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## **COSTS AND BENEFITS OF AGRICULTURE POLICY CHOICE**

**Summary:** Within the framework of the paper, we provide an analysis of the costs and benefits of agriculture policy choice. Such a mechanism of policy choice has a theoretical background. We use the concept of public choice model. Empirical data supplement the theoretical considerations – indicators for agricultural producers' and consumers' support in selected countries. We confirm, that it is necessary to investigate not only the income effects of agricultural policy, but also the cost of the introduction of agricultural policy tools. This reasoning conducted in the paper may help to explain the choice of agricultural policy and its impact on the choices of agricultural producerst.

**Keywords:** public choice, agriculture, agricultural producers, political costs and benefits.

**JEL Classification:** Q18, E61, C54.

### **Introduction**

Extending intervention programmes or support for agriculture coincides with the interests of administration at the national and EU level, involved in programming and managing agricultural policy instruments<sup>1</sup>. Consequently, for

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<sup>1</sup> Jakimowicz [2012, pp. 476-477], when referring to the departure within the EU from market mechanisms in preference of administrative ones, states, i.a. "Thus, there is a kind of science, considered dead up until recently, that has been gaining on significance – the political economy of socialism. (...) it is perfectly appropriate for explaining reality. The behavior of beneficiaries and European Commission officials is more easily described in terms of Kornaian pressure and suction rather than in terms of entrepreneurship and healthy competition. Grants are becoming the «scarcely supplied good», and their shortage is a permanent circumstance, which gives rise to various internal and external tensions". The author continues to observe that "for Poland and other countries in Central and Eastern Europe, this means returning to real socialism". Such a drastic description shows the essence of the problem we discuss in this paper. The benefits in

obvious reasons it is supported by political parties, as they depend on the votes of those directly or indirectly related to agriculture and rural areas. Data of the Polish Central Statistical Office (CSO) indicate that between 2005 and 2011, rural areas were the actual place of residence for 38.6-39.3% of population in Poland. The proportion of those employed in agriculture, forestry, hunting and fishing to the overall number of employed persons in that period also remained at a relatively stable level of 19.9% to 21.6% [GUS, 2016]. Although employment in agriculture as such is already small, and thus the number of farmers as voters is relatively small, this is still a significant number of votes to be gained, when one takes into account all the relationships throughout the agri-food sector. To that number, one must also add the potential number of votes of residents of villages as well as little and medium-sized towns. This gives rise to a specific relationship between stakeholders and beneficiaries.

The issues of political interest – here income of agricultural producers (as potential voters) in defining and shaping specific policies, are included in the models of public choice. Based on Mueller [1989], the public choice can be described as “economic research of non-market decisions making” or just “use of economics in political science”. It is assumed the rationality of decision-makers (political parties, clerks, stakeholder groups and society) concerning the selection of agricultural policy, i.e. weighing of benefits for its beneficiaries and expenditure of public finances. Nevertheless, it is assumed that decision-makers seek to maximize their own utility [Mueller, 1989]. This approach is often used to analyze agriculture and changes occurring within this area. The analyses presented in the paper are some reference to one of the trends of political economy, according to which the emphasis is on the voters’ behavior. This approach is often used to analyze agricultural policy and changes taking place within it [see: Martin, 1990, pp. 189-211; Patterson, 1997, pp. 135-165; Elliott, Heath, 2000, pp. 42-48].

The analysis outlined in this article is related to one of the trends in political economy, where the decision making process of political parties (administration) is ancillary to the maximisation of its objective function just like the choice of the producer<sup>2</sup>, who maximizes profit given certain limitations. In the analysis, we formulate the problem, our goal is to describe the issue by using of algebraic formulas. Our reasoning is supported by an empirical verification.

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the form of payments and other forms of support are becoming a good offered to beneficiaries by decision makers that seek to maximise their objective functions.

<sup>2</sup> The other two approaches to the issue of making policy decisions, which we will not discuss in our analysis, is the trend which focuses on the actions of stakeholder groups [Oskam, 2009].

## 1. The model of political costs and benefits

We present a model of decision making in the area of agricultural policy in the most simplified form, which, however, is necessary to highlight the essence of the problem under analysis. We will relate it to the problem of prices. We may call this a model of political costs and benefits of supporting the prices of agricultural products. This has an obvious impact on the income of agricultural producers as beneficiaries and potential voters. Let us assume that the objective function of agricultural policy and thus of stakeholders (understood as a political party and the administration associated with implementing a specific agricultural policy) takes the following form [Rembisz, 2007]<sup>3</sup>:

$$\max u(D_R^\omega, B), \quad (1)$$

where:

$u$  – a certain utility function,

$D_R^\omega$  – income of agricultural producers,

$B$  – budgetary expenditure for supporting prices and income in agriculture.

The level of the  $D_R^\omega$  variable depends both on the size of production, the prices obtained (shaped by the market), as well as on the support itself, which results directly and indirectly from the agricultural policy. Prices and payments, as well as other regulations that benefit the income, are obviously a result of the policy choice as to the agricultural policy pursued. The  $B$  variable is treated in terms of the cost of obtaining that support as a result of the policy choice. In line with the objective function presented above, it may be assumed that the decision-maker strives to have the income effect of the policy greater (at least not less) than the cost of financing. We may also assume that the benefits that follow from the policy decisions cannot be smaller than those resulting from the market and production efficiency. Thus, the revenues resulting from the policy must be higher than the revenues resulting from the market. This may be expressed in the following way:

$$D_R^\omega \geq b_1(p_y), \quad (2)$$

where:

$b_1$  – a certain price function,

$p_y$  – market level purchase prices without the support.

<sup>3</sup> The domain of the function is a set of positive numbers, the utility function is continuous, convex and differentiable in its set of values. The function is growing because everyone wants to have bigger than smaller amount of good. In addition, with each subsequent increase in the good or wealth, the increase in the utility function is smaller (the marginal utility is decreasing).

Political benefits, which are achieved by raising the income of agricultural producers above their market level  $b_2(p_y)$ , must be confronted with financial costs, i.e. budget expenditure  $B_t$  funding for the effect of income policy. This needs to meet the budget constraints of a given formula:

$$\{D_R^o - b_1(p_y)\} \leq B_t, \quad (3)$$

$$D_R^o - b_1(p_y) = b_2(p'_y) - \text{function of price support.} \quad (4)$$

We have:

$$b_2(p'_y) \leq B_t. \quad (5)$$

Obviously, it must be related to the costs of obtaining such benefits, i.e. budgetary expenditures, e.g. those necessary to maintain prices of agricultural products and thus to increase the income, or to implement specific investment and modernisation programmes. Formulating the objective function in such a way implicitly assumes that the price and income intervention is more of a political and social issue than an economic one. Of course, it does not have to be true in its entirety. However, such an assumption concerning one aspect of political and social benefits in decision making as to the scope of the forms of intervention, and thus of financial flows, should indeed be taken into consideration in analyses.

The policy should be determined so that marginal political benefits do not exceed the marginal political-financial costs and *de facto* burden on consumers:

$$\frac{\partial u}{\partial D_R^o} \cdot \frac{\partial b_1}{\partial p_y} + \frac{\partial u}{\partial B_t} \cdot \frac{\partial b_2}{\partial p'_y} = 0. \quad (6)$$

Transformation of the formula (6) gives us:

$$\frac{\partial u}{\partial D_R^o} \cdot \frac{\partial b_1}{\partial p_y} = - \frac{\partial u}{\partial B_t} \cdot \frac{\partial b_2}{\partial p'_y}. \quad (7)$$

The level of supported prices should be established in such a way that the marginal political benefits of a given political party or administration (or both) related to supporting agricultural producers' incomes through supported agricultural prices expressed on the left-hand side of formula (7) do not exceed the marginal political costs (achieved through increased budgetary spending and increased consumer costs) which are in fact budgetary costs (right-hand side of the formula 7). Under this approach, an increase of the income of agricultural producers obtained from the support under the CAP is the "political advantage". The increase in budgetary expenditure (current EU) and the related loss of sup-

port from taxpayers and consumers paying higher prices for agricultural products are the political costs. It seems to be consistent with the intuitive or common-sense perception of the problem<sup>4</sup>.

Adequately to the benefits offered under the agricultural policy, the agricultural producer makes rational choices to maximize their own specific objective function:

$$D_R^\omega = \max_y f\{e(EP), g(B)\}, \quad (8)$$

where:

$e(EP)$  – production efficiency,

$g(B)$  – income effect of support for agricultural producer related with implementation of the various programmes and mechanisms of the CAP.

Where sources of income are a function of improving the production efficiency:

$$(EP) = e(y \cdot p_y - n \cdot p_n) \max, \quad (9)$$

where:

$y \cdot p_y$  – the revenue (production value) of the agricultural producer (agriculture sector) as the product of the volume of production (supply) and the prices of products,

$n \cdot p_n$  – the cost of using manufacturing factors, i.e. the factor of capital and the labour factor for a given level of agricultural production (on a producer or sector scale).

Feature benefits of agricultural policy are as follows:

$$(B) = g(T_R + T_B \cdot Z_t) \max, \quad (10)$$

where:

$T_R$  – income support through the market,

$T_B$  – direct support – direct area payments,

$Z_t$  – area of the land factor.

<sup>4</sup> This determines the limit for future expansion of intervention needs and the inexhaustible creativity in this regard. That limit, in line with formula (7), is the equalisation of political benefits associated with the benefits of agricultural producers (higher prices), with the political and economic costs to the budget (taxpayers) and consumers (higher prices). This observation confirms the earlier assertions and at the same time precisely defines the issue of supporting income through maintaining agricultural prices above the level that would result from market mechanisms. The obvious limit of that support is the burden for the taxpayer and the consumer. In practice, however, that limit may be disregarded, especially when constraints on the national budget are not significant for intervention programmes under the Common Agricultural Policy.

Assuming substitutability both of these sources of income for a given level of income (at the time) and its simplified functions:

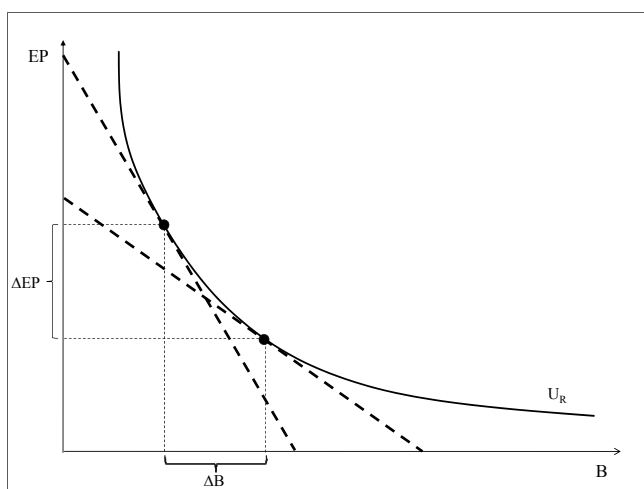
$$D^C = f(EP, B). \quad (11)$$

Solving differential at a given income  $dU_D = 0$  we have:

$$\pm \Delta EP \frac{\partial U_D}{\partial EP} = \pm \Delta B \frac{\partial U_D}{\partial B}. \quad (12)$$

Therefore, the agricultural producer optimizes own choice between these two sources of income comparing their utility, thus the benefits from activities to improve the efficiency with the benefits arising from the use of agricultural policy support.

This condition means that the agricultural producer has reached a balance; i.e. they maximize their aim function – income, when the income effect of a policy equates the loss of income effect as a result of deterioration in the efficiency of production. This decrease in production efficiency stems from the fact that support resulted in a decreased pressure to improve efficiency that would exist had it not been for the support<sup>5</sup>. But we need to remember that these are relative and unit values because they are referred to a given level of production (on a given isoquant), as shown in Figure 1 [Bezat-Jarzębowska, Rembisz, Sielska, 2012].



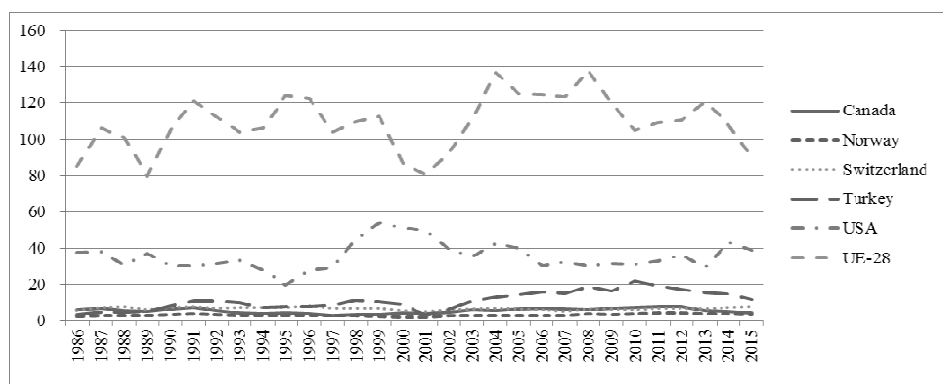
**Figure 1.** The relationship between the level of efficiency (EP) and the level of support (B)

<sup>5</sup> The direction of this substitution discussed on the basis of the above formula may go in the other way round, i.e. growing income effects of improved efficiency replace the need for support of the agricultural policy. However, it seems less likely.

## 2. Empirical evidence – selected issues

These analytical considerations are reflected in empirical visualizations of the indicators relating to benefits of producers and consumers. It is the first step of analysis of the problem and it will be extended in the next future scientific works. The first indicator is the *Producer Support Estimate* – PSE, covering the equivalent of the amounts of price support, direct payments, the cost of advice, support and other not paid by the agricultural producers social services costs<sup>6</sup>. The second indicator is the *Consumer Support Estimate* – CSE, covering the equivalent benefit of consumers in respect to the support of agriculture, mainly the price benefits calculated relative to the purchase prices without the support and with the support (the issue of taxes)<sup>7</sup>. The third indicator is the *Total Support Estimate* (TSE) that consists of transfers to agricultural producers (measured by the PSE), consumers (measured by the CSE) and support to general services to agricultural sector (measured by the GSSE).

As shown on the Figure 2, in most cases under consideration the level of support expressed by the *Producer Support Estimate* (PSE) has been diminishing in the last couple of years. As regards EU countries, one may also notice that despite the relative stabilisation of spending on the Common Agricultural Policy, the level of support in EU countries is much higher than, e.g. in the USA.



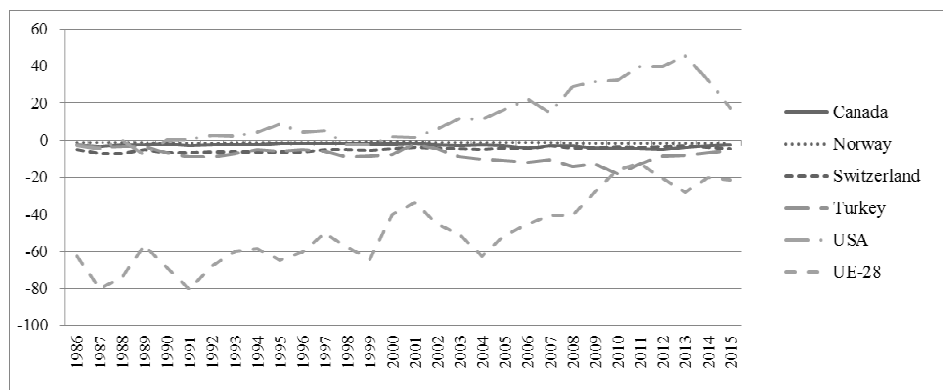
**Figure 2.** The level of agricultural producers' support (PSE) in selected countries in billion USD

Source: Own study based on: OECD Database [2016].

<sup>6</sup> Transfers included in the PSE are composed of market price support, budgetary payments and the cost of revenue foregone by the government and other economic agents.

<sup>7</sup> CSE is an OECD indicator of the annual monetary value of gross transfers to (from) consumers of agricultural commodities, measured at the farm gate level, arising from policy measures which support agriculture, regardless of their nature, objectives or impacts on consumption of farm products.

Figure 3 shows the evolution of the *Consumer Support Estimate* (CSE) indicator. One may notice that the value of the indicator was positive in most of the considered countries, which means that the amount of transfers from consumers was lower than the amount of transfers (grants) that went to consumers. In other cases (also in the EU), although it is negative (and thus the burdens exceed transfers to consumers), one may notice an upward trend. This allows for making an assumption that the difference between transfers to and from consumers is gradually being reduced. That means a relatively smaller burden for the consumer (and in fact, also the taxpayer) for the benefit of agricultural producers. Undoubtedly, this follows in part from the growing wealth of consumers and the decreasing number of agricultural producers as beneficiaries of those transfers.



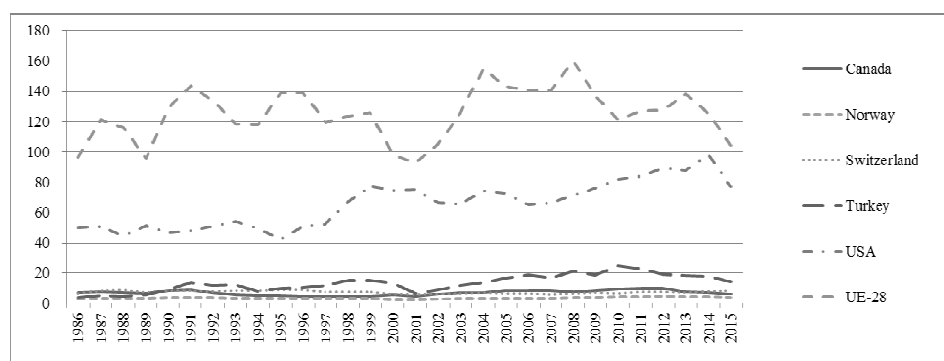
**Figure 3.** The level of consumers' support (CSE) in selected countries in billion USD

Source: own study based on: OECD Database [2016].

Figure 4 shows the level of total support (TSE) in selected countries. As we can see the support in the EU is much higher than in other countries, and amounts more than 100 billion USD each year.

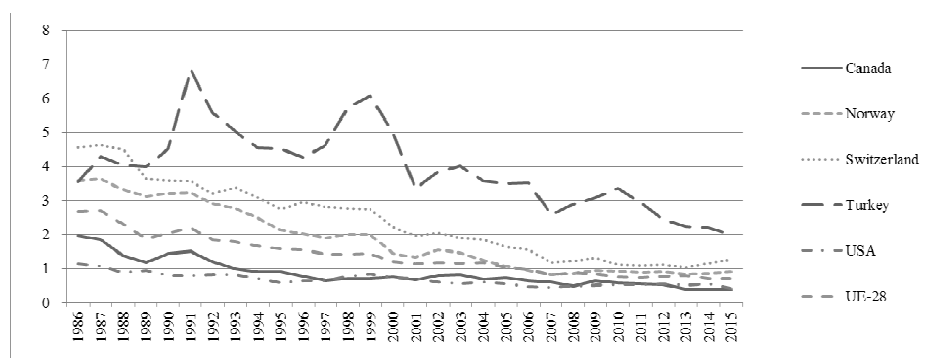
Figures 5 and 6 show the share of TSE in the GDP (%TSE) in selected countries. The Percentage Total Support Estimate indicator (%TSE) represents the total of policy transfers to agricultural sector expressed as a share of GDP. As we can see the share has been diminishing, nevertheless in EU the share is much higher than in USA.





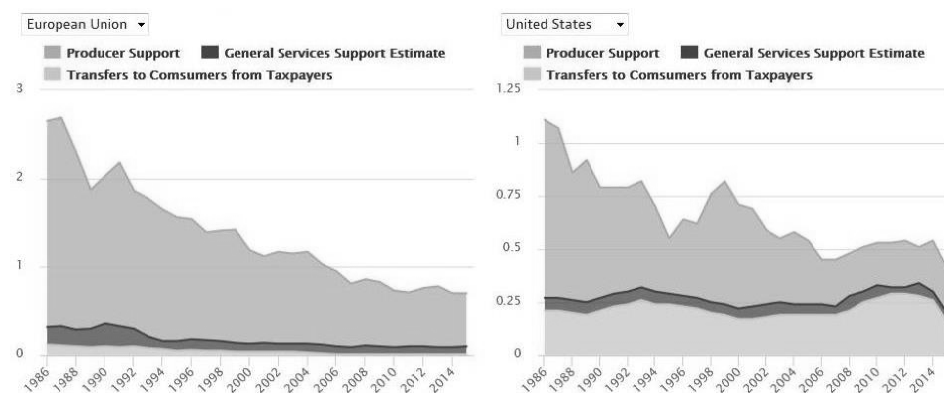
**Figure 4.** The level of total support (TSE) in selected countries in billion USD

Source: Own study based on: OECD Database [2016].



**Figure 5.** The share of total support (TSE) in the GDP (%TSE) selected countries (in %)

Source: Own study based on: OECD Database [2016].



**Figure 6.** The share of total support (TSE) in the GDP (%TSE) in EU and USA (in %)

Source: OECD Database [2016].

## Conclusions

The purpose of this study was to provide an overview of the policies selection mechanism and factors that influence this choice and the impact of the choice of the agricultural producer. In the choice of the agricultural policy income benefits for agricultural producers and financial budgetary costs, including the costs for consumers (which have not been analyzed) were compiled.

This reasoning may help to explain the choice of agricultural policy and its impact on the choices of agricultural producers. These considerations are illustrated ensuing indicators of agricultural producers' and consumers' support in selected countries.

Through analysis, we have shown that the choice is made by policy decision-makers on the basis of a specific analysis of costs and benefits. The model of public choice, and especially the model of political costs and benefits under agricultural policy, may help clarify the mechanism of that choice. The approach opens the path to more detailed empirical studies.

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## **MODEL WYBORU PUBLICZNEGO A RENTA POLITYCZNA**

**Streszczenie:** W artykule dokonano analizy kosztów i korzyści wyboru polityki w obszarze rolnictwa. Taki mechanizm wyboru polityki ma swoje ugruntowanie teoretyczne, w tym sensie, że pozwala wyodrębnić rzeczywisty proces tworzenia polityki. W opracowaniu wykorzystano koncepcję modelu wyboru publicznego. Uzupełnieniem rozważań teoretycznych są dane empiryczne – wskaźniki wsparcia producentów rolnych i konsumentów w wybranych krajach. Można przypuszczać, że rodzaj i zakres polityki rolnej oraz wiążące się z nią środki finansowe, po stronie wydatków na jej instrumenty oraz korzyści (także finansowe) dla jej beneficjentów, nie są dziełem przypadku lub wynikiem jedynie założeń o charakterze ideologiczno-politycznym czy ekonomicznym. Wybór konkretnej polityki określa mechanizm, w którym korzyści i koszty są ze sobą powiązane. W artykule opisano i wyjaśniono ten mechanizm. Potwierdzamy, iż konieczne jest, aby w analizach uwzględniać nie tylko dochodowe skutki polityki rolnej, ale także koszty wprowadzenia jej narzędzi. Rozumowanie prowadzone w artykule może pomóc w wyjaśnieniu wyboru polityki rolnej i jej wpływu na wybory producentów rolnych.

**Słowa kluczowe:** wybór publiczny, rolnictwo, producent rolny, koszty i korzyści polityczne.