

**Production Distortions in the Slovakian Grain Sector Resulting  
from Agricultural Subsidies**

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## Production Distortions in the Slovakian Grain Sector Resulting from Agricultural Subsidies

Abstract: A Policy Analysis Method, based on social benefit-cost analysis, is applied to five production areas of the Slovak Republic to analyze production distortions resulting from direct systematic subsidies in Slovakia. Three grains are analyzed: wheat, barley, and corn. Results indicate that currently applied policies have significant distortion effects, but those effects are not homogeneous across commodities and production areas.

## INTRODUCTION

The Uruguay Round raised an interest in consequences of governmental assistance to the agricultural sector. Subsidies are one of the most universal tools of agricultural policy. Critics call for scrutiny of their use due to their effects on food prices and budget costs borne by tax payers. The subsidy puzzle became important in the new European market economies. Countries in this region have been trying to install administrative frameworks based on examples from other countries while coping with past policies and their outcomes.

The Slovak Republic (SR), constituted on January 1, 1993, is still facing symptoms of agricultural transformation and liberalization. Until 1990 the objective of former Czechoslovakia was to ensure self-sufficiency in food. Therefore, a course of intensification and enormous scale of production was employed in inappropriate circumstances, consuming tremendous amounts of resources. The principal policy tools included price supports, market regulation, and subsidies. As of 1996, agriculture and forestry comprised approximately 5.2% of the Slovak GDP. The Report on Agriculture in SR published in 1997 surmises the amount of transfers to farmers as 1.23% of GDP. Despite this small percentage, the distorting effects caused by misallocation of subvention resources on society might be consequential, and in fact exceed the level of governmental assistance when production is encouraged in non-suitable environments.

Designed study, attempting to determine malformations in the grain subsector, becomes more fitting with the reevaluation of the Slovak agricultural policy and the failed efforts to date to become an integral part of European structures through the EU. A Policy Analysis Matrix (PAM) is applied to three major grains (wheat, barley, and corn) and five different production areas (Corn: CPA, Beet: BPA, Potato: PPA, Potato-Oat: OPA, and Mountainous: MPA).

## BACKGROUND INFORMATION

The subsidy package in SR is divided into systematic and facultative part. Systematic (direct, claim) subsidies are similar to the EU compensation payments to Less Favorite Areas (LFA) or the U.S. deficiency payments. Every farmer meeting certain conditions, such as maintaining eligible land equity, is qualified for systematic subsidies tied to “group of land price<sup>2</sup>”. Facultative (indirect, investment) subsidy is selective, and needs a special approval. Production areas are formed on bureaucratic as well as soil, climatic, and topographic conditions. Table 1 represents subsidy titles and total amount of transfers between 1993 and 1997.

Table 1: Subsidy Titles (mil. Sk), Slovakia, 1993-97.

Subsidy Titles	1993	1994	1995	1996	1997*
I. Ecology and landscape formation support	3913.3	3527.5	3514.3	3493.0	3845.0
of which: system subsidies	3608.7	3353.4	3318.1	3305.6	3570.0
II. Subsidized interest on loans	NA	89.3	217.0	45.7	235.0
III. Production stabilization subsidies	2809.4	2702.2	3347.2	3586.0	4680.0
of which: seeds, biol. material, plant protection, industrial fertilizers	682.4	530.0	1192.5	1170.0	1750.0
milk quality premiums	451.7	481.7	777.4	742.1	1000.0
investments	1288.7	957.5	935.1	1110.1	1190.0
Total	6959.9	7143.0	7178.5	7124.7	8760.0

Source: Report on Agriculture, 1997.

\*budgetary data

## METHODOLOGY

PAM, based on social cost-benefit analysis, focuses on identifying efficient patterns of production and prices, and allows one to interpret the effects of policies specific to agriculture as well as those affecting entire economy (fiscal policy, etc.). The impacts of policies are then

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<sup>2</sup> an outcome of the land classification based on climatic and soil conditions and updated

estimated by comparison with the absence of policy. The final objective is to identify farmers - categorized by the commodities, the agroclimatic zones, etc. - who are competitive under current policies affecting crop and input prices, and how their profits change as policies are altered.. The PAM used is shown in Table 2.

Table 2: Policy Analysis Matrix

		Costs		
	Revenues	Tradable inputs	Domestic factors	Profits
Private prices	A	B	C	D <sup>1</sup>
Social prices	E	F	G	H <sup>2</sup>
Effects of divergences and efficient policy	I <sup>3</sup>	J <sup>4</sup>	K <sup>5</sup>	L <sup>6</sup>

<sup>1</sup> Private profits,  $D = A - B - C$

<sup>4</sup> Input transfers,  $J = B - F$

<sup>2</sup> Social profits,  $H = E - F - G$

<sup>5</sup> Factor transfers,  $K = C - G$

<sup>3</sup> Output transfers,  $I = A - E$

<sup>6</sup> Net transfers,  $L = D - H$ , also  $L = I - J - K$

Costs are divided into tradable inputs (fertilizers, energy, etc.), and domestic factors (labor and land). Depreciation is a part of production costs. “Private” deals with the current situation (farming operation plus subsidies). “Social” is meant as an expression of economic values (farming without any assistance).

The first row measures private profitability reflecting actual prices received or paid by farmers given current technologies, input and output values, and policy transfers. Cost of capital (equal to pretax proceeds required by the capital holders to keep their property in the system) is included, so private profits are defined as above normal returns. If  $D < 0$ , below normal rate of return indicates an anticipated exit unless profits can be increased to at least a normal level ( $D=0$ ).

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yields for nine crops

Positive private profits (supernormal returns) should lead to future expansion, unless the farming area cannot be expanded or substitute crops are more privately profitable [13].

The second row depicts comparative advantage. Outputs and inputs are shadow priced. Parity prices were used for internationally traded items. Labor and land are not mobile internationally, and were appraised by their alternative usage. When social profits are negative, a system cannot survive without governmental assistance, and systems waste resources by producing at social costs exceeding the costs of importing. The third row represents transfers. Efficient systems earn excess profits without any help from the government, and subsidizing policy ( $L > 0$ ) increases the final level of private profits.

*Ratio Indicators for Comparison of Unlike Outputs.*

*Profitability Ratios.* Profitability Coefficient [ $PC = (A-B-C)/(E-F-G)$ , also  $PC = D/H$ ], a ratio of private and social profits, measures the incentive effects of all policies and serves as a proxy for the net policy transfer. Its usefulness is restricted when private or social profits are negative. Private Cost Ratio is a ratio of domestic factor costs (C) to value-added (value of output minus cost of tradable inputs) in private prices (A-B). PCR indicates how much the system can afford to pay domestic factors and remain competitive. If  $(A-B-C)=D=0$ , firms break even. Firms minimize the PCR by holding down factor and tradable input costs to maximize excess profits. Domestic Resource Cost Ratio, a ratio of domestic factor social cost (G) to value-added in social prices (E-F), serves as a proxy for social gains. DRC equals one if PCR equals zero. Minimizing the DRC is equivalent to maximizing social profits.

*Policy Effects on Prices.* Nominal Protection Coefficient, [ $NPCO = A/E$ ] on tradable outputs and [ $NPCI = B/F$ ] on tradable inputs, contrasts the private price with a shadow price. The NPCO implies the degree of output transfer. A NPCO of 1.10 means that policies are increasing

the market price to a level 10 percent higher than the world price. The NPCI determines the degree of tradable-input transfer. A NPCI of 0.80 implies that policies are reducing input costs, and the average market prices for these inputs are only 80 percent of world prices. Effective Protection Coefficient, a ratio of value added in private prices (A-B) to value-added in shadow prices (E-F), measures the degree of policy transfer from product market policies while ignoring the transfer effects of factor market policies. An EPC above one indicates higher private profits than in absence of commodity policies. An EPC below one indicates that the net effect of policies is to reduce private profits, thus the combined transfer effect is negative.

*Transfers to Sector.* Subsidy Ratio to Producers [ $SRP = L/E$ , also  $SRP = (D-H)/E$ ], a ratio of the net transfer to the social value of revenues, implies the proportion of revenues in shadow prices that would be required if a single subsidy or tax substituted the complete set of policies.

## DATA

Data availability narrowed the set into wheat, barley, and corn for grain. Data for year 1997 (most recent with complete data) were obtained from the Research Institute of Ag. and Food Economics in SR. Out of 110 firms providing information about their costs, about 28.7% of firms are from CPA, 27.5% from BPA, 13.7% from PPA, 8.7% from OPA, and 21.2% from MPA. Costs calculations, based on actual expenditures and levels of production, are made at the end of the current year. Price of land (“rent”) is the payment the user of land makes the owner for using it (1108 Sk/year). Distance associated with the social price was set to be 200 km (the maximum length of SR is 428 km) because production areas cannot be explicitly localized. As of 1997, the average salary in agriculture was 6,028 Sk/month. Since labor employed in the agricultural sector is mobile, but does not have skills required in lucrative branches, the food

processing (7,450 Sk/month) was used as an opportunity cost. If negative cost occurs after the subsidy is deducted, the subsidy is likely to be used for other purposes than those intended by the legislature. Data set does not distinguish input subsidies; only systematic and facultative grants are proclaimed. Therefore, the summary matrix captures only the effects of systematic subsidies and does not take input subsidies into account.

## RESULTS

Results and ratios for comparison of unlike outputs are presented in tables 3, 4, and 5. Discussions of yields and profits follow each table, ratios are later discussed in the conclusion.

Table 3: Results of Analysis for Wheat by Production Areas and Country Results, Slovakia, 1997.

Wheat	Production Area					Average
	CPA	BPA	PPA	OPA	MPA	SR
Indicator						
Yield [t/ha]	5.56	4.89	4.02	4.00	3.55	4.96
Private Profit [Sk/ha]	7,148	4,934	2,788	3,817	4,580	5,561
Social Profit [Sk/ha]	2,738	4,727	2,511	3,471	4,445	4,714
Profit Divergences [Sk/ha]	4,410	207	276	346	135	847
PC	2.61	1.04	1.11	1.10	1.03	1.18
PCR	0.58	0.65	0.75	0.63	0.45	0.61
DRC	0.89	0.78	0.85	0.79	0.70	0.79
NPCO	0.76	0.76	0.78	0.76	0.71	0.76
NPCI	1.27	1.41	1.18	1.33	1.28	1.31
EPC	0.67	0.64	0.66	0.61	0.56	0.65
SPR	0.149	0.0079	0.0129	0.0163	0.0072	0.0321

Sample size = 108

Wheat yield in SR in 1997, based on the RIAFE's data, averaged 4.96 mt/ha. The FAO states the Slovak mean as 4.57 mt/ha, the Eastern Europe as 3.43 mt/ha, and the EU as 5.5 mt/ha.



The most fertile zone is the CPA, with the average yield exceeding the EU standards by 10%. On the other hand, yield in the MPA only slightly exceeds the Eastern European level. Producers in the CPA enjoy the highest level of private profits of 7,148 Sk/ha. Despite the low yields, MPA is better off than the PPA or OPA. Positive social profits indicate the ability of the system to survive without assistance. Profit divergences indicate that the policy transfers raise profits received by growers.

Table 4: Results of Analysis for Barley by Production Areas and Country Results, Slovakia, 1997.

Barley	Production Area					Average
	CPA	BPA	PPA	OPA	MPA	SR
Indicator						
Yield [t/ha]	4.58	4.18	3.41	3.23	2.89	4.00
Private Profit [Sk/ha]	5,636	5,163	4,473	3,847	527	4,514
Social Profit [Sk/ha]	-1,596	1,719	3,745	1,917	1,348	1,201
Profit Divergences [Sk/ha]	7,232	3,444	728	1,930	-820	3,312
PC	-3.53	3.00	1.19	2.01	0.39	3.76
PCR	0.62	0.64	0.59	0.58	0.91	0.64
DRC	1.08	0.91	0.75	0.86	0.89	0.93
NPCO	0.85	0.92	0.90	0.89	0.71	0.87
NPCI	2.06	2.42	2.51	2.58	2.41	2.30
EPC	0.73	0.77	0.73	0.67	0.48	0.72
SPR	0.3276	0.1710	0.0443	0.1240	-0.0589	0.1718

Sample size = 109

Barley yields averaged 3.58 mt/ha in SR, 4.40 t/ha in the EU, and 3.24 t/ha in the Eastern Europe (FAO). The average yield in the sample varies from 2.89 (MPA) to 4.58 mt/ha (CPA). Farmers in the MPA earn an average private profit of 527 Sk/ha, even though subsidies for this area are the largest one. Producers in the CPA, receiving the smallest subsidy assistance because

of the better soil, are able to gain 5,636 Sk/ha. Social profits imply the system can survive without assistance in all production areas but the CPA, where the social profit is negative. Profit divergences are positive in all areas but the MPA, where the production is being taxed.

Table 5: Results of Analysis for Corn by Production Areas and Country Results, Slovakia, 1997.

Corn for grain	Production Area					Average
	CPA	BPA	PPA	OPA	MPA	SR*
Indicator						
Yield [t/ha]	7.19	5.85	NA	NA	NA	6.96
Private Profit [Sk/ha]	5,636	5,163	NA	NA	NA	4,514
Social Profit [Sk/ha]	12,072	9,877	NA	NA	NA	15,537
Profit Divergences [Sk/ha]	-6,437	-4,714	NA	NA	NA	-11,023
PC	0.47	0.52	NA	NA	NA	0.29
PCR	0.62	0.64	NA	NA	NA	0.64
DRC	0.68	0.68	NA	NA	NA	0.58
NPCO	0.45	0.54	NA	NA	NA	0.41
NPCI	1.07	1.30	NA	NA	NA	1.12
EPC	0.39	0.46	NA	NA	NA	0.34
SPR	-0.1533	-0.138	NA	NA	NA	-0.2712

Sample size = 54 \*Average includes some operations not indicated for the purposes of disclosure.

The SR average is 6.96 t/ha. The FAO reports 9 t/ha in the EU, 4.47 t/ha in the Eastern Europe, and 5.95 t/ha in SR. Corn can be grown with a private profit of 5,636 Sk/ha in the CPA, and 5,163 Sk/ha in the BPA. Social profits (positive) indicate a capacity to survive without governmental assistance. The negative profit divergences imply the system is being negatively subsidized (taxed).

## CONCLUSIONS AND IMPLICATIONS

Private profits indicate which crops are competitive under current policies, while social profits occur in the absence of distorting policy. The study concludes that all grain subsectors (except barley in the CPA) are both privately and socially profitable, and able to survive without assistance.

*Profitability ratios.* PC measures the incentive effects of all policies and serves as an indicator of the net policy transfers by showing the extent to which private profits exceed social profits. The smallest discrepancies between the private and social profits occur in case of wheat grown in the MPA (3%), BPA (4%), OPA (10%), and PPA (11%). In the case of barley, the absolute values of PCs exceed one in all areas but MPA, where private profits are only 39% of the social profits. Low private profits in the MPA are caused by low yields per ha, rather than policy transfers. In the corn subsector, private profits are only 47% (CPA), resp. 52% (BPA) of social profits valued at shadow prices. Different scenarios are observed in the case of wheat in the CPA where private profits exceed social profits 2.61 times (2.61x), and in case of barley in the BPA (3x) and OPA (2x). Businesses try to minimize their PCR in order to maximize excess profit. The lowest PCR is achieved in the MPA in the wheat system (PCR = 0.45), although all PCRs are below one, implying excess profits in the system. By minimizing the DRC, social profits are maximized. The most socially profitable grains are corn for grain in the CPA and BPA (with DRC of 0.68), followed by wheat in the MPA (0.70). All DRCs (except barley in the CPA) are less than one, meaning the domestic production is economically profitable, and SR has a comparative advantage in their production.

*Policy Effects on Prices.* NPCO implies the degree of output transfer. Market price levels converge to the world price levels in the case of barley grown in the BPA (NPCO = 92%), PPA

(90%), OPA (89%), and CPA(85%). The market price level approaches the world level also in the case of wheat in the PPA for which the NPCO is 78%, and in the CPA, BPA and OPA is 76%. However, in all instances investigated current agricultural policies are decreasing the market price level to a fraction of the world price and, therefore, favoring consumers more than producers. The lowest NPCO were found for corn for grain in the CPA (45%) and BPA (54%). NPCI implies the extent to which agricultural policies are increasing input costs. All NPCIs exceed one, suggesting that policies applied are increasing input costs, and that their average market prices exceed world prices. Market prices approximate world prices in the case of corn in the CPA, where the domestic prices exceed the world prices only by 7%, and wheat in the PPA (excess of 18%). EPC indicates the degree of policy transfer amounts that result from product market policies. All EPCs are less than one, implying that the net effect of policies is a reduction in private profits. This is partly explained by the existence of the State Fund for Market Regulation. The Fund constrains proceedings related to market performance of grains, potatoes, and certain meat commodities. One of the Fund's purposes is administration of state intervention purchases of the volumes known beforehand for minimum guaranteed prices announced before the harvest starts. If a farmer signs a contract with the Fund, and the market price exceeds the guaranteed price, a farmer suffers a loss equal to a difference between those two prices, and vice versa. If a farmer does not sign an agreement with the Fund, the risk of higher inventory and lower liquidity increases.

*Transfers to the Sector.* SRP, indicates the level of policy transfer. The calculated SRPs vary among different crops and production areas, indicating both positive and negative transfers to agricultural producers. One of the largest positive transfers appears with respect to barley in the CPA, indicating an increase in total incomes.

## OBSERVATIONS AND RECOMMENDATIONS

Decoupled DIPs (income stabilization programs, more selective eligibility criteria, payments caps, funds for regionally targeted support) target low income farmers and disadvantaged areas while limiting economic distortions. A major aim is to maintain farming in marginal areas and strengthen job opportunities related to agriculture in areas lacking other options. They often might be appropriate as a temporary measure and alternative policies should be examined. DIPs may embody policies for enhancing the value-adding capacity of productive factors, such as modifying policies in other sectors, or making adjustments to macroeconomic policies, competition policies or the legal framework. Policies assisting structural adjustments should be utilized together with DIPs to ameliorate productivity, encourage diversification and increase investments in the agricultural and food sectors. Despite the positive effects, DIPs also have certain shortcomings. Criticisms are often heard from the taxpayers whose money fulfills the state budget, and later is divided among the recipients of support. In spite of the attention given to wealth distribution and resource allocation in the society, certain producers in marginal conditions might not accept the DIP as a contribution to structural adjustment to ameliorate their conditions, but as guaranteed income payment from the state budget.

Lower support might have serious impact on farm incomes, migration, and conservation issues. A gradual adjustment is more desired than a radical reform. The emphasis of current world policies centers on the food sector and its link to production agriculture, rather than emphasizing the farm-gate value of production. The average Slovak consumer spends approximately one-third of his disposable income on food items. Producers receive only a fraction paid by consumers. The difference can be attributed to high margins charged by intermediaries because of high transaction costs, undeveloped market structures, lack of integration, accessibility of information, etc.

The procedures for application and participation, data used to determine awards, the accurate criteria for evaluation, and a “phase-in” or “phase-out” strategy for specific subsidies (if necessary) should be announced in advance (a horizon of three - five years). Despite the annual allocation of funds, the exact amounts desired for each program should be given in the multi-year legislation so the Ministry can “drive” agricultural policy development through its budgetary requests rather than react to budgetary awards. Shifting LFA subsidies into rural development, and addressing development issues and concerns through agricultural policy decisions should be encouraged. A long-term approach to the needs of rural areas should be considered (such as community development projects to decrease a dependency on agriculture subsidies in areas not suited for intensive cultivation, zones of development possibly qualifying for enhanced government and private sector attention through a system of grants, low interest development loans and other forms of support). Subsidies and support programs should focus in two areas: (1) Production of major strategic crops (food wheat, corn, and barley); (2) Production of primary and secondary agricultural goods - likely “winners” in the post-EU accession era.

#### SUMMARY

Study was designed to provide information concerning both private and social profitabilities in support of future Slovak agricultural policy formulation. The results indicate various distortions in production from current agricultural policies. Subsidies based on the group of land price, together with other factors, cause distortions in the production patterns. Guaranteed “lump sums” prevent growers from implementing alternative uses of their land, or even from a closer examination of their costs. The direct result of the transfers is a distortion of desired market outcomes. Different grains in unlike areas exhibit incompatible levels of distortions. Grains in worse conditions are less severely distorted than in better conditions.

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