

**Producer Subsidy Equivalents and
Evaluation of Support
to Russian Agricultural Producers**

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ABSTRACT

We critiqued the PSE method as it is traditionally applied. It can be concluded that it has severe limitations when it is applied to Russian agriculture during transition to a market economy. Many of the conditions and assumptions taken for granted in mature market economies cannot be assumed for transition economies, so the validity of PSE measures is questionable. The specific approaches are applied to calculate PSEs for Russian agriculture, emphasizing the unique structure of production and marketing channels. The appropriate interpretations of PSE estimations for major agricultural commodities are provided.

PRODUCER SUBSIDY EQUIVALENTS AND EVALUATION OF SUPPORT TO RUSSIAN AGRICULTURAL PRODUCERS

Introduction

The analysis of agricultural policy often includes the estimation of overall effects on the performance of domestic agriculture. The best known and internationally adopted method to appraise the effect of all policy instruments is the producer subsidy equivalent (PSE). Recently this kind of analysis has been carried out for Russian agriculture (Liefert, et al). The general conclusion was that “the estimated values are highly negative, indicating that Russian agriculture has been heavily taxed.” The authors state that this result derives from the following factors: “First, government trade and price policies, at the regional as well as federal level, have operated to keep domestic producer prices below world prices. Second, deficient Russian physical and institutional infrastructure has resulted in high domestic transaction costs for Russian agricultural output. Since in competing with goods on the world market, Russian producers must bear all the costs of getting their output to final users, the high transaction costs in an economic sense also tax domestic production.” The final results of this analysis are presented in Table 1.

However, the conclusion and supporting arguments, together with the chosen data for these calculations, raise some doubts and concerns about the consistency of approaches to this analysis. In order to make these concerns clear we need to analyze in more detail both the principles of the PSE approach and the specific features of the agricultural structure and markets in Russia.

The Concept of PSE

The PSE method was initially developed by Professor Tim Josling for the Food and Agricultural Organization of the UN (FAO) in the early 1970s (Cahil and Legg). It was adopted by the Organization For Economic Co-operation and Development (OECD) in implementing the 1982 Ministerial Trade Mandate. PSEs were initially calculated for a set of OECD countries consisting of Austria, Australia, Canada, the European Economic Commonwealth (EEC), Japan, New Zealand, and the United States. The purpose of calculating PSEs was to provide in a single, all-inclusive measure, the transfers to the agricultural sector from the rest of the economy arising from government policies.

For each product, the PSE for a given category of support represents the value to agricultural producers of the transfers from consumers or the government due to the support at the existing level of production. PSEs are calculated at the farmgate level. The prices received by farmers are the prices paid by consumers at the first level of consumption. Under these conditions, the consumption price at the farmgate is the producer price, except when the level of consumption is higher than the level of production and the level of market support of the quantities imported is different from that of domestic production.

Table 1. Estimates of PSEs for Russian agriculture (percentage per unit value)

	1992	1993	1994
Beef	-1162	-449	-363
Pork	-680	-175	-136
Poultry	-432	-58	-31
Milk	-918	-467	-310
Eggs	-635	-209	-79
Wheat	-399	-292	-341
Corn	-120	-103	-24
Barley	-277	-187	-304
Sugar beets	-482	-184	-108
Sunflower seeds	-164	-322	-173

Source: derived from Liefert et al.

The PSE is an indicator of the value of the transfers from domestic consumers and taxpayers to producers resulting from a given set of agricultural policies at a point in time. Thus, PSEs are aggregate measures of the total monetary value of the assistance to output and inputs on a commodity-by-commodity basis, associated with government policies.

Four categories of agricultural policy measures are included in the OECD calculations of PSEs:

- (1) Measures that simultaneously affect producer and consumer prices (market price support);
- (2) Measures that transfer money directly to producers without raising prices to consumers (direct payment);

- (3) Measures that lower input costs (reduction in input costs);
- (4) Measures that in the long term reduce costs but that are not directly received by producers (general services).

PSEs can be expressed in three ways: (1) as the total value of transfers for the commodity produced; (2) as the total value of transfers per unit of the commodity produced; and (3) as the total value of transfers as a percentage of the total value of production including transfers.

In algebraic form, where the level of production is Q_p , the domestic market price is P_d , the world price is P_w , direct payments are D , levies on producers are L and all other budgetary financed support is B , the PSE expressions as measured by OECD are (Cahil and Legg, 16):

$$\text{Total PSE} = Q_p(P_d - P_w) + D - L + B$$

$$\text{Unit PSE} = \text{Total PSE}/Q_p$$

$$\text{Percentage PSE} = 100 (\text{Total PSE}) / [Q_p P_d + D - L] \text{ (at domestic prices).}$$

There are some underlying assumptions for the calculation of PSEs:

- (1) Markets of agricultural commodities have downward-sloping demand and upward-sloping supply curves which determine equilibrium prices and producer and consumer surpluses; it means the "law of one price" should be applied;
- (2) An open small-country economy is assumed, where prices in the world market are assumed to express the opportunity costs to domestic producers and consumers;
- (3) Commodities are assumed to be homogeneous for producers and consumers. This applies both to the commodities defined for reference (world) price purposes and domestic commodities.

We will show that, if the main purpose of the calculation of PSEs is taken into consideration, the methods used by the above-mentioned paper are not consistent with the purpose, because some of the assumptions are violated. It will also be shown that more accuracy is required when one operates with statistical data on Russian agricultural production and sales. The improved data approach will give significantly different results even in the framework of standard methodology.

Discussion of the Assumptions for PSE Calculations

It is necessary to mention that originally the PSEs method was applied for the countries with developed market economies. All of them are well integrated into the world agricultural and nonagricultural markets. That is why the use of this methodology for countries with economies in transition to market economy and with a low level of integration in international markets could be limited

(Harley, Meyers). For each country different limitations may apply. Further, we consider some restrictions which make the use of the PSE method for Russian agriculture questionable.

The “law of one price” is not applicable in most transition economies, though the degree of market integration varies considerably. It is particularly not acceptable for Russian agriculture due to a few main reasons.

First Assumption

First, Russian agricultural producers vary greatly in the degree of market integration. At present, there are three forms of agricultural enterprises in Russia. One group consists of 25,000 large agricultural enterprises, LAEs, (average area is 5000 ha, average labor force is 500 employees). In 1994, they produced about 60 percent of agricultural output. Approximately 38 percent of output is produced by private subsidiary farms, PSFs, consisting of a few million small land plots (average size is 0.4 ha). About 2 percent of output is produced by newly emerged private farms (peasant farms) which have an average area of 40 ha and a labor force of 3 persons. During the transition period, one can observe significant changes in the structure of agricultural production (see Tables 2 and 3). Each of these groups has its own specific production and marketing characteristics and faces very different input and product market conditions, but Liefert et al. analyze the whole agricultural sector without distinguishing the difference between various groups of producers.

Table 2. Share of agricultural output among groups (percent of total output)

	1990	1991	1992	1993	1994
Large agricultural enterprises	76	72	66	63	60
Private subsidiary farms	24	28	33	35	38
Peasant farms	-	-	1	2	2

Source: Russian Statistical Yearbook, 1995. p. 351

Because these sectors have different structures of sales channels they face different prices. For example, most meat produced by large agricultural enterprises is sold to local meat processors. Private subsidiary farms prefer to sell their products on local public retail markets (bazaars). That is why in one case the agricultural producers receive the procurement (wholesale) price and in the other case they

receive retail price and internalize the processing and markets costs. By virtue of the fact that both channels of sales have significant shares of the meat market, we cannot consider only one price as a representative farm price for the domestic meat market. Liefert et al. applied only the wholesale price for all agricultural commodities. This approach could substantially understate the revenue for agricultural producers depending on the type of commodity. The structure of sales for each agricultural commodity varies. For example, the bulk of grain is sold on the wholesale market to processor or other enterprises. At the same time, most potatoes are marketed to consumers through local retail markets. Taking into consideration all these reasons, a researcher needs to distinguish groups of producers and different commodity markets in order to obtain the correct information about prices and revenues in agriculture to be used in PSE calculations.

Table 3. The production shares among the groups of agricultural producers in 1993, in percent

	Large agricultural enterprises	Private subsidiary farms	Peasant farms
All grains	94.2	0.6	5.2
Potatoes	16.5	82.5	1.0
Vegetables	34.5	64.5	1.0
Meat	59.4	39.5	1.1
Milk	64.2	34.7	1.1
Eggs	73.0	27.0	0.0

Source: Russian Statistical Yearbook, 1994. p.353, 365.

Second Assumption

Russian agriculture does not operate in the framework of an open country economy for all agricultural commodities. There are only a few cases when one can apply this approach: sugar, butter, poultry, and vegetable oil. A Russian agricultural producer works under the condition of nearly closed or isolated markets for most other commodities. It means that only domestically (sometimes locally) originated demand and supply clear the market. The prices on the world agricultural markets do not

significantly affect domestic prices, so they cannot represent the opportunity cost for the agricultural producers.

There are several reasons that may explain this situation. The first one is a difference in the quality of commodities. Most agricultural producers and food processors cannot provide the quality of products required for international markets. The second reason is the lack of knowledge of international markets. And the third factor is an insufficient market infrastructure to transfer signals from world markets to domestic producers. Also, the experience of many Russian businessmen shows that federal or local regulations cannot be considered as significant obstacles to the export of food products from Russia. However, the necessity to meet the quality requirements in other countries is a real challenge. As a result, the export of agricultural and food products occupies an insignificant share in the market and cannot be considered at present as a source of revenue for domestic agriculture.

The main part of agricultural output can be sold only on domestic markets and in most cases only on local or regional markets. Therefore, one should be very careful in determining a reference price that may represent the opportunity cost for domestic producers. In very rare cases it could be the world prices (for example, in recent years a small amount of barley, wheat, and flour were traded in other countries). However, the small volume of this trade indicates that these markets are not available to most producers. Therefore, these prices cannot be considered as the opportunity cost for the whole of agriculture. In some cases (for example, grains) the average national prices can represent the opportunity costs for many agricultural producers. However, for some agricultural products only local or regional prices are realistic market information for agricultural producers. Only the level of these prices determines a producer's revenue for a particular commodity. The bulk of agricultural products fall into that category, including meat, milk, eggs, and potatoes.

The use of import prices as the reference prices can also be appropriate in some cases. The discussion of this approach follows below, because it is connected with the violation of the assumption of homogeneity of commodities.

Third Assumption

The violation of the third assumption can be considered in the framework of arguments that were applied to explain the violation of the second assumption. Liefert et al. used some world prices as the reference prices for domestic production. However, they do not explain how they provide for the compatibility of these prices with prices for domestically produced agricultural commodities.

In some cases the authors used the prices for one kind of commodity as a reference price for another one. For example, for wheat they used the price that represents food wheat with high quality characteristics (protein, milling quality, etc.). At the same time, the chosen domestic price is the average wheat price including food and feed varieties. In the case of poultry, the reference price relates mostly to imported chicken legs. However, the domestic price relates to the whole chicken carcass. Therefore, the assumption of homogeneity of commodities is violated.

Further, there are some concerns about the use of so-called “world prices” for such kinds of agricultural commodities as sugarbeets, milk, and eggs. These commodities are raw agricultural products that are not traded internationally. If the authors used prices from other countries, it means that they violated the second assumption because these markets are not available for Russian agricultural producers.

The Exchange Rate

The previous arguments have cast some doubt on the acceptability of the PSE methodology to estimate the overall transfer to or from agricultural producers. However, it is also necessary to mention the problems connected with the choice of exchange rate in these calculations.

The exchange rate is the price of one currency in terms of another one. In our case, this price reflects the equilibrium on the money market which is comprised of dollar demand and supply and ruble demand and supply. Until 1994, the ruble exchange rate was far from equilibrium with supply and demand forces, as it adjusted from a complete controlled rate to a relatively flexible rate. That is why the use of a commercial ruble/dollar exchange rate for the estimation of transfer to Russian agricultural producers prior to 1994 is not realistic. Liefert et al. even showed that the use of another exchange rate (purchasing power parity) would give absolutely the opposite result: PSEs become positive, and the reason for the conclusion, that Russian agriculture is heavily taxed, disappeared immediately. However, the authors did not attempt to use a calculated equilibrium exchange rate, as is normally done in OECD studies. Our analysis later in this paper will test the sensitivity of the results to such an exchange rate adjustment.

The Reference Prices

The correct definition of the external reference prices has always been the most controversial issue in the PSE calculation. Experience has shown that reference prices are the most important parameter in determining the magnitude and the trends in PSE. Liefert et al. have used a practical rule, established by OECD, that an f.o.b. (free-on-board) border price would be chosen if a country was a net exporter while a

c.i.f. (cost, insurance, freight) price would be chosen for a net importer (Cahil and Legg, 24). Moreover, the authors have applied this rule for all commodities assuming that “the appropriate border prices to use in computing PSEs are import c.i.f. prices (mainly to Baltic ports).”

Two things can be argued in this approach. First, to use a uniform approach to calculate PSEs for all chosen commodities may not be correct. In recent OECD studies on agricultural policies in transition economies, different prices have been used as a proxy of reference prices. For example, in order to calculate PSEs for the Czech Republic the following reference prices have been used (*Review. Czech Republic*, 281):

- EU export price for wheat (f.o.b. Rouen), barley (f.o.b. French ports), and refined sugar (f.o.b. EU),
- Austrian unit export value for rye,
- Czech unit export value for potatoes,
- EU import price for rapeseed,
- New Zealand farmgate price for milk,
- EU live animal price for beef, veal, and pigmeat,
- Extra-EU unit export value for poultry and eggs.

Secondly, the estimation of some border prices that were used in PSE calculations causes some concerns. For example, Liefert et al. used the reference price for wheat that ranges from \$209 to \$214 per ton for various years. However, these prices greatly overstate the actual prices of wheat imports to Russia. In 1992 and 1993, the average price of imported wheat was about \$146. Sometimes the price has been even lower, because either Russia imported subsidized grain from developed countries or the grain was imported from Commonwealth of Independent States (CIS) countries. For example, in the first quarter of 1995 the average price of imported wheat was \$85 per ton, in the second quarter it was \$109. Also, the quality characteristics of the commodity should be taken into consideration. The wheat traded on the Chicago Board of Trade has, in most cases, different quality characteristics than the bulk of wheat traded domestically in Russia. That is why the so-called “world price” cannot always serve as a correct reference price for PSE calculations.

Discussion of the Domestic Economic Environment and Regulation

Liefert et al. suggest that there are two main reasons for “large negative PSE calculations”: state controls on prices and trade, and deficient agricultural infrastructure. These factors cause the low

farmgate prices, from their point of view. The discussion in the previous section showed that we cannot always consider the world prices as the opportunity costs for domestic agricultural producers. Now we examine how the economic environment and regulations influence domestic agricultural prices.

State Control on Prices and Trade

As Liefert et al. noted, there is no restriction on internal trade from the federal government. Also, one can analyze the federal regulation for a few recent years and conclude that the federal government did not have, does not have, and will not have any intention to restrict the domestic agricultural trade. There are some interventions for international trade. The federal government imposes significant tariffs on imported food (from 15 to 30 percent) which are in favor of the domestic agricultural producers. In addition, the federal government has several programs which significantly increase incentive prices, to support revenue for agricultural producers. That is why the federal agricultural policy cannot be considered as a main factor in depressing farmgate prices.

Further, Liefert et al. suggest that state control, in the form of quotas, licenses, taxes, and bans on export, have been stronger at the regional than the federal level. While this is true, the effects of these local policies can be argued. Based upon economic theory one can conclude that the restrictions on export in producing regions cause oversupply in these regions and shortages in net-importing areas. The oversupply causes the prices to fall in producing regions, and, at the same time, the shortage will cause the increase of the prices in deficit regions. Sooner or later the agricultural products will be moved from exporting regions to importing regions. Since arbitrage cannot be presented, both effects of the regional export restrictions need to be recognized, as well as the possibility of arbitrage to exploit the price differences that result from these restrictions.

Another argument that supports the existence of state control on the local level is the controlling of retail prices for food commodities. A reference from a Russian source quoted by Liefert et al. states that in March 1994 the percentage of cities that control retail prices at a low level is 66 for bread, 35 for sugar, 33 for meat, and 44 for milk. The authors assume that these restrictions cause the lower level of purchasing prices for agricultural producers.

However, the percentage of cities that control retail prices together with the facts of trade restrictions do not provide sufficient information about the significance of control on the deviation of prices from equilibrium. The authors assumed that the implementation of these regulations at the local level can be a significant factor that explains the large difference (from 2 to 10 times) between the world prices and the domestic prices on agricultural products. In order to obtain this kind of conclusion detailed studies should be conducted.

Unfortunately, we are not aware of studies on this matter. However, we can cite another study on retail food prices in Russia, conducted by Gardener and Brooks, that shows that regulation on the local level explains only a small part of price differences between cities of Russia. That is why we cannot use this factor to explain the significant deviation of the domestic prices from the world prices.

Alternative Evaluation of PSEs

Taking into consideration the above-mentioned arguments, another calculation of PSEs for Russian agriculture has been conducted. The results of these calculations and the discussion on this matter is presented in this part of the paper. In Table 4 one can find the final result of these calculations. The tables with calculations of PSEs are provided in Appendix 1.

Several modifications have been made to compare with the previous work. First, production marketed has been separated between different groups of agricultural producers. Second, the appropriate prices have been applied for each part of production marketed. Wholesale prices have been used for the output marketed by large agricultural producers. Retail prices from city markets have been chosen as a proxy for the products marketed by private subsidiary farms. Third, different approaches have been applied to choose reference prices depending upon the commodity and the situation on the market.

From these calculations two periods can be distinguished: the period with negative PSEs and the period with positive PSEs. We can interpret the negative estimates of market price support to mean that agricultural producers supply cheaper agricultural products than could be imported from the international market. This situation is beneficial for domestic consumers. One cannot interpret the situation as a transfer from agricultural producers to consumers or taxation of agriculture. Both sides of the food market prefer to operate under these conditions because open markets with current exchange rates would mean extremely high prices, decrease of consumption for consumers, and the loss of significant markets for agricultural producers.

Also, agricultural producers cannot compete on the international market due to the difference in quality between domestically produced and internationally traded products. Also, there are no developed channels for international trade. The small volume of agricultural exports indicates that only an insignificant portion of agricultural producers can receive benefits from international trade, taking advantage of substantially lower costs of production.

It could be taken into consideration that the commercial exchange rate for 1992 cannot be used in the conventional way as in other countries. The exchange market was very "thin," with a small volume of exchanged currency, and unstable due to the high level of inflation and changes in governmental regulation. At that period, the level and dynamic of exchange rate did not fully reflect the domestic economic conditions. Like any market, the currency market needed some time for adaptation to the new economic environment. Before that period, the exchange rate was established only by government. Later, a greater volume of currency became involved in exchanges, and imported food products became

an important part of overall import. At that period (presumably 1993-1994), the exchange rate started to play a more significant role for food consumption and agricultural producers. One can see that market price support became positive at the 1993-94 period for most of the analyzed products.

Table 4. Alternative estimates of PSEs for Russian agriculture
(percentage per unit value)

	1992	1993	1994
Beef and veal	-148	-16	14
Pigmeat	-33	22	42
Poultry	-32	21	38
Milk	-4	3	45
Eggs	-211	30	48
Wheat	-106	-98	-132
Corn	-40	-48	-10
Barley	-274	-88	-90
Sugar beets	16	25	16
Sunflower seeds	-56	0	5
Potatoes	-103	-68	64

Source: author's calculations

We assume that the positive value of market price support for agricultural producers has three sources: budget transfers, consumer transfers, and compensation for entrepreneurship. The compensation for entrepreneurship is not an independent or additional source of money flow for the agricultural producer. Part of consumer transfers goes to agricultural producers directly because they sell a part of their output on retail markets. Of course, agricultural producers bear some expenditures connected with processing and transporting commodities to consumers. In the case of meat products, it means they need to slaughter livestock and cut carcasses. Some part of milk is also sold in the form of processed products

(sour cream, butter, and cheese). Experience shows that these expenditures are significantly lower than the gap between farmgate and retail prices.

In the previous analysis, it has been pointed out that retail prices were applied only for sales by private subsidiary farms. However, it is a well known fact that large agricultural producers also use this channel to receive “live cash.” Usually they do not report correctly the volume of these sales.

In other words, positive market support can be interpreted as a support of entrepreneurship by agricultural producers.

Analysis of PSEs by Commodity

Meats

The market price for beef for large agricultural producers can be found in the annual official statistical handbook. One can also find the annual average price through other channels. It is important to note that these sources indicate that almost 80 percent of beef sales go through the wholesale market (local meat processors and consumer cooperatives). Thus, procurement prices serve as good indicators of market revenue for large agricultural producers.

The determination of the market price for private subsidiary farms is a complex task. There is no official statistical information about these sales. For this reason, city market prices are used as a proxy of the market price for these agricultural producers, because most products from PSFs go to consumers through local retail markets. The officially reported volume of agricultural products sold by private subsidiary farms is underestimated (perhaps significantly). For obvious reasons, private farmers do not prefer to report a true volume of sales. Therefore, the overall revenue for the agricultural sector from private subsidiary farms is consistently understated. However, our calculations show that even using the official information on these agricultural producers significantly changes the financial performance of the agricultural sector.

Because Russia imports a significant quantity of beef (1992 - 288,000 tons, 1994-358,000 tons), one can use the average price of imported red meat as a reference price for beef. The justification for this approach is that the import of beef is the real opportunity cost for Russian meat processors and meat traders.

The supported domestic price is the sum of the weighted market price plus per unit policy transfer (all weighted subsidies). This approach has been applied because rural families, who own most of the private subsidiary farms, work simultaneously on large agricultural enterprises. The subsidies are partly

absorbed by these rural families in the form of salaries and resources on preferential prices (e.g., feed, machinery rent, and fuel).

For poultry, as for other meats, the annual average prices of imports are used as reference prices. Objections may be made that the poultry import consists of chicken legs, while the weighted market price reflects the whole carcass price. However, imported poultry can be considered as a perfect substitute for other poultry meat. Moreover, Russian consumers prefer legs to other chicken parts. As a result, in a situation of equal prices, consumers will choose legs rather a whole chicken. In addition, the general quality of domestically produced poultry is lower than that of the imported poultry.

The PSEs for beef were the lowest among livestock products (Appendix, Table A.1). While the cattle sector has the same level of subsidies in revenue as the hog sector, the share of production sold on retail markets is lower. The relatively high PSE estimates for pigmeat can be explained by both the significant share of the production marketed by private subsidiary farms and by the level of subsidies (Appendix, Table A.2). The same reasons hold true for the poultry sector. However, in 1994 the level of retail prices was probably affected by an import tariff. Thus, some transfers to poultry producers can be connected with this factor (Appendix, Table A.3). It is expected that the PSE for 1995 will be significantly higher for this sector because import tariffs have been increased.

Milk

For milk the standard OECD procedure is used to calculate PSE (Appendix, Table A.5). The New Zealand farmgate price for milk serves as a reference price. This is a reasonable reference price for Russia, since much imported butter is from New Zealand. The estimate of transportation cost is taken from *Review of Agricultural Policy: Estonia. Working Party Paper. Annex 1*.

The percentage PSE for milk was negative in 1992, and reached the lowest level in absolute value among livestock products. In 1994, PSE for milk reached the highest positive value for two reasons. First, milk production in large agricultural enterprises was heavily subsidized by local governments because it was the main resource of milk for the urban population. The share of subsidies in revenue from marketed milk was the highest among livestock products: 36 percent in 1992, 25 percent in 1993, and 28 percent in 1994. Second, both private subsidiary farms and large agricultural enterprises sold a significant amount of milk on retail markets. Thus the high level of positive PSE can be attributed in part to entrepreneurship.

Grains

Average prices of imported wheat, barley, and corn are used as a proxy for a reference price for grains. These prices include transportation cost to Russian continental ports, and can be considered as an opportunity cost for domestic grain trade companies and mills. There is no significant difference in transportation costs within the country between imported grain and domestically produced grain. On average, the transportation and handling cost of grain from sea ports to consuming areas is almost the same as the transportation and handling cost from domestic agricultural regions to the consuming areas.

The difference in the quality of imported grain and domestically traded grain should be taken into account. This problem is a reality for wheat, especially. Russia used to import high quality food wheat (hard and durum varieties with higher protein content and other superior quality characteristics). Reported marketed wheat production in Russia includes both food and feed varieties. Therefore, the average quality of domestically marketed wheat is lower than imported wheat. Also, Russia exports mainly feed grains (wheat and barley).

The negative PSEs for wheat reflect a specific situation in the food market (Appendix, Table A.6). Grain products are the main components of human consumption in Russia, and now they are even more important than before. The consumption of grain products has increased significantly. This conclusion cannot be extracted from official data on consumption. These data show that there is a slight increase in the consumption of grain products. However, before price liberalization a substantial portion of grain products went to feed livestock on private subsidiary farms because of a very low price and ample availability of bread products compared with the high price and poor delivery system for concentrated feed.

After price liberalization, market prices corrected this situation. Since that time, human consumption has not included feed for livestock. Therefore, in reality, many more grain products are consumed directly and they play a significant role in daily diets. For this reason, federal and local governments consider a stable supply of grain products as a primary goal for food market policy. Generally, with the exemption of a few regions, they allow markets to clear prices. However, they use imports (from abroad and from other regions) to provide enough supply to keep grain product consumption at a stable level. This additional supply keeps retail prices at a stable level, lower than they would be otherwise.

Can this situation be viewed as some kind of taxation for agricultural producers, and would agricultural producers obtain “air” prices in the absence of this policy? In general, the answer to these questions is “no.” In the short run and even in the long run, agricultural producers are not able to provide an adequate quantity of grain to match the goals of state social policy. Also, the average quality of

domestically produced food wheat is lower than that available on international markets. In situations of unrestricted competition, domestic mills prefer to import wheat. In the extreme case, imported wheat can substitute for a substantial part of domestically produced wheat. As a result, agricultural producers will lose a huge share of the market and their total revenue could be even lower compared with current conditions. Another result will be increases in retail prices and decreased consumption, which could provoke serious social conflicts. The government would be forced to subsidize imports to support socially acceptable prices. Due to the decrease of the domestic producers' surplus and the increase of government spending, the overall losses for society could be much higher compared with the current situation.

The negative PSEs for corn (Appendix, Table A.7) and barley (Appendix, Table A.8) are caused by the fact that they are used mainly to feed livestock. This sector has negative PSE estimates and the demand for feed crops is the derived demand from the livestock sector.

Sugar Beets/Sugar

The price of imported raw sugar is used as a reference price for sugar beets. This price reflects the opportunity cost for Russian sugar refiners. They always have a choice to produce white sugar from sugar beets or from imported raw sugar.

This calculation also takes into account that since 1992, agricultural producers have preferred to order refiners to process sugar beets. After that, agricultural enterprises sell or barter refined sugar on their own. Positive PSEs for sugar beets are explained partly by subsidies and partly by the benefit of entrepreneurship (Appendix, Table A.10). Also, the level of domestic prices has been increasing due to the introduction of import tariffs. Therefore a certain part of positive PSE is connected with this factor. This factor will be particularly significant in 1995 when import tariffs were raised again.

Sunflower Seeds/Oil

For sunflower seeds, it is reasonable to use the approach applied for sugar beets, in which the price for a processed product serves as a reference price. In this case, one needs to use sunflower oil. Because Russia is a net importer of vegetable oil, the price of imported sunflower oil could be used as a proxy of the reference price for sunflower seeds. However, these prices are too high because imported oil is of higher quality and has a higher level of preparation for retail trade. For this reason, the annual average price of exported sunflower oil is used for the calculation of market support. These prices better reflect the average quality of domestically traded oil.

In this sector agricultural producers also prefer to have processors only extract and return oil and other byproducts (meal, etc.) to the producers of seeds. After processing, the oil has been sold on the retail and wholesale markets. In 1993 and 1994, PSE estimates for this crop have been around zero (Appendix, Table A.12). This figure indicates that the benefits of entrepreneurship were the main factors that allowed agricultural producers to obtain revenues that are comparable to revenues from marketing at world prices. It is expected that high import tariffs on vegetable oil will raise PSE estimations in 1995.

Potatoes

The previous work by Liefert et al. does not consider potato production. However, this crop is an important source of income for small agricultural farms. In a recent study, PSEs for potatoes are calculated (Appendix, Table A.13). Again, prices for marketed production have been distinguished between LAEs and PSFs. The average price of the potato export from the Czech Republic is used as a reference price. Of course, the best choice would be to choose the Poland export price for potatoes because Russia sometimes imports significant quantities of potatoes from this country. However, these prices were not available. Furthermore, many Polish potatoes were bartered. Therefore, Czech prices are considered as a proxy for Polish prices.

Starting with negative numbers in 1992 and 1993, the PSE for potatoes became positive in 1994 (64 percent). However, this sector of agricultural production did not receive notable government support; there are no direct subsidies and import tariffs do not play a significant role for pricing on retail markets (see Appendix A, Table A.13). One source of the positive PSE is a compensation for entrepreneurship because PSFs sell their potatoes on retail markets. Another source is the depreciation of the exchange rate which makes the national currency more valuable with respect to the U.S. dollar.

Summary and Conclusions

We have critiqued the PSE method as it is traditionally applied and can conclude that it has severe limitations when it is applied to transition economies. Many of the conditions taken for granted in mature market economies cannot be assumed for transition economies, so the validity of PSE measures are questionable. Certainly these measures must be interpreted with more caveats than would normally apply in, say, OECD countries.

Despite these deficiencies, we have attempted to calculate PSEs for Russia, being especially careful in selection of appropriate farm prices and reference prices. We have also conducted a sensitivity analysis to indicate how the results could be influenced by changes in key assumptions. These results are

compared to previous estimates of PSEs by Liefert et al. and resolve some of the questions raised by that analysis (see Tables 5 and 6).

The results that are most similar to the Liefert paper (PSE-USDA) are those where the same domestic wholesale prices were used for all producers (PSE-1). However, as a result of selecting farm prices more carefully and choosing reference prices that more accurately reflect opportunity costs of domestic product sales, these estimates are less alarming than the Liefert results. Most are still negative, but not as large in absolute value. PSEs for eggs become positive in 1993-94 and for poultry in 1994.

When PSEs are calculated with differentiated prices for two groups of agricultural producers (PSE-2), the meat, milk, eggs, sugar beet, and sunflower seed results move further away from large negative figures of Liefert and a few more positive PSEs appear. Grain results do not change, since large and small farms both sell to major processors and do not usually market grain directly. The increased average prices reflected in these results are due to a large extent to returns to entrepreneurship, since the higher prices are obtained by the group of farms that engage in direct marketing. These results are likely to overstate the prices these farmers receive, since the cost of post-harvest activities is not counted. These costs, however, are smaller than the differences between prices associated with PSE-1 and PSE-2.

The next set of calculations takes the differentiated price results and adjusts them for exchange disequilibrium. Following the OECD method, we picked a year (1994) where the exchange rate was deemed to be at or near equilibrium, then calculated equilibrium exchange rates for the previous years. This calculation simply assumes that prior year exchange rates differ from 1994 as if purchasing power parity holds. The exchange rate for 1994 remains the same, while for 1993 it is 709 rubles/dollar (nominal 962), and for 1992 it is 75 rubles/dollar (nominal 205). The PSEs for 1994, of course, do not change, but earlier years are dramatically different. Only a few negative PSEs remain, and all of these are for grains, because market conditions and infrastructure together with regional regulation hold consumer product prices down.

The large impact of the exchange rate disequilibrium in earlier years should not be surprising. The national currency, the ruble, was only in the early stages of adjustment from a highly distorted rate to a market rate. This did not happen quickly, so in those years the exchange was undervalued and was not a valid measure of the value of foreign goods in the domestic market. In fact, the U.S. dollar was frequently used as the medium of exchange during that period.

Given the appropriate reference prices, differentiated farm prices, and adjustment for exchange rate distortions, the results in the PSE-3 scenario may be closer than the others in reflecting a realistic view of government support of agriculture in Russia. These results indicate positive support for all agricultural

products except for grain. In most years, grains and especially wheat have negative PSEs. This is consistent with a government policy to import as needed to keep food grain products available at relatively low prices. However, even the PSE-3 scenario cannot be considered very reliable in comparing levels of support with OECD countries or even with other economies in various stages of transition. When comparison of domestic and border prices is used as the main indicator of support or losses, the results will always be less reliable where markets are immature and poorly integrated with external markets.

Table 5. Dynamic comparison of various estimations of PSEs for livestock products

	Beef			Pork			Poultry			Milk			Eggs		
	1992	1993	1994	1992	1993	1994	1992	1993	1994	1992	1993	1994	1992	1993	1994
PSE-USDA	-1162	-449	-363	-680	-175	-136	-432	-58	-31	-918	-467	-310	-635	-209	-79
PSE-1	-193	-74	-36	-292	-71	-31	-201	-32	5	-137	-61	-34	-211	30	48
PSE-2	-148	-16	14	-33	22	41	-31	15	29	-4	3	45	-211	30	48
PSE-3	9	43	14	51	43	41	39	15	29	62	28	45	14	49	48

Table 6. Dynamic comparison of various estimations of PSEs for crop products

	Wheat			Corn			Barley			Sugarbeet			Sunflower seed		
	1992	1993	1994	1992	1993	1994	1992	1993	1994	1992	1993	1994	1992	1993	1994
PSE-USDA	-399	-292	-341	-120	-103	-24	-277	-187	-304	-482	-184	-108	-164	-322	-173
PSE-1	-106	-98	-132	-40	-48	-10	-274	-88	-90	-23	-7	-1	-49	-242	-123
PSE-2	-106	-98	-132	-40	-48	-10	-274	-88	-90	16	25	16	-56	0	5
PSE-3	24	-46	-132	49	-9	-10	-38	-38	-90	69	45	16	43	26	5

Notes: PSE-USDA - calculations presented by Liefert, et al.
PSE-1 - calculations with the same prices for agricultural producers
PSE-2 - calculations with differentiated prices for agricultural producers
PSE-3 - calculations with adjusted exchange rate

APPENDIX. TABLES WITH PSES CALCULATION

Table A.1 Estimation of PSEs for beef and veal

	Units	1992	1993	1994	
1	Production marketed, total (live)	thou. tons	6081	5435	4750
2	- large agricultural enterprises	thou. tons	4681	3835	3100
3	- private subsidiary farms	thou. tons	1400	1600	1650
4	Production marketed, total (carcass)	thou. tons	3223	2881	2518
5	- large agricultural enterprises	thou. tons	2481	2033	1643
6	- private subsidiary farms	thou. tons	742	848	875
7	Weighted market price (carcass):	thou. rubles/ton	62	895	2594
8	- large agricultural enterprises*	thou. rubles/ton	46	520	1468
9	- private subsidiary farms**	thou. rubles/ton	119	1795	4710
10	All subsidies	billion rubles	153	675	1203
11	Subsidies per unit (carcass) (10/4)	thou. rubles/ton	47	234	478
12	Supported domestic price (7+11)	thou. rubles/ton	110	1129	3072
13	Reference price (carcass)***	USD/ton	1330	1365	1159
14	Exchange rate	rubles/USD	205	962	2276
15	Converted reference price (13*14)	thou. rubles/ton	273	1313	2638
16	Unit PSE (12-15)	thou. rubles/ton	-163	-184	434
17	Percentage PSE (16/12*100)	%	-148	-16	14

*- annual average procurement price

** - annual average city market price

*** - average price of import

Note: Production marketed by large agricultural enterprises in 1994 was defined on the basis of percentage structure of 1993 using the information on overall livestock sales. Production marketed by private subsidiary farms was defined on the basis of the changes in the structure of livestock herds.

Table A.2 Estimation of PSEs for pigmeat

	Units	1992	1993	1994	
1	Production marketed, total (live)	thou. tons	3576	3138	2990
2	- large agricultural enterprises	thou. tons	1676	1257	1080
3	- private subsidiary farms	thou. tons	1900	1881	1910
4	Production marketed, total (carcass)	thou. tons	2539	2228	2123
5	- large agricultural enterprises	thou. tons	1190	892	767
6	- private subsidiary farms	thou. tons	1349	1336	1356
7	Weighted market price (carcass):	thou. rubles/ton	180	1540	4236
8	- large agricultural enterprises*	thou. rubles/ton	44	619	1743
9	- private subsidiary farms**	thou. rubles/ton	300	2155	5646
10	All subsidies	billion rubles	65	333	579
11	Subsidies per unit (carcass) (10/4)	thou. rubles/ton	26	149	273
12	Supported domestic price (7+11)	thou. rubles/ton	206	1689	4509
13	Reference price (carcass)***	USD/ton	1330	1365	1159
14	Exchange rate	rubles/USD	205	962	2276
15	Converted reference price (13*14)	thou. rubles/ton	273	1313	2638
16	Unit PSE (12-15)	thou. rubles/ton	-67	376	1871
17	Percentage PSE (16/12*100)	%	-33	22	41

*- annual average procurement price

** - annual average city market price

*** - average price of import

Table A.3 Estimation of PSEs for poultry

	Units	1992	1993	1994	
1	Production marketed, total (live)	thou. tons	2067	1844	1620
2	- large agricultural enterprises	thou. tons	1367	1244	1020
3	- private subsidiary farms	thou. tons	700	600	600
4	Production marketed, total (carcass)	thou. tons	1881	1678	1474
5	- large agricultural enterprises	thou. tons	1244	1132	928
6	- private subsidiary farms	thou. tons	637	546	546
7	Weighted market price (carcass):	thou. rubles/ton	91	924	2382
8	- large agricultural enterprises*	thou. rubles/ton	34	523	1638
9	- private subsidiary farms**	thou. rubles/ton	200	1755	3646
10	All subsidies	billion rubles	66	328	719
11	Subsidies per unit (carcass) (10/4)	thou. rubles/ton	35	195	488
12	Supported domestic price (7+11)	thou. rubles/ton	126	1120	2869
13	Reference price (carcass)***	USD/ton	1022	986	889
14	Exchange rate	rubles/USD	205	962	2276
15	Converted reference price (13*14)	thou. rubles/ton	210	949	2023
16	Unit PSE (12-15)	thou. rubles/ton	-84	171	846
17	Percentage PSE (16/12*100)	%	-67	15	29

*- annual average procurement price

** - annual average city market price

*** - average price of import

Table A.4 Estimation of PSEs for eggs

	Units	1992	1993	1994
1 Production marketed, total:	thou. tons	27871	26199	23600
2 - large agricultural enterprises	mln. eggs	27871	26199	23600
3 - private subsidiary farms	mln. eggs			
4 Weighted market price:	thou. rubles/1000	2	49	152
5 - large agricultural enterprises*	thou. rubles/1000	2	49	152
6 - private subsidiary farms**	thou. rubles/ton			
7 Conversion coefficient (eggs to kg)		0.056	0.056	0.056
8 Handling margin	%	25	25	25
9 Adjusted market price (4*7*1.25):	thou. rubles/tons	45	1083	3400
10 All subsidies	billion rubles	54	302	874
11 Subsidies per unit (7/1)	thou. rubles/ton	2	12	37
12 Supported domestic price (9+11)	thou. rubles/ton	47	1094	3437
13 Reference price **	USD/ton	713	793	784
14 Exchange rate	rubles/USD	205	962	2276
15 Converted reference price (13*14)	thou. rubles/ton	146	763	1784
16 Unit PSE (9-15)	thou. rubles/ton	-99	331	1652
17 Percentage PSE (16/12*100)	%	-211	30	48

*- annual average procurement price

**- EU export price

Table A.5 Estimation of PSEs for milk

	Units	1992	1993	1994	
1	Production marketed, total:	thou. tons	41644	41371	36000
2	- large agricultural enterprises	thou. tons	26844	25271	19700
3	- private subsidiary farms	thou. tons	14800	16100	16300
4	Weighted market price:	thou. rubles/ton	19	96	458
5	- large agricultural enterprises*	thou. rubles/ton	6	49	152
6	- private subsidiary farms**	thou. rubles/ton	44	170	828
7	All subsidies	billion rubles	210	948	2085
8	Subsidies per unit (7/1)	thou. rubles/ton	5	23	58
9	Supported domestic price (7+11)	thou. rubles/ton	24	119	516
10	Fat content - domestic	%	3.50	3.50	3.50
11	Fat content - New Zealand	%	4.73	4.73	4.73
12	Transport cost, milk equivalent	USD/ton	17	18	18
13	Reference price ***	USD/ton	144	138	144
14	Adjusted reference price ****	USD/ton	124	120	124
15	Exchange rate	rubles/USD	205	962	2276
16	Converted reference price (14*15)	thou. rubles/ton	25	115	283
17	Unit PSE (12-15)	thou. rubles/ton	-1	3	234
18	Percentage PSE (17/9*100)	%	-4	3	45

*- annual average procurement price

** - annual average city market price

*** - New Zealand farmgate price

**** - price adjusted to domestic fat content and transportation cost

Table A.6 Estimation of PSEs for wheat

	Units	1992	1993	1994	
1	Production marketed, total:	thou. tons	21746	22773	15435
2	- large agricultural enterprises	thou. tons	21320	22110	14700
3	- peasant farms	thou. tons	426	663	735
4	Weighted market price:	thou. rubles/ton	8	48	106
5	- large agricultural enterprises*	thou. rubles/ton	8	48	106
6	- peasant farms*	thou. rubles/ton	8	48	106
7	All subsidies	billion rubles	138	526	482
8	Subsidies per unit (7/1)	thou. rubles/ton	6	23	31
9	Supported domestic price (4+8)	thou. rubles/ton	15	71	137
10	Reference price **	USD/ton	146	147	140
11	Exchange rate	rubles/USD	205	962	2276
12	Converted reference price (10*11)	thou. rubles/ton	30	141	319
13	Unit PSE (9-12)	thou. rubles/ton	-15	-70	-181
14	Percentage PSE (13/9*100)	%	-106	-98	-132

*- annual average procurement price

** - average price of import

Note: the value for peasant farms is calculated using a share in total production of the commodity

Table A.7 Estimation of PSEs for corn

	Units	1992	1993	1994
1 Production marketed, total:	thou. tons	1113	559	361
2 - large agricultural enterprises	thou. tons	1091	543	344
3 - peasant farms	thou. tons	22	16	17
4 Weighted market price:	thou. rubles/ton	9	58	251
5 - large agricultural enterprises*	thou. rubles/ton	9	58	251
6 - peasant farms	thou. rubles/ton	9	58	251
7 All subsidies	billion rubles	14	21	18
8 Subsidies per unit (7/1)	thou. rubles/ton	13	38	49
9 Supported domestic price (4+8)	thou. rubles/ton	21	96	299
10 Reference price **	USD/ton	146	147	145
11 Exchange rate	rubles/USD	205	962	2276
12 Converted reference price (10*11)	thou. rubles/ton	30	141	330
13 Unit PSE (9-12)	thou. rubles/ton	-9	-46	-31
14 Percentage PSE (13/9*100)	%	-40	-48	-10

*- annual average procurement price

** - average price of import

Note: the value for peasant farms is calculated using a share in total production of the commodity

Table A.8 Estimation of PSEs for barley

	Units	1992	1993	1994
1 Production marketed, total:	thou. tons	6863	6748	6517
2 - large agricultural enterprises	thou. tons	6729	6551	6207
3 - peasant farms	thou. tons	135	197	310
4 Weighted market price:	thou. rubles/ton	6	38	77
5 - large agricultural enterprises*	thou. rubles/ton	6	38	77
6 - peasant farms	thou. rubles/ton	6	38	77
7 All subsidies	billion rubles	6	143	119
8 Subsidies per unit (7/1)	thou. rubles/ton	1	21	18
9 Supported domestic price (4+8)	thou. rubles/ton	7	59	95
10 Reference price **	USD/ton	127	115	79
11 Exchange rate	rubles/USD	205	962	2276
12 Converted reference price (10*11)	thou. rubles/ton	26	111	180
13 Unit PSE (9-12)	thou. rubles/ton	-19	-52	-85
14 Percentage PSE (13/9*100)	%	-274	-88	-90

*- annual average procurement price

** - average price of import

Note: the value for peasant farms is calculated using a share in total production of the commodity

Table A.9 Estimation of PSEs for sugarbeet/sugar

	Units	1992	1993	1994
1 Production marketed, total:	thou. tons	11209	7422	1358
2 - large agricultural enterprises	thou. tons	10989	7143	1312
3 - peasant farms	thou. tons	220	279	46
4 Weighted market price:	thou. rubles/ton	2	20	59
5 - large agricultural enterprises *	thou. rubles/ton	2	20	59
6 - peasant farms	thou. rubles/ton	3	24	56
7 All subsidies	billion rubles	29	80	33
8 Subsidies per unit (7/1)	thou. rubles/ton	3	11	24
9 Supported domestic price (4+8)	thou. rubles/ton	5	31	83
10 Coefficient (beet to sugar)	%	11	12	13
11 Retail price for sugar	thou. rubles/ton	88	494	910
12 Reference price **	USD/ton	272	293	290
13 Exchange rate	rubles/USD	205	962	2276
14 Converted reference price (13*14)	thou. rubles/ton	56	282	660
15 CRP in terms of beet (14*10/100)	thou. rubles/ton	6	33	83
16 Unit PSE (9-15)	thou. rubles/ton	-1	-2	-1
17 Percentage PSE (16/9*100)	%	-23	-7	-1

*- annual average procurement price

** - annual average price of imported raw sugar

Note: the value for peasant farms is calculated using a share in total production of the commodity

Table A.10 Estimation of PSEs for sugarbeet/sugar (alternative approach)

	Units	1992	1993	1994	
1	Production (beet)	thou. tons	25548	25468	13901
2	Production marketed (beet)	thou. tons	11209	7422	1358
3	Production exchanged for sugar (beet)	thou. tons	14339	18046	12543
4	Coefficient (beet to sugar)	%	11	12	13
5	Sugar received from exchange	thou. tons	1506	2117	1587
6	Market price (beet)	thou. rubles/ton	2	20	59
7	Market price (sugar, wholesale)	thou. rubles/ton	58	329	607
8	Weighted market price:	thou. rubles/ton	4	33	75
9	All subsidies	billion rubles	29	80	33
10	Subsidies per unit (7/1)	thou. rubles/ton	3	11	24
11	Supported domestic price (8+11)	thou. rubles/ton	7	44	99
12	Retail price for sugar	thou. rubles/ton	88	494	910
13	Reference price **	USD/ton	272	293	290
14	Exchange rate	rubles/USD	205	962	2276
15	Converted reference price (13*14)	thou. rubles/ton	56	282	660
16	CRP in terms of beet (15*4/100)/	thou. rubles/ton	6	33	83
17	Unit PSE (beet) (11-16)	thou. rubles/ton	1	11	16
18	Percentage PSE (17/11*100)	%	16	25	16

*- annual average procurement price

** - annual average price of imported raw sugar

Note: the value for peasant farms is calculated using a share in total production of the commodity

Table A.11 Estimation of PSEs for sunflower seeds

	Units	1992	1993	1994
1 Production marketed, total:	thou. tons	1609	1538	1507
2 - large agricultural enterprises	thou. tons	1521	1399	1368
3 - peasant farms	thou. tons	88	139	140
4 Weighted market price:	thou. rubles/ton	17	72	310
5 - large agricultural enterprises*	thou. rubles/ton	17	72	310
6 - peasant farms**	thou. rubles/ton	17	72	310
7 All subsidies	billion rubles	37	31	17
8 Subsidies per unit (7/1)	thou. rubles/ton	23	20	11
9 Supported domestic price (4+8)	thou. rubles/ton	39	92	321
10 Reference price **	USD/ton	287	328	315
11 Exchange rate	rubles/USD	205	962	2276
12 Converted reference price (10*11)	thou. rubles/ton	59	316	717
13 Unit PSE (9-12)	thou. rubles/ton	-19	-223	-396
14 Percentage PSE (13/9*100)	%	-49	-242	-123

*- annual average procurement price

** - c.i.f. price to Baltic ports

Note: the value for peasant farms is calculated using a share in total production of the commodity

Table A.12 Estimation of PSEs for sunflower seed/oil (alternative approach)

	Units	1992	1993	1994
1 Production (seed)	thou. tons	3110	2765	2553
2 Production marketed (seed)	thou. tons	1609	1538	1507
3 Production exchanged for oil (seed)	thou. tons	758	1211	710
4 Coefficient (seed to oil)	%	42	41	41
5 Oil received from product exchange	thou. tons	318	496	291
6 Market price (seed)	thou. rubles/ton	17	72	310
7 Market price (oil, wholesale)	thou. rubles/ton	58	584	2028
8 Weighted market price:	thou. rubles/ton	19	146	477
9 All subsidies	billion rubles	29	80	33
10 Subsidies per unit (7/1)	thou. rubles/ton	18	52	22
11 Supported domestic price (8+10)	thou. rubles/ton	37	198	499
12 Retail price for oil	thou. rubles/ton	70	707	2454
13 Reference price **	USD/ton	667	500	510
14 Exchange rate	rubles/USD	205	962	2276
15 Converted reference price (13*14)	thou. rubles/ton	137	481	1161
16 CRP in terms of seed (15*4/100)	thou. rubles/ton	57	197	476
17 Unit PSE (seed) (11-16)	thou. rubles/ton	-21	0	23
18 Percentage PSE (17/11*100)	%	-56	0	5

*- annual average procurement price

** - annual average price of exported sunflower oil

Note: the value for peasant farms is calculated using a share in total production of the commodity

Table A.13 Estimations of PSEs for potatoes

	Units	1992	1993	1994
1 Production marketed, total:	thou. tons	2964	3402	2748
2 - large agricultural enterprises	thou. tons	2732	2131	1350
3 - private subsidiary farms	thou. tons	232	1271	1398
4 Weighted market price:	thou. rubles/ton	9	72	462
5 - large agricultural enterprises*	thou. rubles/ton	8	55	270
6 - private subsidiary farms**	thou. rubles/ton	26	100	647
7 All subsidies	billion rubles	1	3	4
8 Subsidies per unit (7/1)	thou. rubles/ton	0	1	2
9 Supported domestic price (4+8)	thou. rubles/ton	10	73	463
10 Reference price ***	USD/ton	97	127	74
11 Exchange rate	rubles/USD	205	962	2276
12 Converted reference price (10*11)	thou. rubles/ton	20	122	168
13 Unit PSE (9-12)	thou. rubles/ton	-10	-50	295
14 Percentage PSE (13/9*100)	%	-103	-68	64

*- annual average procurement price

** - annual average city market price

*** - average price of export from Czech Republic

Note: sales for PSF are based upon the data from budget surveys

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