

PROTECTION OF AUTOMOBILE  
PRODUCTION IN UKRAINE. COST -  
BENEFIT ANALYSIS.

by

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Abstract

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Protection measures, imposed to protect Ukrainian automobile industry, bring not only deadweight losses, as is stressed by many researches. Arguments, dealing with dynamics must be included for a broader analysis.

The problem of protection of a automobile production in Ukraine is viewed in this paper as the tradeoff: from the one side, deadweight losses due to protection, arise, when statics is considered, but in dynamics they are accompanied by the firm`s movement along the decreasing average costs curve. Issues of “strategic” - industry argument used by government to justify protection of the industry, are considered in the analysis.

Cost - benefit analysis of the protection is conducted, and evaluation of the possible government`s policy alternatives is presented.

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## 1. INTRODUCTION.

In spite of all benefits, offered by free trade theory, countries persistently continue to put obstacles on the way of free trade, protecting in such a way certain home industries. The case is common for developed countries, such as US, which imposes restrictions on imports of automobiles, steel and textiles. But especially sharply problem of protection confronts developing and transition countries, whose economies, facing different institutional environment, often do not function according to the rules of behavior, prescribed by classical economic theory.

Industries, imposed by planning systems, often have not been the ones comparatively advantageous for the countries. But their collapse left trained labor and old-fashioned equipment unemployed. Unstable legislation and economy, in general, has led to little capital inflows. All these factors have caused a situation under which market force fails to direct resources efficiently. Government intervenes to improve the situation. One such intervention in Ukraine has resulted in the case of “national” automobile - protection of the automobile industry.

The model in this paper is built on the tradeoff between deadweight losses due to import restriction and more efficient production at lower point of the average cost curve. Taking into account all pros and cons, a theoretically optimal import tariff may be positive even for the “small” country.

The paper is organized as following: next section deals with the relevant literature review, Ukrainian market for automobiles is described in the third section. Section four is devoted to description of “strategic” industry argument. The model is developed in the section five. Data are described in section six. Seventh section deals with estimation of parameters for demand and cost functions. Then model is

applied to data on Ukrainian automobile market, and results are presented. Political economy issues are overviewed briefly, as the possibility for the further research, in the next section. Conclusions, including analysis of three possible scenarios of the development of events, are presented in the last section.

## 2. RELEVANT LITERATURE REVIEW.

Why be concerned with protection? Surely because of its consequences. The most important and general one is the distorted structure of incentives, in other words, the classical “invisible hand”, that directs resources to their most productive use, fails to function, when trade policy instruments are used. Distortion occurs as the result of tariffs, which cause the situation, when prices do not reflect cost of production; and limited competition from abroad – firms with higher costs, than those of the world, can survive, and this causes disproportional inflow of resources into the industry. Import restriction prevents specialization and thus, industries, which need large scale of production to reach minimum average costs, can not produce efficiently.

International trade textbooks (Krugman, Obstfeld, 1997), dealing mainly with static situations, give only one example, where trade policies can increase the nation’s welfare. It is the case, when the country, introducing trade policy, has monopoly or monopsony power. This time tariff burden is divided between importers and domestic consumers, but domestic losses are offset by improved terms of trade. The case, though persuasive, is rarely applicable to developing and transitional economies, in the sense that they in most cases are “small” and take world prices as given.

Helpman and Krugman (1996), while introducing into international economics imperfect competition and economy of scale, give more reasons to justify protection:

?? Concentration of production, when each industry, facing increasing returns to scale, concentrates in a separate country.

?? Rationalization, when international trade increases competition, while allowing firms to reach markets of each other. Thus, profits are reduced and number of firms in the industry too, but those left in the industry produce higher quantities and face lower average cost of production.

Authors are uncertain about the own production effect. There is possibility, that due to international trade, country`s own production in industries with increasing returns to scale and monopolistic ones will decline, which will lead to production at higher average costs and prices.

As for attempts to do research on Ukrainian automobile market, they have been conducted by Pivnenko (1998) and Holovetsky (1998), but they analyzed Draft Law on Automobile production, which was not adopted in the form presented by authors. Besides, main point of their concern were welfare losses of protection, which do not imply comprehensive analysis. A point of view, completely different from the one, presented by two authors, mentioned above, is taken by Hapotchenko (1999). While the former stress the point that everybody loses, when protection is imposed, the latter comes to the conclusion that national automobile - building industry still has a chance to survive, if import tariffs for autos increase.

#### 4. MARKET DESCRIPTION.

The case of “national automobile” has become the first problem of protection in Ukraine loudly discussed by practically all Ukrainian press. The reason is that this time it disturbed wide group of consumers of second-hand cars.

Protection in Ukrainian automobile market works out in the form of import tariff and excise duty, which depends on engine volume, and have been set by Law on “Excise duty rates and import tariff on transport facilities” at May, 24, 1996. Later measures were adopted in the period, when privileges have been granted to certain domestic producers. They included an increase in minimum customary value of imported automobile up to \$5000 (Government decree of February, 16, 1998); and limitation on import of automobiles, older than 5 years since April, 1-st, 1998.

The Ukrainian - Korean joint-venture “AvtoZAZ - Daewoo”, created in 1997 on the basis of the Zaporizhian auto plant “AvtoZAZ”, is a monopolist in Ukraine`s car production. Only imported cars, especially second - hand middle - class ones, can be considered as its competitors. Other Ukrainian car producers, which have appeared recently, are oriented on assembly operations, while AvtoZAZ - Daewoo has declared that 70% of production will be produced locally in ten years. And complete production of *Tavrias* - family automobiles - plant`s specialization before creation of joint-venture, will be continued.

The Law “On Promotion of Automobile Production in Ukraine”, adopted in September, 1997, satisfied the main DAEWOO requirements, including exemption from tariffs on imported goods for auto production, land tax exemptions, zero VAT tax and zero tax on dividends if they are reinvested in

production development. Korean producers, in their turn, invested \$150 mln. in Ukrainian auto production. Its investment program planned production of 250 thousand of cars per year in 7 years after joint venture creation, with 70% Ukrainian localization of production of automobile components in 10 years. Besides, AvtoZAZ planed to export 50% of its production.

The enterprise produces five car models: *Tavria* (present price \$2800), *Tavria-Nova* (\$3300), *Lanos* (\$8200), *Nubira* (\$10700), *Leganza* (\$15000) (Den`, # 63, 1999). Credit possibilities have been offered to the consumers, according to the agreement between AvtoZAZ - DAEWOO and Prominvestbank, Pryvatbank and Ukreksimbank. These three Ukrainian banks provide loans at 18 - 23% yearly for those, willing to buy cars, produced at AvtoZAZ - DAEWOO.

Besides, enterprise offered sale at autoclub scheme. 120 members pay certain fee every month, and two of them (one - according to the lottery, another - by auctioning) obtain their cars every month. (Den` # 140, 1998). Problems with joint venture`s management have begun when head of directors` council, Olexandr Sotnikov, informed the press, that Korean partner did not fulfill some of its investment liabilities, including \$ 20 million credit on development of distributional network and technical service to make joint venture`s automobiles more popular at the Ukrainian market (Den` # 140, 1998).

Affairs are in progress. On February, 1999, Korean part of joint venture managers announced that enterprise is in the state of deadlock. Reasons for this were defined as lack of agreement with local partners, overall economic crisis and insufficient demand for automobiles in Ukraine (Solovjov, 1999). In March *Tavria`s* production has been stopped. New business plan for the enterprise is being developed.

## 5. STRATEGIC INDUSTRY ARGUMENT.

“Strategic” industry argument rests on the assumption that “... some industries are better than others - that countries that do pursue policies to promote desirable sectors will gain at the expense of countries that do not.” (Krugman, Obstfeld, 1997, p. 276)

Automobile industry is protected in Ukraine as the strategic industry, within a framework of industrial policy conducted by the government in the country. One of the reasons to justify this kind of protection, accepted by the governments most often, is of the “popular” kind. It implies the desirability of high value-added industries for economic growth (Krugman, Obstfeld, 1997, p. 276). As GNP is calculated as the sum of value - added in the economy, statement seems reasonable. But in practice, capital - intensive industries, with high value - added per worker are protected, which implies low value - added per unit of capital. Though it can be viewed empirically, that developed countries faced the process when resources have been transferred from simple industries, basing on raw materials, to capital intensive ones and then to “knowledge - intensive”, or service - oriented, as it has occurred in Japan after the second World War (Krugman, Obstfeld, 1997, p.286), it is not proved that economic growth have been caused by this kind of policy, and it does not show the sign of influence on the growth of developing and transitional economies.

Another justification for protection of “strategic” industries, given in the literature, is based on the domestic factor market failures. If financial market is not developed in the country, and industry in which it faces potential comparative advantage requires high initial investment, financial institutions may lack the ability to provide the necessary loans, and possibility to develop this industry may be lost

(Krugman, 1995, p. 135). This argument is hardly applicable for the case of Ukrainian automobile production, as AvtoZAZ- DAEWOO is the branch of large multinational corporation, which can use for its development, the funds, obtained from profits, or borrowed at the outside markets. Though Ukrainian government in the Investment plan has presented the importance of foreign direct investment for strategic automobile industry development, as the main argument for joint venture privileges and protection.

Recent literature on international trade has emphasized on the importance of increasing returns to scale, and the imperfect competition in the world economy (Krugman, 1995, p. 135). Out of these concepts, new explanation for the “strategic” industry argument was born. When it becomes evident that only large - scale production can survive, question arises, at which country should it be located. Krugman`s “strategic argument” states that “ a preannounced export subsidy for domestic firms, by inducing foreign firms to produce less, can raise the profits of domestic firms by more than the amount of subsidy” (p. 136). The problem is that for argument to work, threat of protection should seem credible for foreign firms to make them reduce production. In other words, to obtain benefits from protection, country must be able to influence prices at the world market, which is rarely the case for developing countries. But concentration of production, predicted by Helpman and Krugman (1996), when each industry, facing increasing returns to scale, concentrates in a separate country, will not take place in its pure form, as small countries can respond with protection, because in dynamics their firms also obtain gains, when moving along the decreasing average cost curves. Theoretically, protection is reasonable if dynamic gains of production at lower average costs will outweigh static deadweight losses. Whether it is the case for Ukraine, I try to test in this paper.

Criterion for estimation of regulation efficiency, accepted in this paper, is that of Hicks and Kaldor (as cited in Cullis and Jones, 1998). It states that redistribution of wealth via regulation is efficient, “if the amount by which gainers gain exceeds the amount lost by losers, such that it is possible conceptually for the gainers to compensate the losers and still benefit from the change”.

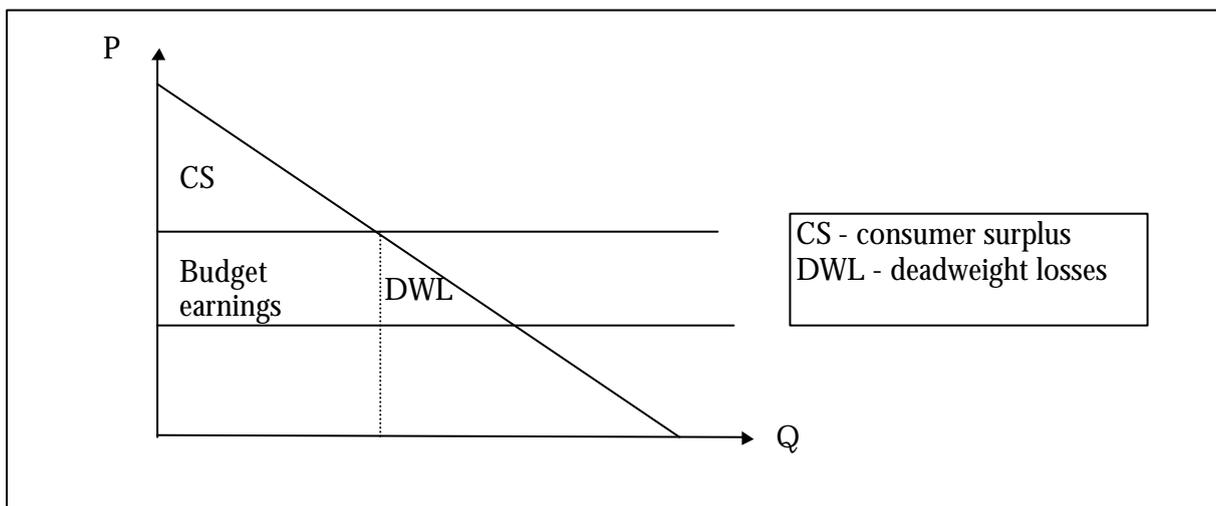
Welfare functions values of two real and two hypothetical outcomes will be compared to find out the most efficient outcome, and give future policy recommendation, whether it is worthwhile to increase protection rate further, according to the demand of the Korean part.

Though theoretical argument for protection of “strategic” industries sounds in the literature often, it is not proved empirically. World Bank researches on automobile industries protection in the developing countries, have proved its inefficiency, for example in Uruguay and Philippines. “It keep vehicle prices high, maintain high-cost domestic production of both vehicles and components, and transfer large sums to special interest groups ” (Takas, 1992, p. 13). In other words, dynamic positive effects in the form of increased output, fail to overweight deadweight losses from protection. The reason for this, for my mind, is that enterprises, used for strong government planning and regulation, can not find their niche to sell their products at the world market, as they are not used to hard competition, and hence can not react for changes quickly.

## 5 MODEL DESCRIPTION

### 5.1. Basic Model.

As Helpman and Krugman (1993) pointed out, there is no clearly stated theory on international trade with imperfect competition. Partial equilibrium model with consumer and producer surpluses comparison has been chosen as basis for the analysis, basing on the one, presented in Pindyk and Rubinfeld (1997).



Domestically produced and imported goods are assumed to be homogeneous - similar in quality. The country is small - i.e. it can not influence world prices and tariff imposed is transferred one to one into the price, domestic consumers pay for the good. According to this model, any amount of tariff imposed, as amount  $P_0P_1$  at the example, will cause price increase from  $P_0$  to  $P_1$ , and decrease in

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<sup>1</sup> It will be shown later that forbidden import of automobiles, older than 5 years old, and \$5000 minimum custom price, imposed, will have an effect, similar to the one caused by tariff.

consumer surplus, equal to P0P1AB, partially compensated by budget earnings increase (P0P1AC). Deadweight losses, equal to area ABC, occur because consumers can now buy less good at higher price. Hence, according to this model, deadweight loss is unavoidable consequence of trade restriction in small country.

Though this model shows a very much simplified reality, it is a helpful tool for analysis of regulation impact on welfare of different groups. The latter can be quantitatively estimated as areas of the figures, in the way, shown above, and analogously to the one, represented in works of Tarr (1990, 1994).

## 6.2 Modified model.

The dynamic issue is included in the model in the form of domestic firm`s movement along the decreasing average cost curve. Hence, when economy of scale is exploited, output is produced at lower average cost.

AvtoZAZ – DAEWOO`s assets have been estimated to be worth \$150 million last year. Large initial fixed cost imply that on average, costs are decreasing with increase in output. According to some researchers, manufacturers in advanced countries typically regard output of several hundred thousand of vehicles a year as necessary to achieve full production efficiency (Krugman, 1995, p.137). Given global competitive pressure, this number is likely to be approximately true throughout the industry. Hence, economy of scale in production of automobiles by Ukrainian producers, seems reasonable assumption. Fixed costs, some of which are sunk, also serve as the barrier for entry into the industry, especially when underdeveloped capital market fails to finance initial investment, which must be sufficiently large (150 million, according to Law “On Promotion of Automobile Production”) to obtain

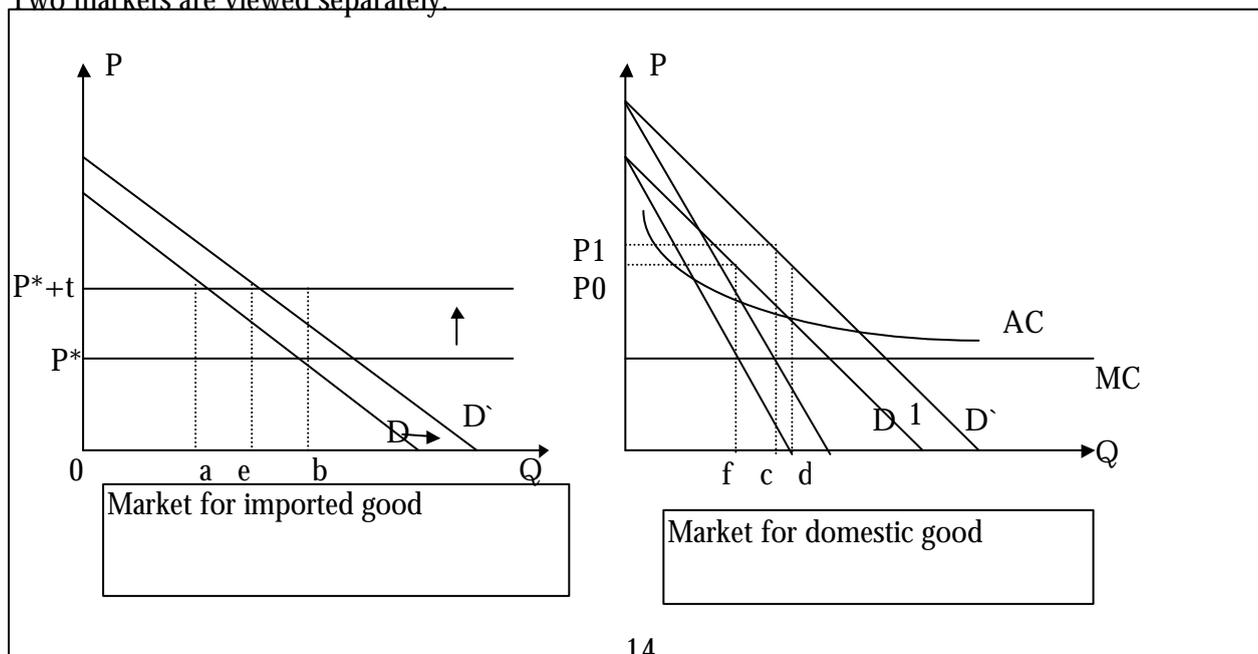
privileges; and besides, turns out to become risky with unstable legislation, possibility of crisis and changing political environment.

One more point, which is not taken into account by the classical theory is labour market imperfections, specific for the transition economies. The reason is that it is assumed, that every resource in the economy, including labour, has its opportunity cost, i.e., when country gives up production of some good, relying on supply of import, labour, used to work in this industry is transferred into the other sectors. This is not the case for Ukraine, which is signified by high unemployment level in the country.

For further analysis it will be useful to stress again on quality differences between domestically produced and imported cars.

Assume a good, produced domestically and by foreign producers at equal marginal cost. Because of quality differences, two types of good are differentiated and substitution between them is not perfect.

Two markets are viewed separately:



The essence of the model is as following: when tariff is imposed, consumers of imported good face higher price of it. As our country is assumed to be the small one, and takes world price as given, tariff is transferred one to one into price of imported good. Those, who demand quantity  $Q^*$  can not satisfy their demand and can partially switch to the consumption of domestically produced good. Thus, at every given price of domestic good, it is demanded more of it. This implies outward shift of the demand curve for “national” good. The extent of the shift depends on cross elasticity of demand for domestically produced good with respect to price of imported one.

Producer - monopolist increases price from  $P_0$  to  $P_1$  to maximize profits.

Again,  $Q^*$  of good, produced nationally, will not be obtained by those, who expected to buy it at price  $P_0$ . This will in its turn shift the demand for imported cars upward. The extent of this shift will depend on cross elasticity of demand for imported cars with respect to price of those domestically produced. As *Tavria's* price has almost stayed the same, in 1998, this last shift of demand curve for import will be neglected in further analysis.

As supply curve at this market is perfectly elastic, at this shift, all shifts are finished and all consumers willing to substitute domestic car for imported one, are left with their cars, higher price for autos ( $P^* + t$  instead of  $P^*$  for imported autos;  $P_1$  instead of  $P_0$  - for domestic cars), higher quantity consumed of domestic good ( $Q^*$  instead of  $Q^*$ ), and of foreign good ( $Q^*$  instead of  $Q^*$ ).

### 6.3 Game description.

How is the amount of optimal protection rate is estimated? The model is developed further basing on the models of Miravete (1996), Krugman (1993) and existing conditions of Ukrainian economy.

Government is assumed as Stackelberg leader in the sense that it sets tariff first of all the players. Then firm, facing this amount of tariff, make production decisions such that profits are maximized.

While estimating optimal amount of tariff, government strives to maximize overall welfare of the groups, influenced by protection:

?? consumers of imported and domestically produced goods;

?? state budget;

?? shareholders, who obtain industry profits.

Equal weights are given to welfare of each group in the additive welfare function, as it is assumed that government values them equally.

Hence, tariff amount will be estimated, according to following maximization problem:

$$\max_t \text{Welfare} = \text{Consumer Surplus} + \text{Budget Earnings} + \text{Industry Profits}$$

Firm, accepting decisions of other players (other firms of the industry and government) as given, maximizes its profits:

$$\max_{q_i} \pi_i(q_i, Q) = P(Q)q_i - cq_i, \text{ where } q_i \text{ is } i\text{-th firm output, } Q = \sum_{i=1}^n q_i,$$

c - average costs, n - number of firms in the industry.

Hence, price will be set such that marginal revenue equals marginal cost:

$c = p(1 + \frac{1}{n \epsilon})$ , where  $\epsilon$  - is elasticity of demand, facing by firm.

## 7. DATA DESCRIPTION.

1996 with 32% average custom payments for imported automobile is taken as a base year for further analysis. Though Law “On Promotion of Automobile Production” has come into force in 1997, joint-venture has actually begun its production in 1998. Until that year, it has been binded by lacking capital constraint and large arrears. Capital inflows in the form of foreign direct investment, have lead to 3 times increase in production in 1998, as compared to 1996 (Appendix 1). But this increase has been accompanied by 84% decrease in quantity of imported automobiles.

With capital inflows average product of labour per automobile ( $\frac{\#employed * av.wage}{quantity\_produced}$ ) has been reduced drastically - from \$482 in 1986 and \$1616 in 1997 to \$146 in 1998. Actually, it can be even less, but Investment plan prohibits decrease in quantity of workers at the plant. But in real terms workers' earnings (# of employed\* average wage, adjusted for inflation) have increased by 10 %.

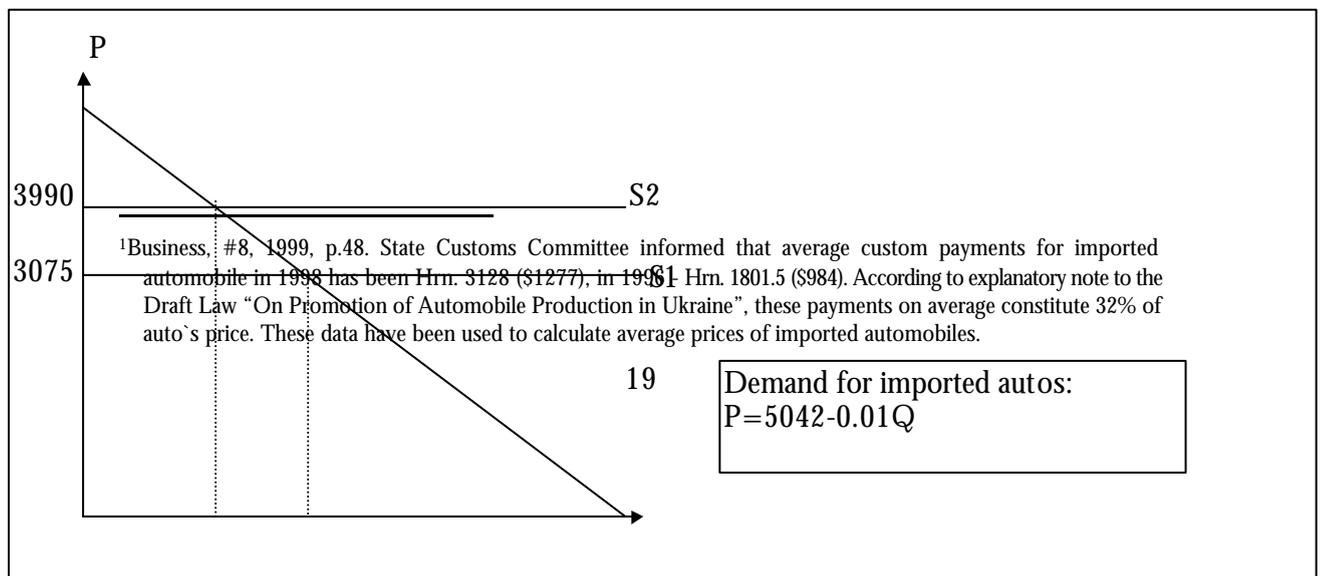
## 8.PARAMETERS ESTIMATION.

### Demand for imported automobiles.

As data are insufficient to provide econometric analysis, I have assumed linear demand specification. As it has been shown in Tarr`s (1990, 1994), research, this simplification still allows an analysis of protection measures.

The methodology, used in the paper, implies averaging, to take into account the protection influence on national automobile fleet in general.

Hence, non-tariff protection measures, such as age import limitation and minimum custom value, mean that those, who preferred automobiles older, than 5 years old, which are now prohibited to import, will partially shift to others, more expensive models, while still obtaining the same marginal benefit, signified by the demand curve. Minimum custom value \$5000 also implies that some consumers will deny automobile purchase at all, and others will buy more expensive models. In general, these protection measures can be shown by shift in the supply curve. Basing on data of State Customs Committee<sup>1</sup>, it is obtained the following graph:



105200 194000

where S - supply curve with 0 tariff, S1 - represents supply in 1996, and S2 - in 1998.

Domestic cost functions.

Estimation of cost function of the enterprise was based on insufficient data obtained.

As a proxy for marginal cost for AvtoZAZ-Daewoo models I have taken plant`s transfer prices for Russian VAZ automobiles (<http://www.vaz.ru/vaz/cena.html>). The reason for this has been the point, stressed in press, that the main competitor for DAEWOO models have been Russian VAZ`es with analogous models. (*Business*, 4, 1999, p.55)

Average transfer price for VAZ models, with 1500 cubic cm. engine volume (analogous to DAEWOO`s *Lanos*) is about \$4000. That is 50% of *Lanos`* retail prices in Ukraine. As average weighted price for models, AvtoZAZ - Daewoo offers, is \$6505 (see Appendix 2), marginal cost of production will be assumed to be 50% of it, i.e. \$3252.5.

As for the fixed cost, AvtoZAZ-Daewoo investment project, accepted before privileges were granted to the joint - venture, estimated plant`s property (buildings and equipment) as \$150 million worth. According to the Ukrainian legislation, depreciation on buildings is 5% yearly, and on equipment -

25%. If take average, \$22,500,000 per year must be spent to replace worn out equipment, and may be assumed as fixed cost<sup>1</sup>.

General form of the total cost function is:  $TC = FC + MC * Q$ , where

TC - total cost;

MC - marginal cost,

Q - quantity produced.

According to the specification,  $TC = 22,500,000 + 3252.5 * Q$ .

Average cost,  $AC = TC / Q = 22,500,000 / Q + 3252.5$ .

#### Demand for domestically produced automobiles.

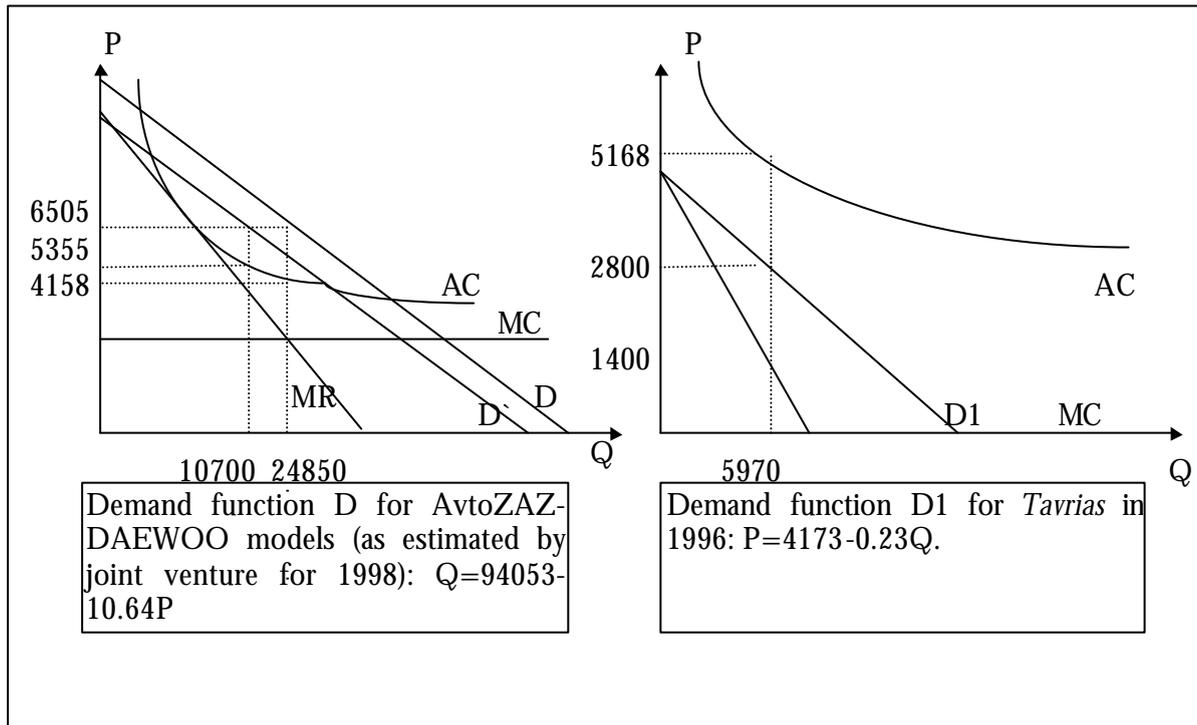
Estimation procedure in this section is based on the notion that firm maximizes its profits, facing the demand curve for its production, after government has already imposed protection measures.

Point, which needs to be stressed on here, is that estimation of the demand curve for AvtoZAZ-Daewoo production has been seriously affected by Russian crisis, which partially contaminated Ukraine and shifted estimated demand curve inwards. Hence, it must be taken into account that plant planned to maximize its profits, while expecting that demand for AvtoZAZ-DAEWOO models will be more

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<sup>1</sup> As sunk costs are excluded from the analysis, i.e. it is assumed that enterprise is able to sell all of its assets, the quantity of fixed cost, defined in the paper, may be overestimated.

than twice as high, than it has really occurred. In other words, parameters estimation must be based on the quantity produced, not consumed (See Appendix 3).



Crisis decreased purchasing power of Ukrainian and Russian consumers (the latter ones were going to purchase 50% of plant`s production, according to Investment program). Shift of the demand curve from D to D` ( $P=7896-0.13Q$ ) has lead to 10700 automobiles sold, which is 40% of what it has produced. Further calculations will be based on existing demand curve for AvtoZAZ-DAEWOO automobiles, ignoring overproduction, expecting that plant will adjust its production to existing demand.

Existing situation is compared to the 1996, making the same assumptions about marginal and fixed cost, but taking into account that only *Tavrias* were produced that year.

Smaller intercept in 1996, compared to 1998 one, may be explained by less models produced, and larger elasticity - by less strict protection measures, which means that domestically produced models may be substituted by imported ones more easily.

## 9. RESULTS.

Table 1 represents obtained results. Columns 2 and 3 show consequences of regulation, imposed in 1996 and 1998 respectively. Column 4 gives the result of the hypothetical case of complete import prohibition, which would actually occur at the existing demand curve, if tariffs were increased by 30% more, as has been proposed in the Draft Law “On Promotion of Automobile Production in Ukraine”.

Hypothesis about efficient regulation must be rejected, as regulation measures of 1998 reduced overall welfare by 43%, and, hence, have lead society to the less efficient outcome. Hypothetical example shows that legislators had an intention to drive inefficiency even further.

Protection has lead mainly to the redistribution from consumers to producers. But, as little demand for domestically produced automobiles shows, many consumers, facing impossibility to import the model of the preferred price range, found it reasonable to give up the purchase at all, or to go around the existing legislation, by the means of temporary import. The latter has not been touched by regulation measures of 1998, and considerably increased in quantity, compared to previous years. This fact signifies that the form of regulation, imposed in 1998 had also its social consequences, not taken into account by the analysis, presented below. The reason is that privately it makes sense to spend resources to take the car out the country every year, and then bring it back, as conditions for temporary import require. But socially it means loss of resources.

Table 1.

Influence of protection of automobile production on market participants.

1	2	3	4
	1996	1998	Hypothetical
Consumer Surplus	194,807,810	62,777,050	24,111,594
including:			
Consumers of Imported Autos	190,790,000	55,335,200	0
Consumers of Domestic Autos	4,017,810	7,441,850	24,111,594
Industry Profits	-14136960	12305000	40,143,232
Budget Earnings	190,896,000	134,340,400	0
Value of Welfare function	371,566,850	209,422,450	64,254,826

According to calculations, value of welfare function becomes equal to the one in 1996, if enterprise manages to shift the demand curve for its automobiles to above \$35000 at a given average price; and if this shift occurs due to export (i.e. surplus of domestic consumers of imported cars stays the same, as in 1998).

## 10. POLITICAL ECONOMY ISSUES.

As hypothesis that regulation measures, used in automobile market, were aimed to improve overall welfare, is rejected, political economy issues arise especially sharply.

According to Carlton and Perloff (1994), protection is more likely to occur:

?? in concentrated industries because it is easier for them to organize lobbying the government;

?? in industries, where consumers of produced good are many and small, such that it is costly to organize counter - lobbying.

Both these features can be found in Ukrainian automobile production. Ministry of Industrial Policy of Ukraine lobbied law “On Promotion of Automobile Production”. Protection measures, mentioned in the draft law, can be divided into two parts:

?? Import restriction of used cars. Its target was to make lower-income consumers used imported autos on new domestically produced ones. This point of the draft law has been adopted in the form of import prohibition of automobiles, older than 5 years; and imposition of \$5000 minimum custom price.

?? Import restriction of new autos. Was aimed to make new imported cars more expensive by the means of tariff, such that to make consumers redirect their preferences to domestically produced cars of the same class.

The latter part of law has not been adopted, as strong counterlobby of firms, engaged in import of new automobiles, has arisen.

The consequence of this political bargaining is, actually, tariff burden, imposed on lower-income consumers. The point is contrary to what is argued by development economics (Todaro, 1996, p. 626). The latter states that equity principles, which are especially important in development period, demand more heavy tax on goods for rich.

## 11. CONCLUSIONS.

Though specification errors are possible, in this work I did not expect to estimate absolute value of deadweight losses, incurred by society due to regulation. The main purpose has been to make ordinal rather than cardinal comparison of the possible ways out the critical situation, faced by the national automobile industry, and find the most efficient one.

Three scenarios of the issue development are possible:

1. Government gives further protection. This strategy, though not optimal, according to the analysis, provided above, but practically possible, if lobbying of the joint - venture `s interests will be continued.
2. 1998 restrictions (minimum custom price and import prohibition of autos, which have been exploited for more than 5 years) are canceled. As it has been proved, it is the most efficient outcome. But there is a little possibility, that it will be reached. The reason is that the main motive, used by the government to justify this kind of regulation has been dealing with ecological problems (harmful emissions of agedly automobiles) through increase in quality of the Ukrainian automobile fleet. A good alternative to the most efficient outcome may be the following:
3. Protection measures are left at the existing level. This second - best outcome, though difficult to implement, may be equalized in efficiency with the leading one, if the requirements of the Investment plan on selling the automobiles, are fulfilled (for the first

year it implied production of 40,000 of Tavrias and 30,000 of autos made of imported parts). The quantity produced must be above 35,000, for the value of welfare function to become equal to the one in the most efficient outcome. In other words, joint - venture should direct resources to shift the demand for its production outwards. This may occur through exploration of the CIS, especially Russian markets for export; creation of distributional and service networks, or through elaborated advertising campaign, which can change consumers` skeptical attitude to the domestically produced automobile.

4. APPENDIX 1.

Automobile Market in Ukraine.

	1996	1997	1998
Production, including:	6940	1973	25423
AvtoZAZ-Daewoo*** production	5970	876	24850 (14150 unsold)
Import	194000*	185900*	105200*
Number of Employed	75383	64039	60463
Average Wage** (\$) )	44.4	49.8	61.7

Source: State Statistics Committee of Ukraine.

\*Source: State Tariff Committee.

\*\*Basing on average yearly NBU exchange rate

\*\*\*ZAZ until 1997.

APPENDIX 2.

Average weighted price for AvtoZAZ - Daewoo models:

1998:

Model	Quantity consumed	Price, \$
Tavria	5186	3000
Lanos	2662	8200
Nubira	2456	10700
Leganza	396	15000
Total	10700	
Average weighted price		6505

Source: Business,4, 1999, p.55.

### APPENDIX 3.

#### Demand estimation for AvtoZAZ-DAEWOO models.

Linear specification is assumed:  $P=a-bQ$ .

Joint - venture maximizes profit in the point, where  $MR=MC$ , i.e.

$$TR=aQ-bQ^2,$$

$$MR=a-2bQ=MC.$$

If take into account that in 1998 plant produced 24850 automobiles at average price \$6505, we obtain system of two equations:

$$a-49700b=3252.5$$

$$6505=a-24850Q.$$

Hence, firm expected demand curve to be:  $P=9713.5-0.13Q$ . But crisis has shifted it inwards, such that 10700 autos have been sold at a given price. Actually, firm works at the demand curve with lower intercept:  $P=7896-0.13Q$ .

Analogously, for 1996:

$$a-11940b=1400$$

$$2800=a-5970b$$

$$P=4146-0.23Q$$

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