dairy products and eggs (48.5 million €), cereals and cereal products (€ 57 million), beverages (53.4 million €) (Monstat, 2013). We believe that it is important to present the main relevant data from the sector strategy of meat production in Montenegro, conducted for the Ministry of Agriculture and Rural Development in 2010.

*Table 4. Beef meat production in Montenegro: main indicators*

-	Around 26,000 agricultural holdings in Montenegro farm cattle, a total of 90,000 animals (out of which about 62,500 are dairy cows that produce about 60,000 calves annually)
-	About half of agricultural holdings hold only 1 or 2 heads of cattle. Only about 4,455 farms have more than three cows, an average of 6.3 animals. However, in recent years a positive change in the structure has begun.
-	Low productivity: milk yield per cow: total population - 2,500 kg (estimate); 2009 The cows included in the official control of milk yield- 5.204 kg, 3.80% fat and 3.18% protein; Calves live weight of about 100 - 160 kg (aged 3 - 4 months) and heifers 480-500 kg (aged 12 - 14 months) are the main categories of slaughter;
-	There are no specialized beef breeds;
-	Every year significant number of calves for fattening is imported;
-	Total beef production is about 6,800 tons, or 40% of total meat production (covering 56% of domestic needs)

*Source: Meat production sector strategy in Montenegro, ADT and GTZ, Ministry of Agriculture and Rural Development, 2010.*

### **3.2. Analyses and calculation of PSE indicator for beef production in Montenegro**

Having in mind that the PSE indicator is commonly given at the level of the national economy, but also for certain groups of products (cereals, rice, meat, milk, etc.), our analysis can be complemented with a practical example of calculating the % PSE and PSE indicators for beef meat production in Montenegro (with all the methodological restrictions). The methodology for calculation of this indicator requires accurate data from the Bureau of Statistics (movement of domestic and world prices for the product groups, all budgetary and extra-budgetary transfers to producers, data on import prices that they generate, Customs duties, etc.).

However, the lack of relevant data can be replaced with data from other relevant sources, such as reports and forecasts of the OECD, the European Commission and Eurostat for world prices (EC, Agricultural commodity prices, 2013), Ministry of Agriculture and Rural Development for domestic prices (AMIS, 2011), the data from the Strategy of meat production in Montenegro for domestic production as stated in the following calculation (Table 5).

*Table 5. Inputs for calculation of MPS indicator for beef production in Montenegro 2012*

Category of meat (carcasses) USD / t	USD/t	World price WP €/t*	Domestic Price €/t	Production in Montenegro/t	MPS
Beef and veal	4654	3257,8	3070	6800	-1.277.040
Poultry	1389	972,3	1300	3030	992.931
Lamb and goat meat	4119	2883,3	2500	4120	-1.579.196
Pork	2051	1435,7	2500	3370	3.586.691

*Source: OECD-FAO Agricultural Outlook 2013-2022, Ministry of Agriculture and Rural Development, Meat sector analyses (author's modification)*

As can be seen in the table above, the MPS has negative value for beef (and veal) production in Montenegro, since the domestic prices are lower than the world prices for this commodity.

In the following table (Table 6), the inputs for PSE and %PSE for beef production in Montenegro in 2013 are presented.

Value of budget allocations for beef production is calculated based on the weight that is obtained on the basis of participation of monetary value of beef in total meat production (domestic meat categories production multiplied with corresponding domestic prices).

The weight for beef is 47, 95 for all budget lines, except for the direct support of livestock production (for beef and veal) where it is 100%. Relatively high weight for beef is due to the fact that the pork and poultry production is not subsidized through the budget, while beef production in Montenegro is around 40% of total meat production.

As it can be seen in the Table 6, the total livestock breeding financing through the agricultural budget is around 9,5 million € for 2013, while the significant share goes to beef production (5.4 million € or 56,9%).

Table 7 presented the %PSE of the beef production sector in Montenegro in 2013. It is obvious that the level of individual production (beef) % PSE indicator has a significant positive value of 15.63: it is primarily due to better ratio of domestic and world prices (in favor of domestic prices) and relatively substantial financing of livestock breeding.

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*Table 6. Inputs for calculation of PSE and % PSE indicators for beef meat production in Montenegro 2013*

Budgetary payments (BP)			
Participation of beef production in total agricultural output 47,95%	Weighting factor (% of participation in total financing)	Value from agricultural budget 2013 (€)	Participation of beef meat production in agricultural budget financing
Direct support to livestock production (beef)	100,00	1.591.671	1.591.671
Preservation of genetic resources in agriculture	47,95	40.000	19.180
Sustainable use of mountain pastures	47,95	200.000	95.900
Renovation and development of villages and rural infrastructure	47,95	415.000	198.993
Old - age allowances	47,95	2.720.000	1.304.240
Program of extension and advisory services in livestock breeding	47,95	322.000	154.399
Interventions on the market	47,95	150.000	71.925
Risk Management in Agriculture	47,95	300.000	143.850
Program of mandatory measures for animal health protection	47,95	1.350.000	647.325
Other: Loan and grant funds * MIDAS, Fund for Development, FAO, local governments	47,95	2.360.000	1.131.620
<b>TOTAL budget payments (BP)</b>		<b>9.448.671</b>	<b>5.379.923</b>

*Source: Agricultural budget of Montenegro, 2013 (author's modification)*

Some alternative calculations of this indicator (%PSE) show that it is extremely sensitive to relatively low increases (or decreases) of budgetary financing. In other words, with small changes in livestock breeding financing through agricultural budget, we can achieve significant impact on overall beef support and hence, sustainability and profitability of its domestic production.

Meaning of the %PSE indicators for beef sector in Montenegro (15.63) is better illustrated using the comparative data from other countries and the EU. The movement of this indicator could be tracked using the Producer Single Commodity Transfer (SCT) in table below. It basically describes the participation of beef and veal, as a percentage of Total Commodity Transfers (SCT) for the chosen national economy (OECD, StatExtracts, 2013). This is basically the



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same indicator as the %PSE, for it takes in account the same elements of calculation. This indicator for the chosen countries is given in table 8.

*Table 7. % PSE of the beef production sector in Montenegro 2013*

Category of meat (carcasses) USD / t	World price € / t	Price in MNE € / t	The value of domestic production at world prices = (A) x (E)	The value of domestic meat production at MNE prices = (E) x (B)	Production in MNE (t)	The difference of domestic and world prices
	A	B	C	D	E	F
Beef and veal 4 654 USD / t	3257,8	3070	6800	20.876.000	6.800	- 1.277.040
MPS = QPp – QPb						-1.277.040
<b>Budgetary support for beef production</b>						
Participation of primary meat production in total agricultural output (weighting factor)						weight
Subsidies for farms in calves and cow production– 17.023 heads x 66,91 €				1.139.009	1.139.009	100,0
Subsidies for organized fattening of bulls, oxen and calves 3.377 heads x 128,94 €				435.431	435.431	100,0
Slaughter subsidies for other categories of cattle 1.010 heads x 17,06 €				17.231	17.231	100,0
Preservation of genetic resources in agriculture				40.000	19.180	47,95
Sustainable use of mountain pastures				200.000	95.900	47,95
Renovation and development of villages and rural infrastructure				415.000	198.993	47,95
Old - age allowances				2.720.000	1.304.240	47,95
Program of extension and advisory services in livestock				322.000	154.399	47,95
Interventions on the market				150.000	71.925	47,95
Risk Management in Agriculture				300.000	143.850	47,95
Program of mandatory measures for animal health protection				1.350.000	647.325	47,95
Other: Loan and grant funds * MIDAS, Fund for Development, FAO, local governments				2.360.000	1.131.620	47,95
TOTAL budget payments (BP)				9.448.671	5.379.923	
<b>PSE (production on meat on farms) PSE = MPS + BP</b>					4.102.883	
<b>% PSE = PSE/(QPp + BP)*100</b>					<b>15,63</b>	

Source: OECD-FAO Agricultural Outlook 2013-2022; Ministry of agriculture, Agro budget 2013; Sector analyses of meat 2010; (author's modification)

*Table 8. Producer Single Commodity Transfer (SCT) for selected countries (beef and veal) 2013.*

Country	2006	2007	2008	2009	2010	2011	2012
European Union	51,5	43,5	31,0	34,3	12,4	11,1	28,3
Turkey	44,5	43,0	37,0	33,7	53,8	45,1	42,2
Switzerland	63,4	58,1	50,6	41,8	37,7	38,5	33,6
Canada	2,3	2,7	3,8	3,4	2,6	3,4	2,4
China	-4,2	-2,7	1,8	11,3	12,7	13,3	12,9

*Source: OECD StatExtracts (Authors Modification)*

It should be noted that this indicator in the EU during the 2006 was 51,5. In 2012 it declined to 28,3. The level of production support of beef in Montenegro is higher than the corresponding level Canada and China, but it is still almost twice less than in the EU. However, this indicator should be taken with caution, since it used to be much higher for decades.

However, the differences among the EU Member states should be taken in account. In the analysis of beef production, feed and animal purchases are the most significant costs. On average in EU-15, they make up 49 % of the total costs for breeders, 61 % for breeders & fatteners and 85 % for fatteners but in EU-10 countries it is lower (37 %, 50 %, and 78% respectively). Thus, any changes in these two variables affect fatteners more than breeders and EU-15 beef producers more than those in EU-12 countries. When groups of countries within the EU are compared, it is worth noting that the level of specific costs in EU-15 countries is nearly twice that of EU-10 countries (EC, DG Agri, EU beef farms report, 2012). The expected decline in EU beef production will be mainly due to a decrease in the total number of cows (Buczinski, 2010). The EU dairy herd has been steadily declining (23.2 million of dairy cows in the EU-28 in 2012). In the long run, the European beef sector is potentially more sensitive than other large beef meat exporters to the decisions that will be taken in the framework of the future WTO trade negotiations. In addition to multilateral trade agreements, the future dynamics of the European beef sector will also depend on internal choices concerning the next CAP reforms.

## 5. Conclusions

Continuity in the development of the OECD PSE methodology is constrained by the fact that this methodology has some limitations in the application. The lack of relevant statistical data on the various direct and indirect budgetary and other transfers from the state to farmers is a key limitation in the application of the methodology for determining the level of protection of agriculture.

The methodological and available data limitations we have tried to overcome in this paper using all available official data from domestic and foreign sources, the most important being agricultural budget data, AMIS, OECD-FAO prices outlook, Meat production sector analyses for Montenegro.

From the above analyses, according to available data for calculation, it is evident that the level of overall support to the beef production sector in Montenegro should be increased in order to catch up with the existing levels of income support in the EU.

If the current level of livestock breeding funding is maintained, the outcome after the Montenegrin accession to the EU might be uncompetitive beef production sector and increased import and trade deficit. Regardless of all difficulties, we consider that the available data and methodology used in this paper are sufficient to prove our key hypotheses i.e.

- the highest investment needs (and potentials) in Montenegrin agriculture are still in the livestock production: especially, in beef and veal production, and
- % PSE indicator for this commodity is a good base for accession negotiations with the EU and proper use of pre-accession assistance instrument (IPA II) and loans. Hence, calculation of the PSE indicator for beef meat sector is important for policy decision making process, especially for agricultural budget planning.

Calculation of the %PSE indicator for beef will enable comparative analysis of agricultural policies and more targeted agricultural budget spending for meat sector in order to raise competitiveness.

This analyses is significant step forward compared with the first analyses of this indicator done within the document "Food production in Montenegro and EU integrations" (2006) where %PSE was estimated for the whole Montenegrin agriculture, taking in account Slovenian respective levels of support at a time. Although worth mentioning, seven years later, it is surely outdated and needs an update.

Due to further opening of the market, the introduction of new sales channels and increasing competition, the existing relative price levels may be difficult to maintain. Without development support, public and private initiatives, this sector will hardly be able to withstand all the pressures and use existing comparative advantages. The results of this paper also point to the most likely direction of the IPARD support (for EU 2014-2020 financial perspective), where livestock breeding and especially beef production should be paid special attention. The result also indicates that more significant support should be given not only to the Agriculture and rural development (Chapter 11 of accession negotiations), but also to the Food safety (Chapter 12) for the standards in this area are a precondition for the placement of food products in the EU

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single market and certification of food processing establishments (award of EU export number). These investments are costly and time consuming, so the early planning and investments are necessary. The %PSE may be well used in the accession negotiation process to support need for increased support from the European Agricultural Guarantee Fund (EAGF) aimed for direct support and the European Agricultural fund for Rural Development (EAFRD) for livestock breeding (especially, beef and sheep).

A new concept of agricultural policy and the concept of budget support are also the essential preconditions to increase production in the medium and long term in this vital agricultural sector (meat and milk production). The fact, as the paper shows, that the level of support to beef production is almost two times lower than in the EU, is signal for decision makers in Montenegro to invest more heavily through the agrarian budget (increased subsidies) and through the favourable credit lines into this production and its processing facilities.

### **List of Abbreviations:**

*% PSE, Product Support Estimante (Percentage),*  
*AMIS, Agricultural Market Information System,*  
*BDP, Bruto društveni proizvod,*  
*CSE, Consumer Support Estimate,*  
*DANIDA, Danish grant for "Organic agriculture development projects" in Montenegro,*  
*EAFRD, European Agricultural Guarantee Fund,*  
*EAGF, European Agricultural fund for Rural Development*  
*EC, European Commission,*  
*EU, European Union,*  
*EUROSTAT, European Union Statistical Office*  
*FAO, - Food and Agriculture Organization of the UN*  
*GDP, Gross Domestic Product,*  
*GSSE, General Services Support Estimate,*  
*IBRD, International Bank for Reconstruction and Development*  
*MIDAS, Montenegro institutional development and agriculture strengthening,*  
*MONSTAT, Statistical Office of Montenegro,*  
*MPS, Market Price Support,*  
*NAC, Producer Nominal Assistance Coefficient*  
*NPC, Producer Nominal Protection Coefficient,*  
*OECD, Organization for Economic Cooperation and Development,*  
*PSE, Product Support Estimate*  
*SCT, Single Commodity Transfer*  
*TSE, Total Support Estimate*

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