WELFARE EFFECTS OF SUGAR MARKET CONTROLS IN UKRAINE

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Abstract

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The sugar industry is one of the most important industries in Ukraine, mostly an agrarian country. Seemingly privatized sugar processing plants still remain under heavy control from government bodies. Thus we could refer to this industry as to highly monopolized with all the consequences of such industry structure. The only difference from classical monopoly in Ukrainian sugar market is that sugar producers instead of earning high monopolistic profits are suffering losses due to high fixed costs of operating the sugar processing plants. The other reasons for loss making is the state controls over sugar prices.

Ukrainian government imposes high barriers to imports in order to protect the inefficient industry. The absence of international competition removes the incentives for sugar producers to decrease their costs, thus keeping the welfare losses in sugar market very high. High production costs make it impossible for Ukrainian producers to export their sugar to countries other than former USSR. The ways to decrease the welfare losses are: removing state controls on domestic and international levels and creation of possibilities for raw cane sugar imports to Ukraine.

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Section 1

GENERAL ISSUES ON AGRICULTURAL POLICIES

1.1. INTRODUCTION

Historically, agriculture has been quite an important sector of the Ukrainian economy. Sugar production, in its turn, became one of the largest parts of the Ukrainian agriculture with 192 sugar refining plants and 120 000 permanent workers in the refining industry alone (CPER, 1998)[*]. Perfect soils and good climate conditions together with government directives in soviet times made Ukraine the largest sugar producer in the former USSR with the share of white sugar produced in Ukraine exceeding 50% of all white sugar produced in the Soviet Union (CPER, 1998). Most of the agricultural enterprises (farms) in Ukraine grow at least some amount of sugar beets each year.

The closeness of Ukraine to the Black Sea and other transport routes resulted in Soviet times in the building of a large number of sugar processing plants in Ukraine. These plants were oriented not only on processing of homegrown raw materials, but also on processing of raw cane sugar, imported from Cuba and other countries. Such orientation led to the very large size of these plants and thus to extremely high fixed costs of operating them. Today the imports of raw cane

[*] Unless other source is mentioned all the numbers further are either directly taken from Center for Privatization and Economic Reform in Agriculture report on sugar market in Ukraine or calculated based on the numbers provided by CPER

sugar are almost nonexistent, which makes sugar plants work an average of 40-45 days a year instead of an optimal 90-100 (CPER, 1998). In this situation their high costs are transferred on smaller amounts of domestic sugar produced, thus leading to very high costs of each kilogram of sugar produced.

The monopolistic power of some of the sugar market participants in some sectors of sugar market also does not contribute to market efficiency. This issue primarily concerns the relationships between sugar refiners and farms, where refiners act as monopolists (or, put it the other way, monopsonists).

As in many other countries, the sugar market is highly protected in Ukraine. Understanding the importance of sugar for Ukrainian economy, in this work I would try to analyze the welfare losses due to current situation in Ukrainian sugar market, and the possible gains from removing the state control over it together with other measures that could be adopted to improve the situation.

1.2. SURVEY OF RELATED WORKS

Many countries use different trade policies to protect their domestic markets. These policies are used both by developed countries and by LDC's. Definitely many economists are concerned with the costs such policies impose on the society. Some studies have been made to estimate the social costs of sugar import quotas on the US economy.

D. Tarr and M. Morkre (Tarr D. and M. Morkre, 1984, p.76) estimated the social costs of sugar import quotas as $251.6 billion for 1983 fiscal year. They used a partial equilibrium approach to this problem. D. Tarr and J. de Melo used a

General Equilibrium approach to estimate the welfare costs of import quotas on textiles, steel, and autos in U.S. They claimed that "the U.S. loses an estimated $14 billion in revenues through rents lost to exporting countries through export quotas". (De Melo J., and D. Tarr, 1988, p. 15) They also argue that "if the existing tariffs are removed, this would produce a welfare gain of about $0.9 billion – for a net benefit of $105 billion, measured in terms of a discounted value of displaced workers' lost earnings over a lifetime" (De Melo J., and D. Tarr, 1988, p. 17-18).

It is often argued that tariff barriers generate lower welfare losses than non-tariff barriers. However the situation could be the reverse. "When changing the policy of border protection in agricultural trade after the Uruguay Round, the ad-valorem tariff bindings in major commodities in several countries remained higher than the rate of protection during 1982-93. The high level of bound tariffs may allow countries to apply variable tariffs below the bound level, thus failing to stabilize tariffs and improve market access" (Ingko M., 1995, p.1). That means, that sometimes the tariffs implemented can deter trade much more than the quota substituted by such tariff, thus generating higher welfare losses and less (or even nonexistent) revenues for the government.

At the same time the state trading enterprises play a major role in defining the market situation. Such enterprises "with monopoly power or exclusive rights in agricultural trade in major products are still prevalent in both industrial and developing countries. Due to this there are significant price distortions in trade in products subject to state trading" (Ingko M., F. Ng, 1998).

Government intervention in international trade, pricing and distribution of products may result in high welfare losses both due to import limitations and to rent-seeking activities associated with the distribution of products in shortage. D. Tarr performed a study of results of such government intervention and rent-seeking in his work on color televisions and cars in Poland. (Tarr D., 1994) He argues that depending on the method of product allocation the welfare costs differ substantially, because some allocation ways do not result in rent-seeking activities.

Polish color televisions in 1989 was about 10 times the standard of distortion costs", while "the methods of allocating cars did not result in rent-seeking costs" (Tarr D., 1994, p.415). D. Tarr also studies the rent-seeking activity in his paper on butter market in Poland. He points out that eliminating all distortions in the butter market results in substantial structural changes and benefits to Poland. However he founds one case when removing one distortion while other distortions remain in place results in substantial welfare losses (Tarr D., 1990, p. 105). In all of mentioned above David Tarr's works one can also find some surveys of works in the spheres related to these topics.

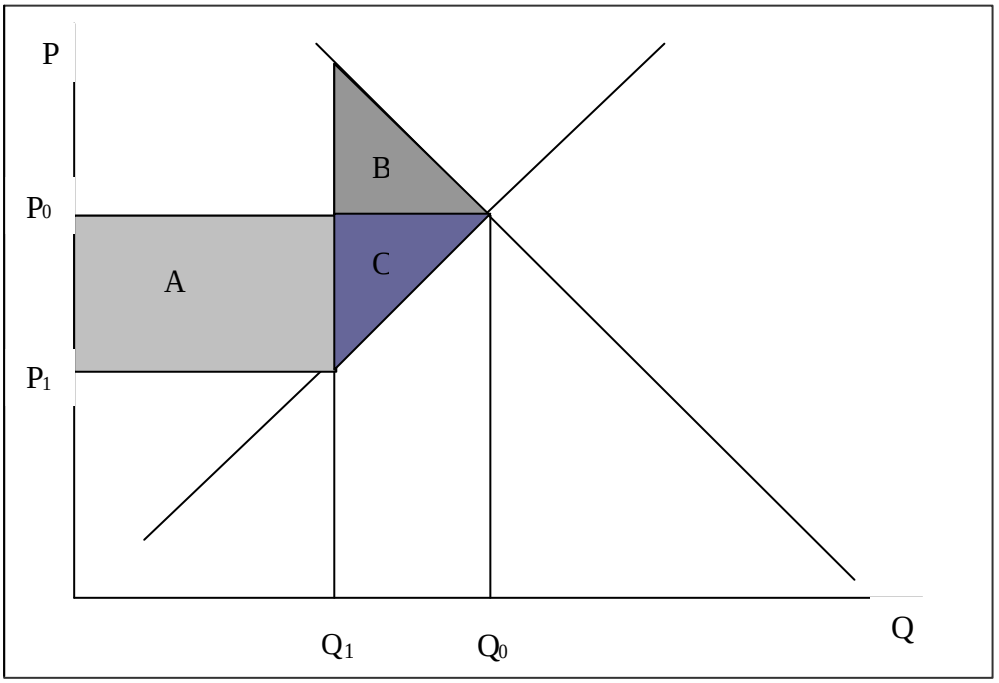
1.3. THEORY AND MODELS OUTLINES

This work's task is to analyze the welfare effects of government policies in two situations. The first one is the so-called "internal market" i.e. without paying attention to international trade. The second case is the government regulation of sugar imports and exports, excluding the imports of raw cane sugar that is used as input by domestic sugar producers.

The situation on internal sugar market is characterized by two main distortions: government regulation of the prices of white sugar and sugar beets; and monopoly of sugar refiners. Later in this work I will explain the reasons why I use only the model of price ceiling to analyze the welfare effects of internal market distortions. The welfare effects of price ceiling are presented on the following figure that is driven from classical literature on microeconomics and could also be seen at David Tarr's work on color televisions and cars in Poland.

Figure 1 shows the effects of price controls on competitive market. In this case the controlled price P_1 is the controlled price that is the highest price at which producers can sell their product.

Figure 1. ***Welfare Loss When Price Is Held Below Market-Clearing Level***



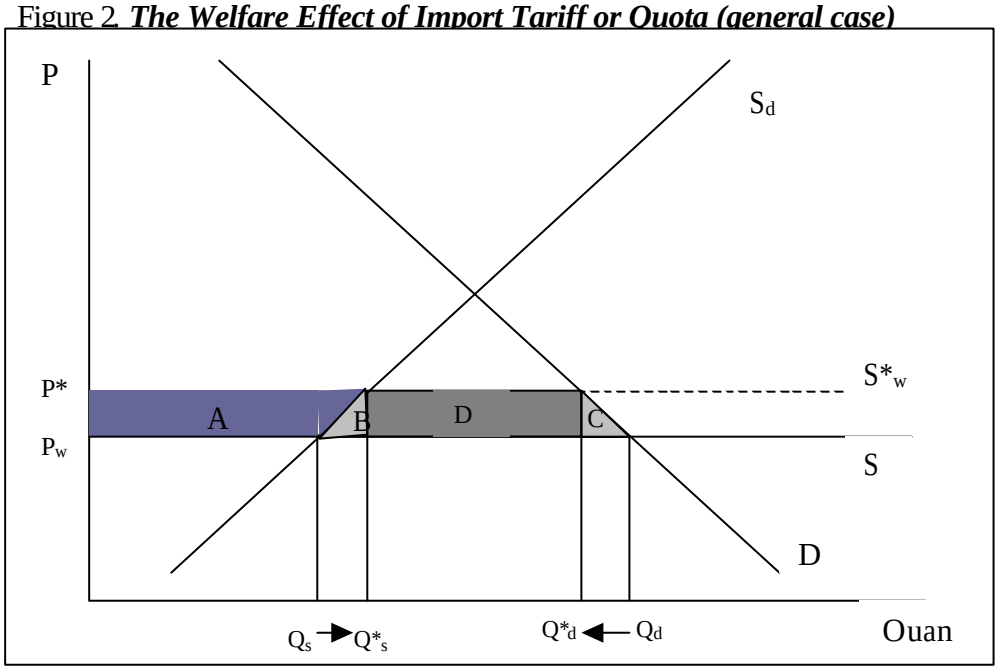
Source: Pindyck and Rubinfeld, 1998, p.297

This determines the quantity Q_1 that they offer to sale (here their marginal costs equal the controlled price). But this quantity of product is valued by consumers at a higher price, thus there are possible gains for the society from expanding the output to the market clearing price and quantity P_0 and Q_0. These gains (distortion costs) are represented by a "Harberger" triangle (Tarr, 1994) that is sum of areas B and C at Figure 1 and is measured as the increase in consumer and producer surplus devoted to increase in quantity supplied. Rectangle A at Figure 1 represents part of the rents (the difference between the value of product for the consumer and consumer's costs). Although the "Harberger" triangle represents the direct deadweight loss to the society, the "rents" rectangle might also be turned into deadweight loss if the rent-seeking activities of any kind take place.

Although officially the Ukrainian sugar market is protected by import tariff, the size of this tariff makes the world price faced by Ukraine higher than the controlled domestic price. This is equivalent to the implementation of a prohibitive quota. The case when tariff regulation is more binding than a quota one is quite common, even than the idea of implementing a tariff is to reduce the quota restrictions (Ingko, 1995). The usual approach to analyzing the welfare costs of import quota in general case is represented in Figure 2. This approach could also be found in D. Tarr and M. Morkre "Aggregate Costs to the United States of Tariffs and Quotas on Imports..." In this Figure P* represents the domestic price of good under quota regulation and Q_s* and Q_d* represent the domestic supply and demand respectively. P_w represents the world price of good (equivalently the domestic price without import restrictions). The world supply is assumed to be infinitely elastic at a price level of P_w. The rectangle D represents the quota rents obtained by the foreign exporters. At the same time the trapezoid A represent the domestic

producers' gain due to quota. The total loss due to quota regulation is represented by the sum of areas B+D+C, where triangles B and C are parts of domestic consumers' surplus loss not absorbed by producers' gain or foreign exporters' rents.

Figure 2. ***The Welfare Effect of Import Tariff or Quota (general case)***



Source; Pindyck and Rubinfeld, 1998, p.314

There are two possible cases for the rent-seeking to appear in the Ukrainian sugar market. The first one is in the distribution of the limited amounts of imported raw cane sugar between the sugar mills, and the second case is obtaining the export license for sugar. If the rent-seeking practice exists, market participants are ready to spend up to the whole amount of their surplus in order to get the limited resource. Such a practice may increase the welfare costs as the rents (A) are added to the deadweight loss. The analysis of the possible outcomes of rent-

seeking could be easily done based on the above mentioned models using the description of the rent-seeking behavior, provided by D. Tarr (Tarr, 1994).

The main problem with my analysis is the absence of reliable data for the Ukrainian market, a common problem for any market in Ukraine. Although the domestic supply curves may be estimated (taking average costs as a proxy for marginal costs), the domestic demand curves are almost impossible to estimate. Thus, when dealing with demand curves in my analysis I make two general simplifying assumptions: that domestic demand is of a linear form and that the domestic demand for all the products I consider is very inelastic in the short run. Since there are no estimates on demand elasticity for sugar in Ukraine, I use the elasticities estimated for the US sugar market in this analysis. This step is justified because the consumers' preferences towards sugar on average are not very different between countries. Although it is often the case that in countries with higher income the elasticities are lower than in low-income countries, some other factors contribute to low price elasticity of demand for sugar in Ukraine.[*] Thus, the reasonable assumption about the price elasticity of sugar demand in Ukraine seems to be –0.5 (the higher boundary for the US sugar market as presented by D. Tarr and M. Morkre, 1984, p.89). It makes no doubt that the price elasticity of demand for inputs is directly related to the elasticity of demand for output. Thus, given the elasticity of demand for sugar at –0.5 and taking into account the specific structure of the Ukrainian sugar industry, it seems more or less reasonable to assume the price elasticity of demand for sugar beets to be somewhere around –1. These figures will be used further in the analysis.

[*] Many people use sugar for producing cheap home-made alcohol and other products, in order not to buy more expensive products in the market

Section 2

THE COSTS OF PRODUCING SUGAR IN UKRAINE

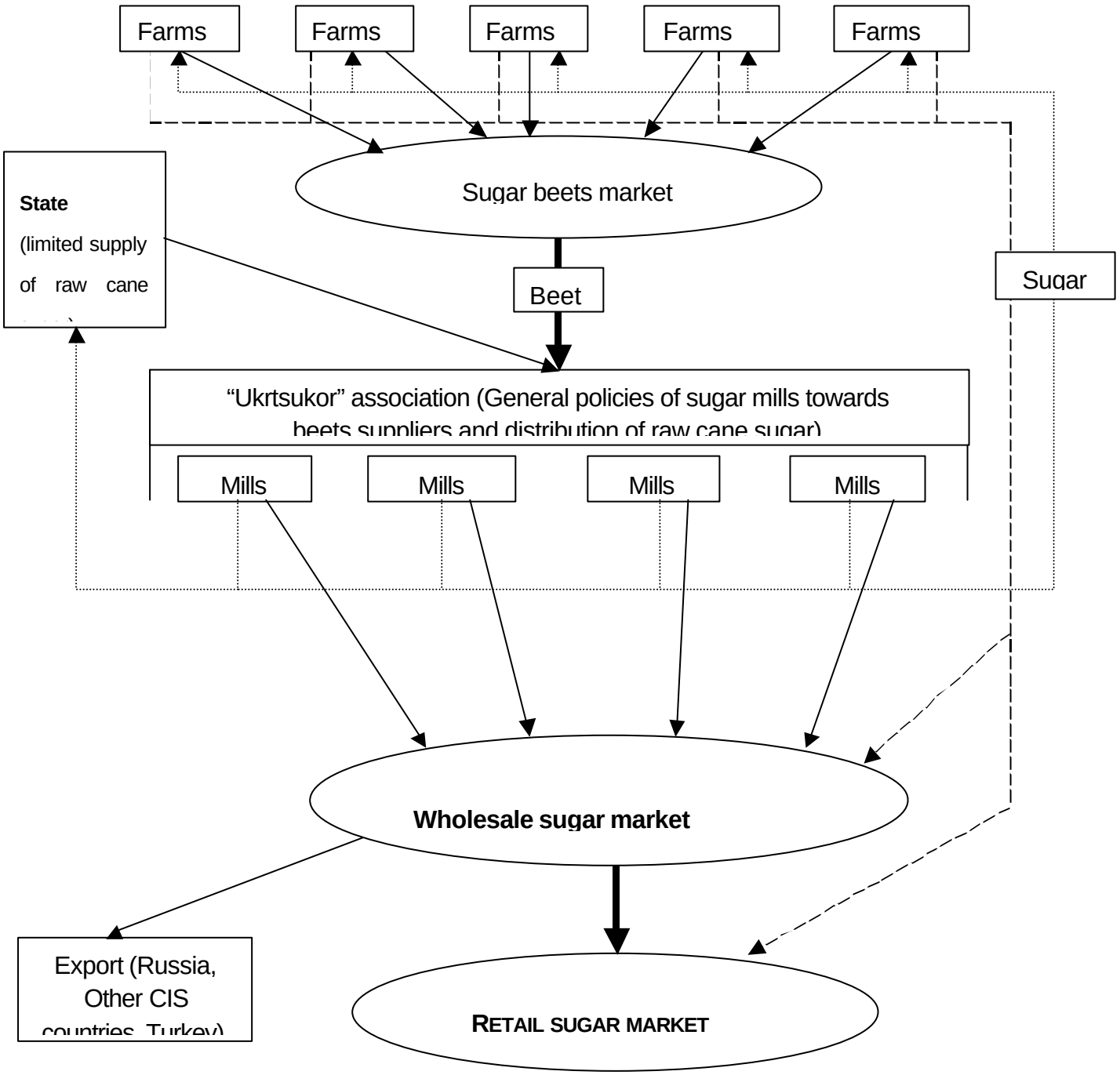
2.1 MARKET STRUCTURE

At this moment it is worth mentioning, that due to different reasons that will be explained later and government regulation the costs of producing sugar in Ukraine is very high, while the wholesale and retail prices are kept at the artificially low levels. Although quite high at the stage of raw materials supply, transportation costs generally are an insufficient part of other costs, so for this moment they can be omitted from the analysis. In order to clearly identify the structure of sugar market in Ukraine, four main issues should be addressed: the market of raw materials, the sugar processing market (wholesale sugar market), the retail sugar market, and government controls over sugar market. The scheme of Ukrainian sugar market is presented in Figure 3.

Market of raw materials. Although highly competitive from the supply side (a huge number of farms are ready to grow and sell sugar beets), the demand side of this market is monopolized by the "Ukrtsukor" Association, that unites all the sugar processing plants in Ukraine. Thus, seemingly independent and mostly privatized processing plants have all the chances to act as a classical monopsony with respect to sugar beets suppliers. But the issue of monopsony (I would show later why) is worth mentioning only because such structure allows sugar mills to

behave identically in response to any government action.

Figure 3. ***The Ukrainian sugar market***



This monopsony also creates the situation where each farm is assigned to specific processing plant and has almost no possibility to sell its product to other.

Wholesale sugar market. The above mentioned situation automatically creates a monopoly in the wholesale sugar market. The main actors in this market are processing plants and farms that receive sugar as payment for raw materials supplied (lacking money, sugar is presently the only way for the sugar mills to pay for any kind of inputs). Agriculture is probably the most "barterized" sector of the Ukrainian economy and farms are ready to receive the highly liquid "sugar money" that could be easily used later to obtain machines, fuel, etc. Sugar processing plants are not the only suppliers on the wholesale market. At the same time their high costs of sugar production and consequently high prices at which they sell sugar to farms, do not allow the farms to compete with processing plants in selling sugar to market intermediaries or industries that use sugar as an input. A price ceiling for the wholesale prices exists in practice, but the mills can use any price they want when selling (giving) sugar to farms, so such prices are higher than the regulated wholesale price. Only a slight decrease in prices appears when farms are forced to sell (or to exchange) some of their sugar at a lower-than-costs prices in order to get the necessary fuel and spare parts. Such sales represent only a small share of the wholesale sugar market, so we cannot consider this market as competitive. Usually farms receive approximately 35% of sugar produced, of which nearly 50% goes as payment to their labor force. The other 50%, sold at low prices to providers of fuel and spare parts are not likely to be sold at prices lower than those, stated by sugar mills.

Retail sugar market. This is the only part of sugar market that may be considered as competitive. Sellers in this market include farms, intermediaries (different firms that buy sugar from processing plants and farms in wholesale market), individuals who receive sugar as wages and, to some extent, sugar mills. The regulated retail price and regulation of pricing mechanisms together with high competition in this market do not allow market participants to recover the losses they incur in the earlier stages.

Government control over sugar trade and production. The above mentioned Association "Ukrtsukor" is a parastatal structure through which the government has direct control over production and wholesale sales of sugar. Besides that the market regulation is performed by means of decrees of the Cabinet of Ministers and other legislative documents. The main issues that are regulated by government are prices and the pricing system, international trade and excise taxation. For some time during 1997 there existed a general quota, by which no more than 1 500 000 tons of white sugar might be provided to Ukrainian market in a year (Cabinet of Ministers, 05.24.1997). This not only prohibited imports of sugar, but also forced the Ukrainian producers to export the sugar at any price suggested to them. Although this quota was abandoned later (Cabinet of Ministers, 08.04.1997), the international trade restrictions were changed to tariff regulation. The ad valorem tariff of 50%, but not less than 0.3 EURO/kilo is imposed on imports of white sugar in Ukraine (Supreme Rada, 08.17.1997). Taking into account the importance of raw cane sugar imports for Ukrainian sugar mills, it seems strange that the imports of raw cane sugar to Ukraine are restricted. The tariff of 15% but not less than 0.05 EURO/kilo is active on imports of raw cane sugar into Ukraine for future processing. At the same time the government limits its possible revenues

from tariff by imposing a quota of 300 000 tons addition (Cabinet of Ministers, 06.16.1997). Only some plants are officially authorized to work with the raw cane sugar imported into Ukraine (a good field for rent-seeking and corruption). The price of white sugar sold is also regulated both via governmental decrees and via local administrations' documents. These regulated prices are generally set at a low level in order "to protect the consumers". Such policy increases the losses of sugar producers.

2.2. COSTS OF SUGAR PRODUCTION IN UKRAINE

Many experts claim that one of the reasons for the high costs of Ukrainian sugar is the decrease in quantity and quality of raw materials inputs (CPER, 1998). As it was already mentioned in this work, it is difficult to argue with this statement, because under overall decreases in quantities of sugar beets the fixed costs of both farms and sugar mills are transferred on smaller quantities of output. This section tries to uncover in brief the costs of sugar production that arise from three different sources: sugar beet production (farming) a the level of agricultural enterprises, sugar refining at sugar mills, and transportation costs both at the stage of raw materials delivery to mills and at the stage of white sugar transportation to final markets. The issue of costs give us the possibility to analyze both the possible reasons for the regulation to occur and the consequences of such regulation.

Sugar beets production. A number of reasons make most of the Ukrainian farms producing sugar beets employ technologies and machines that are not only outdated, but also are 10 and more years old. This results not only in a decrease in the quantity of sugar beets that can potentially be produced even with these technologies and machines, but also in high losses of beets during their harvesting.

Old machines (produced in Soviet times) are also very costly to operate. Sometimes the costs of operating them are 10 times higher than the costs of using the similar foreign equipment.

The director of one of the Ukrainian farm provided a good example of this (although not from sugar production) to the author. A "John Deere" harvester, using 200 liters of diesel fuel, can cover 50 hectares of wheat a day. At the same time the most widely distributed (in Ukraine) harvester "Niva" with the same 200 liters of fuel can cover 5 hectares. The losses of wheat when using "John Deere" are at least 6 times lower...*

The other issue that contributes to increase of costs is the decrease in quality of soils that appears mainly due to two reasons. The first of them is the decrease in overall level of productive soils (see page 17 for an example). Secondly, without having money to purchase any kind of inputs, almost all the farms in Ukraine have abandoned the practice of fertilizing land (the only fertilizer they can use is manure, that can be received free of charge), that definitely decreases the productivity of soils.

There is little doubt that machines are more productive than people in growing any kind of crop (in per hectare yield). But during the last years there had been a tendency for farms to increase the share of labor used in sugar beets production (CPER, 1998). It can be concluded that these are inefficiencies in production together with the high prices of fuel and spare parts that raised the costs of sugar beets to the level of USD 27.5 per ton. The regulated price of sugar beets is USD

* the calculations were made in Collective Agricultural Enterprise "Hayivske", Kirovohrad region, Director Fedir Zhosan

23.3-24.3 per ton that makes farms lose USD 4.2-3.2 on each ton of sugar beets, or equivalently USD 27.88 on each ton of sugar produced (CPER, 1998).

Costs of processing and operating of sugar mills. This subsection covers only the issues of refining costs and other costs of operating sugar mills without paying attention to inputs' prices that were mostly discussed above. The decrease in volumes of sugar beets processed results in an operational season for sugar mills of approximately 44 days on average in 1997, at the same time the optimal length of operation is 90-100 days (CPER, 1998). As far as most of the mills in Ukraine are designed based on the optimal operation cycle, the underloading results in huge cost increases. During the USSR times the deficit of domestic raw materials was mostly covered with raw cane sugar imports. This not only allowed meeting the optimal operation length, but also allowed a decrease in the average costs of sugar produced, because due to technological differences the costs of cane sugar refining are lower than those of producing sugar out of domestic sugar beets. As was noted earlier, now the imports of raw cane sugar are 300,000 tons a year, which is very low and makes it possible to prolong the operational season by 15-20 days at 60-70 mills (CPER, 1998), which is not enough. The other cost-related issues are technologies used in processing and quality of sugar beets. Low input quality and mostly outdated technologies lead to a decrease in sugar extraction levels, that equaled 11.29% in 1997 (CPER, 1998) under higher costs of operating the technologies (mainly due to increase in prices of fuel, electricity and other inputs). It was calculated that an increase of 0.71% in average extraction level in 1997 would have increased revenues of sugar mills by USD 39.7 million.

Two other factors that increase the costs of operating sugar mills are related to labor. The first one is the high proportion of full-time workers on sugar mills, that is 87.6% (as compared to 80% in France) (CPER, 1998) of the workforce engaged. Taking into account the seasonal character of sugar processing, such a high share results in an "unjustified" cost increase. The second factor is that 12.4% of sugar industry's capital is represented by (socialist legacy) non-productive capital, devoted to satisfying the needs of workers (schools, hospitals, housing, etc.), that needs to be financially supported by mills. These non-production costs are transferred on final output. All the above mentioned factors drive the net costs of production (less the price of by-products that could be sold) to the level of USD 101.39 per ton with the total costs (raw materials costs included) of USD 349.63 per ton. At the same time the regulated retail price of sugar drives the corresponding wholesale price to the average level of USD 318.7 and the direct losses of sugar mills averages to USD 30.94 on each ton of sugar produced (CPER, 1998).

Transportation costs. Generally when providing the analysis of welfare and economic efficiency special emphasis is placed on the issue that transportation and/or transaction costs are insignificant and can be neglected. This approach cannot be completely applied in this work. At the stage of final product (white sugar) delivery from sugar mills to market, transportation costs really represent only a small fraction of product's price and can be omitted from the analysis without any crucial consequences. At the same time the transportation of sugar beets from fields to sugar mills is quite expensive and can reach even 9% of final product (white sugar) costs (calculations based on figures provided by CPER report). Such a high share could be explained by the fact that it takes 8.86 tons of

sugar beets to produce 1 ton of white sugar (CPER, 1998). At the same time the average distance between farms and sugar mills in Ukraine equals 38.8 kilometers with the average price of USD 1 per ton/kilometer. The difference in transportation costs mainly depends on ownership and types of transportation means and the distance from fields to sugar mills or accumulation points.* The operating costs of such accumulation points may also be counted towards transportation costs, and lead to a general increase up to 27.8% (CPER, 1998) of transportation costs as compared with directly-to-mill delivery. Another issue that contributes to the increase in transportation costs is that the sugar beets delivered from fields are extremely dirty. Sometimes the percentage of dirt in beets delivered (i.e. soil and other trash) can reach 50% of their total mass (CPER, 1998). This means that each year from 3 to 10 mln tons of soil is transported together with sugar beets to mills and then from mills to the nearby fields. The above mentioned issues result in a situation when the transportation costs account for up to 73% (on average) of total costs of sugar beets, leaving under regulated prices only USD 7 for the farms to cover other costs.

Possibilities of cost decreasing. As it was mentioned above, there are currently 192 sugar mills in Ukraine. Of them 126 were built before 1945 and only partially reconstructed recently. These are the most inefficient plants with very high maintenance and operation costs. The possible way to improve the situation is a shutdown of the part of such plants that could be done by market forces after the market is decontrolled – the most cost inefficient would go out of business. The main result of such policy would be redirection of inputs from the closed mills to

* special places distant from sugar mills where the beets from the nearby farms are collected and then delivered to mills by railroad

more efficient ones that will increase the loading of plants, prolong the operational period and decrease the average costs of production. Improvement could also be achieved via the increase in price of sugar beets the sugar mills pay to farms. This improvement could appear in the short run for the farms. Having better incentives for beet growing and more resources to finance it, they would invest in better technologies, seeds and fertilizers that would not only lead to direct cost decreases, but also would increase the quantity and quality of product. In the long run this will make it possible for the sugar mills to obtain more and better beets inputs at a lower prices (high competition on beets market will drive the prices to a competitive level of P=MC). The other sector where the cost decreases are possible is transportation of sugar beets to mills. One way of decrease is the concentration of sugar beets growing at the farms that are most closely located to mills. This could be done by means of contracts or agreements between mills and farms, if market would show it to be more efficient than planting beets at higher distances. Such production reallocation would not only decrease the transportation distances, but also remove the necessity for accumulation points, so the costs of operating them would not be counted towards the production costs. Definitely, one of the main factors in cost decreasing is the change in technologies used by sugar mills. It is quite possible to increase the level of sugar extraction to 16-17%, as it is dominant in other countries (CPER, 1998). That will decrease not only the average total costs of production, but also the marginal costs, leading to a lower wholesale price of sugar without losses for producers.

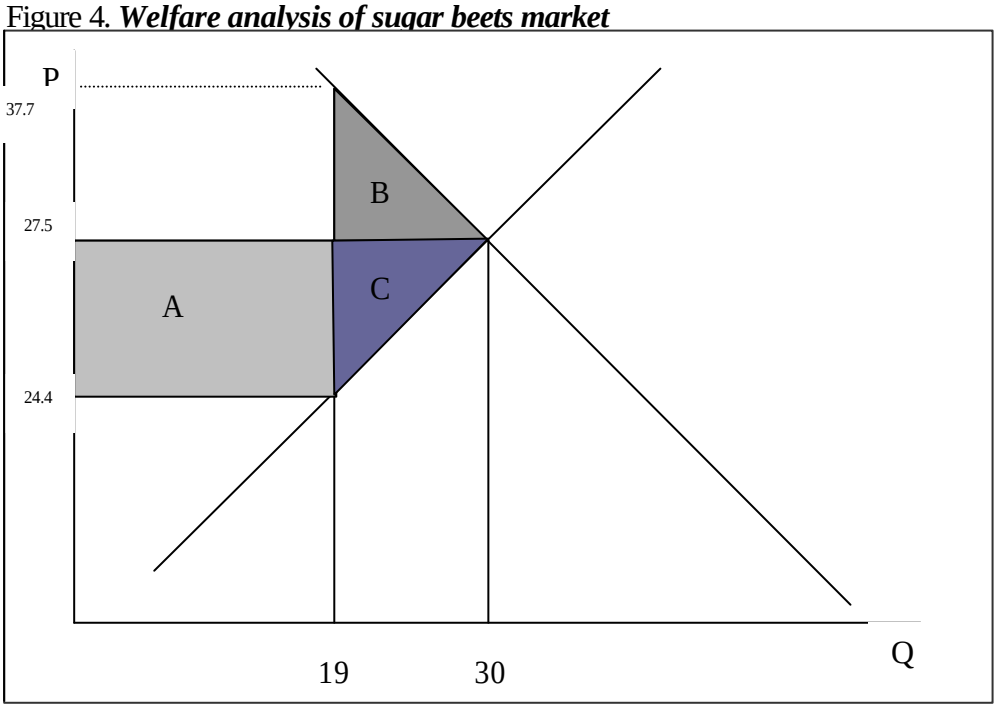
2.3. THE WELFARE SITUATION IN THE INTERNAL MARKET

As was mentioned in Section 1 of this work, the absence of reliable data and practice of competition on the Ukrainian sugar market makes it impossible to estimate the supply and demand curves for all the market sectors. This forces us to make quite specific, although quite reasonable assumptions in the welfare effects model. This leads to an error in welfare effects estimates for all the market participants. At the same time this will influence only the numerical estimates of effects, but not their direction.

Raw inputs market. Based on the above mentioned arguments on costs and an assumption of perfect competition the price of sugar beets in equilibrium might be assumed to equal USD 27.5 (equal to costs of production if both demand and supply sides of market are competitive) per ton. In this case the equilibrium quantity of sugar beets produced would be at a level of 30 mln tons a year. This level represents the optimal loading of sugar plants (i.e. making them operating 90-100 days). At the same time the distorted price of sugar beets in the market is USD 24.37 per ton (CPER, 1998). As it could be seen beets producers lose on average USD 3.13 on each ton of beets produced. Taking into account the volumes produced at 19 mln tons a year (CPER, 1998), the losses of farms (equivalently the producer's surplus loss) are USD 59.47 mln, that is equal to the area of rectangle A at Figure 4. At the same time this amount is captured by the increase in the consumer's surplus – sugar mills can obtain inputs at a lower price. The overall decrease in quantity of sugar beets supplied results in a deadweight loss equal to the sum of triangles B and C, The area of the triangle B that represents losses from producers' side is equal USD 32.87 mln. The lower quality of inputs is valued by sugar mills at a level of USD 37.7/ton. Thus we can claim

that the overall deadweight loss on sugar beets market can be estimated at a level of USD 55.96 mln.

Figure 4. ***Welfare analysis of sugar beets market***

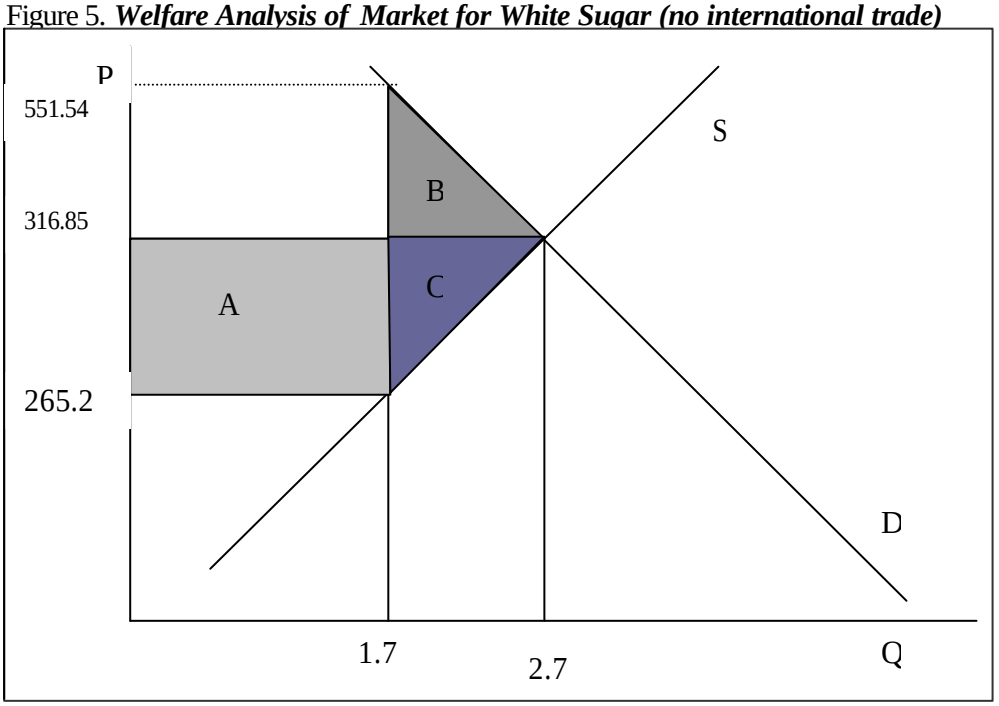


Source: CPER and author's calculations

Market for white sugar. Although the wholesale price of sugar is not regulated at this moment, it remains at a low level due to regulation of retail sugar prices by

local authorities. As a result of such regulation the average retail prices of sugar on the Ukrainian market equals USD 330 per ton (VAT included) that drives the legally determined wholesale sugar price to USD 265.2 per ton. At the same time the costs of producing 1 ton of white sugar equal USD 316.85. For the purposes of our model we can assume the equilibrium price of white sugar to be USD 316.85 per ton with the equilibrium quantity of sugar supplied to the local market at a level of 2.7 mln tons. Under the distorted price the sellers are ready to supply 1.7 mln tons of white sugar a year. This smaller quantity of sugar supplied is valued by the consumers at USD 551.54/ton. At the same time they lose on average USD 51.65 on each ton of sugar.

Figure 5. ***Welfare Analysis of Market for White Sugar (no international trade)***



Source: CPER and author's calculations

This means that the area of rectangle A at Figure 5 that represents the decrease in producer's surplus that is captured by the increase in consumer's surplus is equal to USD 87.81 mln. Here the sugar mills lose USD 87.81 and consumers gain USD 87.81 due to the same reason – prices are set at lower than market-clearing level. At the same time the decrease in quantity of sugar supplied to the local market result in a deadweight loss that is at least USD 25.83 mln (loss in producer's surplus due to decrease in output). Based on the above made assumption about the price elasticity of demand for sugar the decrease of consumer and producer surplus due to decrease in quantity supplied (the Harberger Triangle) is estimated at a level of USD 143.17 mln.

Thus, the total sum of deadweight losses from sugar production in Ukraine without taking into account the possible outcomes of international trade can be estimated at the level of USD 199.13 mln a year, that accounts for 0.34% of GDP. These losses result from the inefficient resource allocation (resources could be redirected to more productive sectors, but are employed in sugar production) that is caused by two main distortions: hidden government monopoly at a level of sugar refining and government price regulation of retail sugar market.

Section 3

INTERNATIONAL TRADE AND ITS EFFECTS

It makes no doubt that international trade benefits different countries in different ways, but the main outcome of trade is the increase in welfare of trading countries. Despite that a number of trade barriers exist in every country. The question of reasons for protectionism on sugar market is mainly the question of not Economics but Political Economy. Thus, this section does not try to analyze the reasons for trade barriers on sugar market, taking them as given. It analyzes the trade barriers imposed by Ukraine on sugar imports and by other countries on Ukraine's sugar exports. It also pays attention to possible cases of rent-seeking associated with international sugar trade.

3.1. EXPORT AND IMPORT RESTRICTIONS

The main purpose of this subsection is to recover the existing barriers for international trade on sugar market and to identify their impact on volumes of trade.

Sugar imports to Ukraine. Despite that the price for white sugar on the internal Ukrainian market is higher than the world sugar prices, there are no white sugar imports to Ukraine. The main reason for this is high tariff on sugar imports imposed by Ukraine. As it was mentioned earlier the import tariff equals 50% of customs price but not less than EURO 0.3 per kilogram. Taking into account that the world

price can be taken as USD 0.25 per kilo, the tariff of EURO 0.3 is always applied. According to the current exchange rate of UAH/EURO 4.21, the tariff of USD 0.42 is itself higher than the regulated retail price of domestic sugar. The idea that import protection via tariff creates less welfare losses for the protecting country than the equivalent import quota is quite common in Microeconomics. At the same time it often happens that when changing quota protection to tariff one the resulting tariffs are more binding than quota removed (Ingko, 1995, p.1). In the Ukrainian sugar case the tariff completely prohibits imports and is equivalent to an import quota of zero. The higher domestic protected price benefits producers, but the consumers are definitely worse off.

Ukrainian sugar exports. [*] The high costs of Ukrainian sugar as compared to the world sugar prices at a level of USD 250 per ton (Golovetskyy, 1998, p.14) make it impossible to export sugar to other countries around the world. Thus, the only possible foreign markets for Ukrainian sugar are the CIS countries' markets. The Ukrainian sugar is exported to the CIS states either in exchange for energy sources (oil, natural gas) as for instance with Turkmenistan or is sold for money, as the exports to Russia. The sugar that is used to obtain resources is mainly driven from state reserves and the price producers receive for this sugar is not largely different from that of internal market, at the same time government receives up to USD 424.1 per ton on such sugar (CPER, 1998). On average the price of exported sugar stayed at the level of USD 350 per ton, and the total amount of

[*] This part of work and related to this welfare estimates given further are mainly based on B. Golovetskyy's MA Thesis Price differences occur due to exchange rate changes. Readers, interested in detailed derivations and explanations of model could refer to Golovetskyy, 1988, pp. 14-16

sugar exported was in 1997 698.96 thousand tons is estimated to be almost the same in 1998 (CPER, 1998). The price differential between domestic and foreign markets seemingly should benefit sugar producers, even to cover some losses from sales in domestic market, because the export price is higher than production costs. At the same time the licensing mechanism (you cannot export without having a license) not only increases the costs of sugar by license price, but also creates a possibility for rent seeking. It is not guaranteed that the license holder would be able to export anything during the license period. Thus the license costs can be viewed as fixed costs which influence not only the exported sugar, but also that sold domestically. In order to be able to export and receive additional revenues producers are ready to spend up to whole amount of rents from exports on obtaining the license (by means of corruption, for instance).

Raw cane sugar imports. As I have mentioned earlier the main purpose of raw cane sugar imports to Ukraine was to decrease the costs of production (see Subsection 2.2). During 1975-1990 20 to 25 percent of all the white sugar produced in Ukraine was cane sugar. Currently the imports of raw cane sugar do not exceed 300,000 tons mainly due to two reasons: government quota and licenses; and the problem of sugar mills having no money (not only foreign exchange) to purchase this input.* In addition to quota and licenses, there also exists an import tariff on raw cane sugar of 15% but not less than EURO 0.05 per kilo. Thus, we face the three possible sources of distortions that arise from raw cane sugar imports: import quota, licensing and rent-seeking behavior and

* One might argue that if sugar refiners had money, they could make the government to remove the quota on raw cane sugar. This point is hard to disagree with.

corruption associated with licensing, and the import tariff. The other distortion source might be the government monopoly on raw cane sugar supplies, however now government does not sell input to sugar mills, but just pay the mills for the refining of raw cane sugar. So, the case of monopoly in supply is not worth mentioning at this stage.

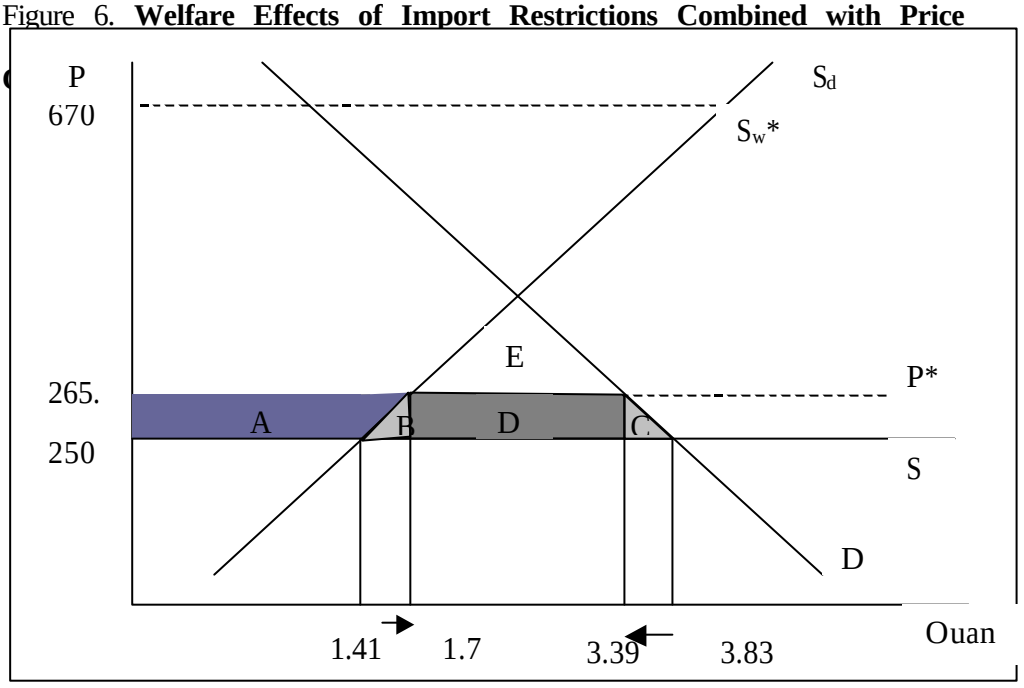
3.2. WELFARE EFFECTS OF INTERNATIONAL TRADE RESTRICTIONS

This subsection will combine the welfare effect estimates obtained in Subsection 2.3 for the white sugar market with the effects from international trade restrictions. I will not pay attention to welfare effects of raw cane sugar import quota because of very low amounts of it imported and impossibility to estimate the exact effect of raw cane sugar on costs of production.

Ukrainian imports. As I have mentioned above. Ukraine applies a tariff of USD 0.42 per kilo of white sugar imported (or, equivalently USD 420 per ton). This drives the world price of sugar that Ukraine faces to the level of USD 670 per ton - dashed line on Figure 6 (transportation costs are neglected) that is much higher than domestic distorted price. Under the free trade and world sugar price of USD 250 Ukrainian producers are ready to supply 1.41 mln tons of sugar to domestic market. The area A at Figure 6 represents the gains of producers' surplus due to this tariff under domestic price ceiling. This producers' gain is equal to USD 23.64 mln. At the same time consumers lose from price increase the sum of areas A+B+C+D. Under the general analysis area D represents either increase in government revenues due to tariff or quota rents. Thus areas B+C represent the deadweight loss and net domestic loss is equal to either B+C+D (quota) or B+C (tariff) (Pindyck and Rubinfeld, 1998, p. 314).). In the Ukrainian case rectangle D

is also counted in deadweight loss, thus net domestic loss is equal deadweight loss and can be estimated at a level of USD 31.24 mln.

Figure 6. **Welfare Effects of Import Restrictions Combined with Price**



Source: CPER and author's calculations

When considering the effects of a prohibitive tariff (quota) the area E (losses emerging from sugar shortages) is also considered as a loss from trade restriction. In the Ukrainian case this area is covered by the price regulation and, thus is described in the previous section. The deadweight loss could be higher if there was no price control on Ukrainian market, but even with the price controls the net domestic loss from import prohibition accounts for 0.05% of Ukrainian GDP. We can expect the Ukrainian sugar market to be in deficit by approximately 2 mln tons under the described situation. At the same time we can observe that the sugar is

supplied to market in more or less sufficient quantities. These additional supplies to the retail market could be provided by two sources: people who receive sugar as a substitute for wages and farms that receive sugar as payment for sugar beets. As far at is impossible to estimate the total quantity of sugar that they supply and the exact prices at which they receive sugar from mills, we cannot estimate the welfare effects of such additional supplies, but it looks reasonable that they are so low that can be neglected. The combined welfare effects of import controls together with price ceiling and monopolization of refining discussed in Section 2 sum up to USD 230.37 mln that is 0.39% of Ukrainian GDP.

Ukrainian sugar exports. According to the calculations of B. Golovetskyy, the possible welfare gains of Ukrainian producers (or decrease in deadweight loss) from removal of Russian quota on Ukrainian sugar is USD 171,754 (Golovetskyy, 1998). Despite the changes in exchange rate the relative prices remained almost the same, so this figure is consistent with current situation. This amount is too small to deserve any attention in the analysis.

Section 4

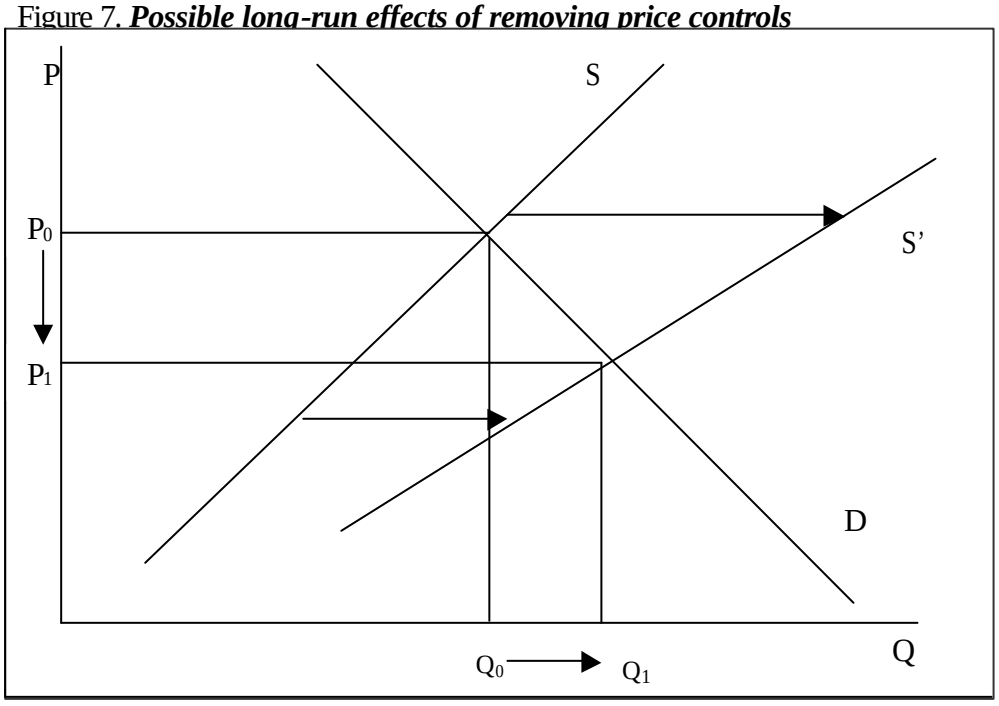
POSSIBLE OUTCOMES FROM REMOVAL OF MARKET DISTORTIONS

The outcome of distortions' removal will depend on type of improvement i.e. the types of policies implemented and the incentives for government to change its policies towards the sugar market as well as the time period considered. If we assume that the Ukrainian government is maximizing total welfare, the welfare effects of removing distortions will depend on a particular welfare function we choose. At the same time this welfare function together with political reasons will influence the government policies. We can assume the welfare function to have the standard utilitarian form of $W = \sum_i U_i$, where the consumers' utility is represented by consumer surplus and producers' utility by producer surplus. Without taking into account the political incentives of the Ukrainian government both consumers' and producers' utilities are expected to have the same weights in welfare function. The relative instability of the Ukrainian government and its awareness of "social crisis" (elections are coming) assign definitely higher weights to consumers' utility. This makes the policies that would greatly reduce the consumers' surplus (via the increase in price, for instance) undesirable to implement. In this part I briefly consider the possible impacts of policies dedicated to distortions' removal both in the short and long run.

Removal of price controls. The immediate impact of this action in the short run would be the increase in price of sugar at the domestic market. Although the total

welfare could be expected to rise due to elimination of the deadweight loss triangle, the result of such policy is not a Pareto efficient outcome, because it leads to a decrease in the consumers' surplus. As I have mentioned earlier, relatively higher weights assigned to consumers' utility might not only nullify the increase in producers' surplus, but can also lead to a decrease in total welfare. While eliminating the internal market losses, the removal of price controls if the import restrictions remain in place even increase the deadweight loss from these restrictions. In this case the net domestic loss increases due to price increase to USD 316.85 per ton and is now USD 86.24 mln. But it is still lower than the loss if internal distortions are kept in place. Quite a different result can be expected in the long run (see Figure 7).

Figure 7. ***Possible long-run effects of removing price controls***



The elimination of price controls would allow the producers to change the technologies, widen the raw inputs base and increase the quality of inputs (mainly via the possibility of offering higher prices). This would lower the costs of sugar production, thus shifting the domestic supply curves at both sugar beets and white sugar markets to the right. Although the extent of this shift is hard to predict, there is no doubt that the main result of this would be the increase in total welfare. At the same time we can observe the Pareto efficient outcome, as all the parties involved are better off.

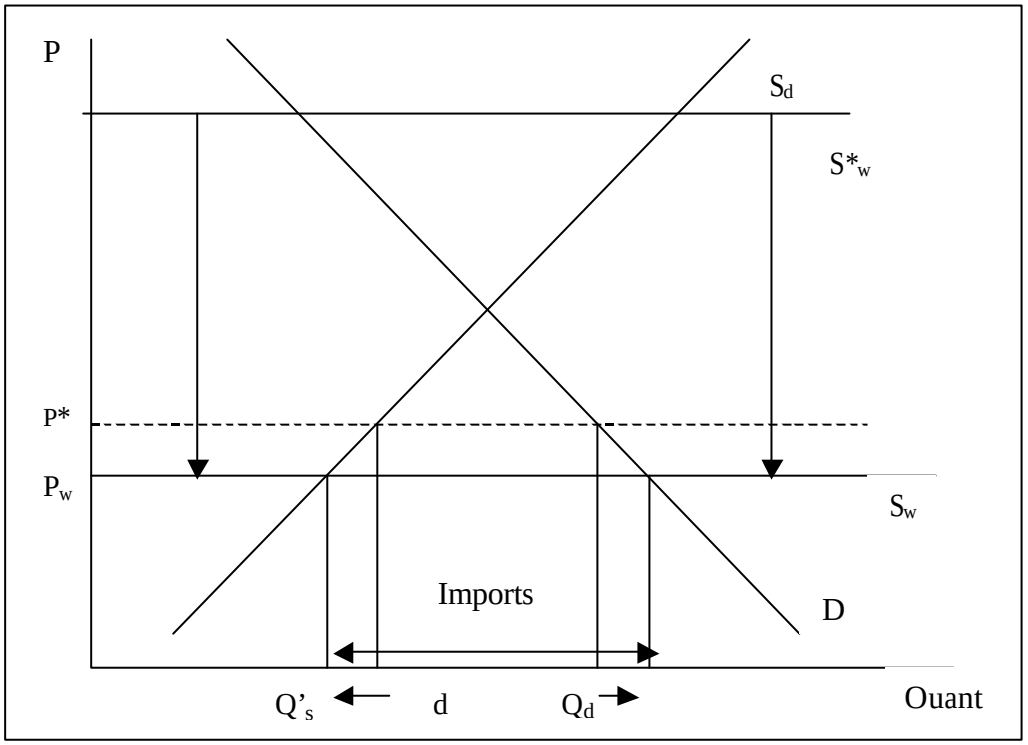
Demonopolization of sugar refining. The policy of removing price controls would not work properly unless the sugar processing industry becomes competitive. Otherwise Ukraine would still face deadweight loss, but in this case it would originate from monopoly/monopsony. Until the "Ukrtsukor" association is able to dictate the common policies for sugar mills, it would act as a monopsonist towards beet producers and as a monopolist towards sugar consumers. Both in the short and long run the demonopolization of sugar market together with active bankruptcy procedure[*] will increase the total welfare due to increased competition and decreased production costs.

Liberalization of international trade. The removal of trade barriers would have different welfare and overall impacts in the short and long run. In the short run the elimination of tariff would increase the consumers utility, further decreasing the

[*] The bankruptcy procedure will make only the most efficient producers to survive, thus leading to decrease in average costs throughout the industry

producers' surplus. At the same time it would result in overall increase in welfare via elimination of deadweight loss (see Figure 8).

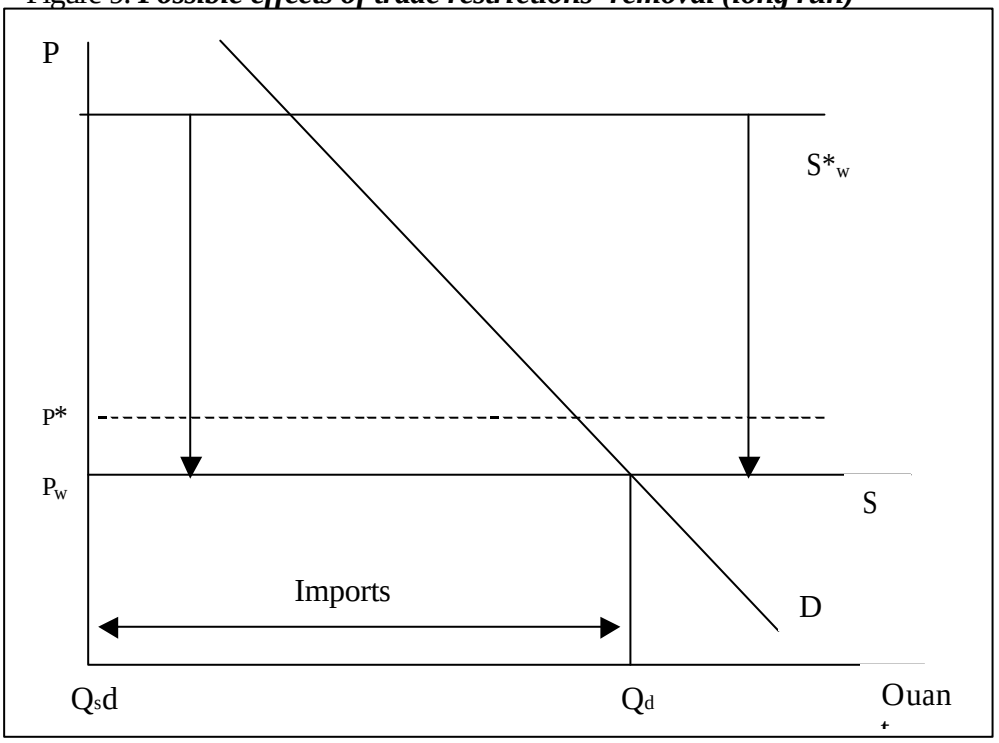
Figure 8. ***Possible effects of trade restrictions' removal (short run)***



In the long run the removal of trade barriers together with incompetitiveness of the Ukrainian sugar industry will result in a shutdown of the Ukrainian sugar mills and elimination of sugar from Ukrainian agricultural output (see Figure 9). Thus we would face the further increase in net domestic losses, as foreigners would capture all of the revenues from sugar sales in Ukraine. One of the possible ways for

keeping the Ukrainian sugar industry alive without experiencing too high deadweight losses could be aprice support program, meaning that producers would be paid some money to cover the difference between price and costs of production. Unfortunately implementation of such policy is impossible in Ukraine, taking into account the huge budget deficit, i.e. Ukrainian government has no money to support the producers.

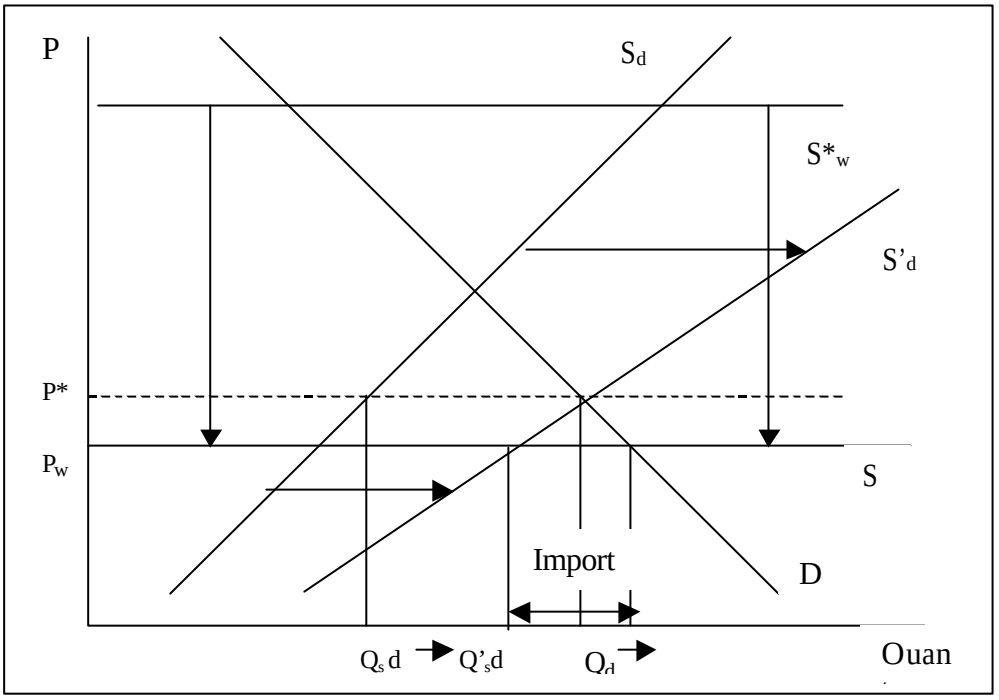
Figure 9. ***Possible effects of trade restrictions' removal (long run)***



As it could be seen from the above arguments, there is no possible single policy that would generate the increase in total welfare and lead to a Pareto efficient outcome both in the long and short run. There is not even a combination of policies

that would generate the desired results immediately. This means that some of the short run interests should be overcome (some losses must be incurred) in order to achieve a long-run improvement. Figure 10 presents the optimal policy combination for Ukraine, as I see it.

Figure 10. ***Possible effects of trade restrictions' removal combined with price decontrol (long run)***



The optimal policy combination for Ukraine might be a removal of price controls combined with demonopolization of refining market and then (after four to five years) the liberalization of international trade, or at least the decrease in the level of protection. This would shift the domestic supply of sugar to the right, as the technological changes will allow the Ukrainian producers to supply more sugar at each price level. So, the volume of sugar imports will decrease, consumer and producer surplus will go up, and the total welfare will be higher in the long run.

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