

PRICE REGULATION AND SUBSIDIZING AT THE REGIONAL LEVEL IN RUSSIA*

Preliminary and Incomplete

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Abstract

Regional leaders were inclined to interference in the regulation of regional economy and to protection of local producers almost everywhere in Russia. Among the political tools, which the regional policy-makers have at their disposal, the intensity of local market price control and subsidies to producers differs essentially.

The paper addresses the problem of subsidizing, price regulation at the sub-federal level in Russia, and barriers erected by the regional administrations for interregional flow of goods. The study relies on a political economy approach. The paper suggests a simple partial equilibrium model of regional protection, a system of empirical hypotheses, and preliminary estimations.

Introduction

Literature on the economics of transition regards the price liberalization as a key element of transition, because it is a necessary condition for the introduction of the market mechanism and for the improvement in the allocation of resources. These studies deal with important efficiency dimension to price liberalization (Lipton and Sachs (1990), Boyko (1992), McKinnon (1991)). However, there is also an important redistributive dimension to price liberalization, and this consideration is a political economics' argument (Drazen (2000), Persson and Tabellini (2002)). What legislators should put in place depends on the political acceptability of the reforms. Roland (2000) writes that the political constraints affect the speed and design of reforms.

There are two aspects of the redistribution that price reforms cause: between individuals and between regions. Individual heterogeneity with differences in income is a fact of life. Sah (1987) compares alternative allocation systems. It is shown that poor people prefer rationing to nonintervention of government, but the rich are better off under nonintervention than under other systems. The political acceptability of price reform may depend on the income structure of constituency. The between regions distributive dimension to price reform is a topic of political economy of international trade policy (Krugman and Obstfeld (1994), Caves, Frankel and Ronald (1996)) where one of the discussions is focused on national welfare arguments for and against protectionism. Applying the results to transitional economy Kruegel and Ciolko (1998) demonstrate that the hypothesis of the endogeneity of price liberalization variable can not be rejected. The worse the initial conditions for transformation, the greater the probability of the deep transformation recession is, and hence there are more likely delays in liberalization. When initial conditions are favorable, rapid liberalization is feasible and preferable. Castanheira and Popov (1999) also suggest that the speed and extend of price liberalization may be endogenous, liberalization policy may depend on the initial conditions and magnitude of the decline in output as a result of liberalization.

The political constraints are reinforced when the fact that bureaucrats and regulators may benefit from the persistence of price control is taken into account. Shliefer and Vishny (1992) applying a rent-seeking model, show that price control creates shortage rents for state sector and represents opportunities for soliciting bribes. Another explanation of low prices is given by Berkowitz (1996). The theory developed in this paper assumes that local politicians are motivated to serve constituents rather than to collect bribes. The model predicts that local government would choose a market clearing price when, firstly, private sector is monopolized, and, secondly, the share of nonresidential consumption within a jurisdiction is high.

So the political constraints may make a gradual price reform preferable despite its efficiency costs (Dewatripont and Roland (1992 a, b) Roland (2000)). Milder reforms are the only way to speed up the process and enhance political acceptability. Bertocchi G. and M. Spagat (1997) give another explanation for gradualism and reversion in the price reforms, applying learning model they show that instability, which economies in transition are faced, dampens learning effect and make policy more gradual.

The economic distortions resulting from partial price liberalization are discussed in Murphy, Shleifer and Vishny (1992). The partial price reforms encourage diversion of inputs away from the regulated sector towards enterprises that are less constrained by arbitrarily regulated prices. When only a few regions impose maximum prices, they hurt themselves as well as the producers, and benefit enormously the regions that have not restrained prices which simply free ride on them.

Summarizing literature on price liberalization Castanheira and Popov (1999) write that there is no theoretical evidence that a big bang approach is associated with less cost than the gradual one and there is no persuasive empirical evidence that fast liberalization performed better than slow one. Liberalization should and would lead to better performance in the longer run.

Features of local policy depend also on the attitudes towards the governments. Paper by Edwards and Keen (1996) synthesizes the two extremes: the view of government as a Leviathan and the view of government as a benevolent maximiser of their citizens' welfare. The policy-makers have quasi-concave preferences defined over some item of public expenditures which, while financed from general revenues, benefits only the policy-maker, and the welfare of their representative citizen.

Polishchuk (2000) shows that under certain assumptions a revenue-maximizing Leviathan-type government might offer better conditions for economic growth than a benevolent, which is concerned about economic well-being of its constituency at large.

Stylized facts and estimations for Russia

1. Documents adopted at sub-federal level in Russia regulate prices and tariffs on a wide range of regional state and private production (Appendix 1).

2. Tools of the regional regulation includes as direct (price ceiling, making-up price, limitations on profitability, limitations on trade extra charge, declaration about change in price) as indirect methods (tax exemptions, credits, subsidies, budget compensations) and differ essentially among the regions. (Appendixes 2, 3).

The TACIS report ranks regions by price control in October 1995. The survey is conducted in capital cities. The ranking differentiates between types of price controls: from subsidies and limitations on the profitability and price mark-ups to rationing and issuance of coupons. The ranking is based on seventy-three food goods surveyed by Goskomstat. Tallying up points for different categories of price controls, regions are rated from most liberal (1) to most regulated (1/47).

3. Growth of private wholesale trade and «porosity» of the interregional borders have undermined attempts of some regional administrations to implement an autarchy policy in food supplying. For instance, in 1995-1996 the famous "Ylyanovskaya" system of control over price and supply of food failed and was discontinued (Хенсон (2001)). However the sub-federal documents erect barriers and limitations on interregional flow of goods and services by introduction of recurring certification, marking and "identification", by direct prohibition of export from and import in the region (Верховенство Конституции РФ и ... (2000)).

4. Price differentiation among the regions is very high in Russia. In 1998 variation of regional living earnings was 30,9%, in 1997 the variation of indexes of consumer prices was 10%, indexes of electric power price – 18%, values of consumer basket – 47% and its share in population's money income – 50%. The dynamics of these indicators are presented in table 9 Appendix 3.

5. There are not only high thresholds for interregional trade, which are surprising for neighboring regions, because transport costs do not explain them. There are also observed diverged time series of price levels in the regions. (Глущенко (2001))

6. A "culprit" of the weak market integrity of Russia is a behavior of a group of regional economies, which lag behind in price liberalization and preserve subsidizing to domestic producers. The economic indicators in these regions are worse in comparison with similar jurisdictions. (Берковиц, Дейонг (2000), the analysis is based on the approach by Engel and Rogers (1996)).

7. Almost all regional policy-makers in Russia base micro-management at their jurisdictions (not always unselfish) on protection of domestic enterprises and on resistance to expansion of the external ones (Хенсон (2001)). As federal budget subsidies decreased as regional authorities join more actively in supporting enterprises (table 1, 2, Appendix 3). However, the level of subsidizing differs essentially among the regions (table 3, Appendix 3).

8. The main source of hidden subsidies to enterprises is as follows: power subsidies in the form of overdue payments and of barter with artificially high prices; non-payments in budget and non-budget funds, state purchase paid by barter or by tax exemptions (Доклад Всемирного банка (2000), Коломак (2001), tables 1, 2, 5, Appendix 3).

9. An important feature of the debts and barter is that they provide the ground for the regional and local executive authorities to control the enterprises and level of their profitability. In exchange for the cooperation the policy-makers soften budget constraints of the enterprises and protect against external competition. More over barter became profitable business for mediators, including bureaucrats of the executive bodies. It resulted in a wide spread of scheme for extracting of benefits, of collusion and corruption. The extraction of political rent became a reason for the highest regional decision-makers to protect the enterprises (Доклад Всемирного банка (2000)).

10. However, the existence of tight local budgets does not explain why many regions allocate scarce financial resources to subsidize basic consumption goods (Berkowitz (1996)). Inter-budgetary relation is a factor provoking barter and subsidies. The level of transfers from upper level budget to lower level budget depends on actual expenditures of previous year. This makes regional bureaucrats interested in exaggeration of expenses, in order to have a possibility to obtain more transfers next year, or to provide a higher share of taxes distributed between different budgetary levels. Barter payments is an easy way of reaching this aim. At the federal level such practice was stopped in 1999-year budget (Доклад Всемирного банка (2000)).

The empirical estimations have shown positive and statistically significant correlation between subsidies granted to industrial, agricultural and constructing enterprises and VAT transfers (table 7, Appendix 3), between tax exemptions to branches of industry and transfers (table 8, Appendix 3) and between subsidies and level of price regulation (table 6, Appendix 3).

11. A characteristic of the regional budgets is high level of overdue for salary and transfers to population (more 40%), the next item is overdue to infrastructure monopolies, supplying public utilities (28%). Hence, the biggest part of burden, resulted from hidden subsidies to enterprises is imposed on population, what contradicts to thesis that subsidizing and help to enterprises are explained by social imperatives of the regional authorities (Доклад Всемирного банка (2000)).

A model

We assume that one of the most important aims of the price regulation is protection of local producers. We consider a local market and the problem is limited to partial equilibrium analysis. The local demand curve is $D_{local}(p)$ and the inverse market demand curve is given by $P_{d,local}(q)$. The supply curve of local producers is $S_{local}(p)$ and is given by marginal costs $P_{s,local}(q)=MC(q)$. If there is no interregional and/or international trade the equilibrium is determined by the condition $P_{s,local}(q) = P_{d,local}(q)$, P denotes the equilibrium price.

Let the outside producer's supply curve is $P_{s,outside}(q)$ and suppose that in the absence of trade the equilibrium price is higher than in the situation of interregional trade. Assume also when there is no price dispersion all consumers prefer domestic goods.

The equilibrium price in case of trade is determined by equation $P_{s,outside}(q) = P_d(q)$, let it be P^* and $P^* < P$. So the demand for local goods is $S_{local}(P^*)$ and the demand for import goods is equal to $S_{outside}(P^*) - S_{local}(P^*)$.

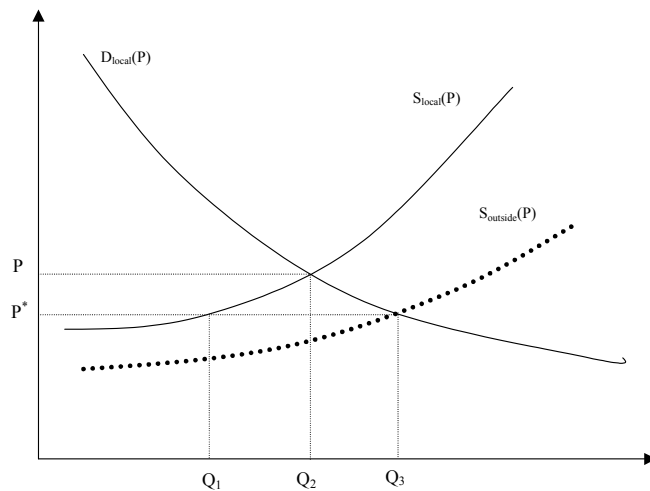
Figure 1 illustrates the distribution of the market between local producers and outside producers. Local producer's share is Q_1 , the outside producers sell at the market $Q_3 - Q_1$.

The local government possesses instruments to protect local producers. Among these tools are price ceiling, subsidizing of local production, restrictions on export and import. The government's problem is to design policy, which is efficient (maximizes its utility function) and acceptable.

The government's utility function depends on attitudes towards government. There are two extreme types of government presented in the literature as stark alternatives: benevolent and Leviathan. When the government is a benevolent, it is a maximizer of their citizens' welfare - consumer's surplus (CS) and producer's surplus (PS): $CS+PS$. To show a different attention to the consumers and to the producers the utility function is defined as $W=CS+\alpha PS$, where $0 < \alpha < \infty$. A Leviathan – government maximizes some item of public expenditures, while

financing from general revenues, benefits only the policy-makers (GR). A more general assumption is that policy-makers are neither wholly benevolent nor wholly self-serving, an obvious encompassing is that the policy-makers maximize a weighted average $U = \theta W + (1 - \theta)GR$ with $\theta \in [0, 1]$.

Figure 1



The acceptability includes two aspects: financial and political. The financial acceptability means satisfying the budget constrain, local government expenditures should be less than receipts. The receipts are in the form of taxation of the domestic aggregate income (T), $T = t * Y$. Assume three expenditure items: price subsidies to local producers (S), public goods (PG) and government's revenues (GR). $S = s * Y$, s is subsidies per unit.

$$S + PG + GR \leq \beta T$$

Where β reflects the local government ability to 'soften' local budget, it can be done through transferring expenses of local policy to another budgets or by obtaining additional resources from another budgets.

The political acceptability signifies that the government's reform has got a constituency support and therefore can be implemented. The indicator function $\mu(\omega)$ awards 1 when the condition of the acceptability is fulfilled and 0 when it is not.

$$\mu(\omega) = \begin{cases} 1 & \text{if } \omega \geq 0 \\ 0 & \text{if } \omega < 0 \end{cases}$$

Function ω measures the difference between the share of population supporting the reform and do not willing to vote for the reform. Assume that the population makes the decision based on not only economic criteria but on the political one too. The 'economic' component refers to utility function and includes consumer surplus of privately produced goods (CS), public goods (PG) and income structure (a share of rich people - R). The political component of the decision measures 'antipathy' to the government (A). Index 0 indicates the state before and index 1 indicates the state after the government's interference.

$$\omega = [v(CS^1, PG^1, R, A) - v(CS^0, PG^0)]$$

Assume $v'_{cs} > 0$, $v'_{pg} > 0$, $v'_r < 0$, $v'_a < 0$.

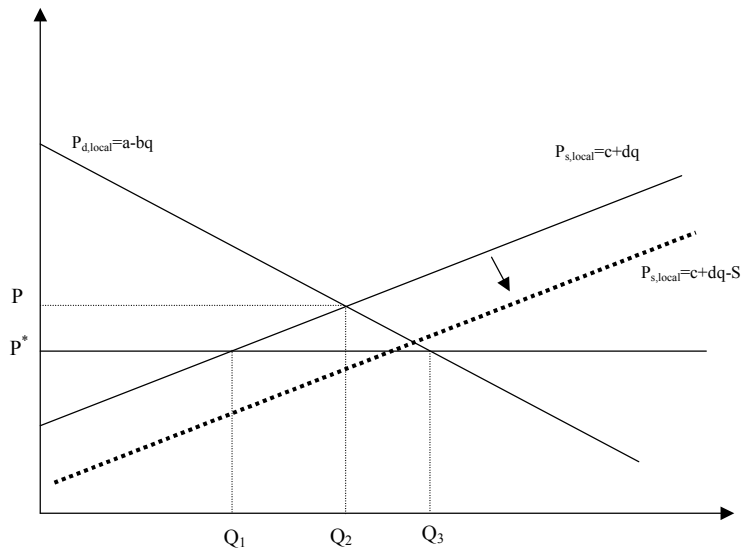
The political constrain modifies the government's utility function:

$$U = \omega[\theta W + (1 - \theta)GR].$$

A special case

Consider a region where population has great sympathy for the local government. In terms of the model it means that the political constrain is not binding ($\omega = 1$).

Figure 2



The local demand curve, $D_{local}(p)$, is linear and the inverse market demand curve is $P_{d,local}(q)=a-bq$. The supply curve of local producers, $S_{local}(p)$, is also linear $P_{s,local}(q)=c+dq$. P is equilibrium price. The outside producer's supply curve is perfectly elastic $P_{s,outside}(q)=P^*$ and $P^*<P$. Let protection decisions be restricted in subsidizing. The government's problem is to optimize level of subsidies (Figure 2).

If the government is a benevolent the maximization task is $U=CS+\alpha PS$, the budget constrain is $s*Y<\beta tY$. The optimal level of subsidies is $s=\beta t$ (whole regional budget), and the regional product is $Y=1/d(p^*-c+\beta t)\beta t$.

If the government is Leviathan the task is to maximize $U=\phi tY$, subject to budget constrain $sY+\phi tY<\beta tY$. The solution is

$$s = \beta t + \left(-\frac{\beta t}{2} + \frac{c - p^*}{2} \left(1 - \frac{t}{t + \phi} \right) + \frac{-2t^2 (1 + \phi) \phi}{2(t + \phi)} + \frac{-ct(1 + \phi)}{2(t + \phi)} + \frac{\beta t^2 (1 + \phi)}{2(t + \phi)} \right)$$

It is shown (Appendix 4) that $s_{Leviathan} < s_{Benevolent}$. However it means also that $Y_{Leviathan} < Y_{Benevolent}$.

Empirical estimations

A. Hypotheses

Assuming the model is correct the empirical estimations will support the hypotheses as follows.

Hypothesis 1. Regional subsidizing, granting tax relief and protecting price control are more active in the sectors where interregional or/and international competition is higher. Transport costs could mitigate the competition.

To test the hypothesis the price regulation and tax relief by sectors will be estimated. These figures will be compared with the estimations of the level of monopolization by the sectors in Russia.

Hypothesis 2. Regional protection with subsidies, tax exemptions and price regulation is a feature of regions that have weak competitive positions.

For testing these hypotheses connection between price control, subsidies, regional tax relief and characteristics of initial conditions and efficiency of regional economic development will be estimated.

Hypothesis 3. Subsidies, tax relief and price regulation depends on macroeconomic demand and supply shocks.

Data on regional subsidies and on the number of price regulating documents adopted at the regional level in 1992 – 1998 confirms this hypothesis (Appendix 3, table 4). There was growth of regional activity in price regulation in

1995 and in 1998 and in subsidizing - in 1998. Those years are famous for sharp devaluation of ruble, growth of consumer demand and prices of goods of both import and domestic production.

For testing this hypothesis correlation with other macroeconomic and local shocks will be estimated (energy and transport tariffs, world market and internal political solutions).

Hypothesis 4. Regions demonstrating active subsidizing, tax exemptions and price control have larger share of transfers from federal center and higher level of non-payments in their budgets.

To test the hypothesis the dependence of level of transfers received by region and of budget non-payments on price regulation will be estimated. The preliminary estimations have shown positive significant correlation between subsidies and transfers from the federal budget (Appendix 3, table 7).

Hypothesis 5. Regional protection through subsidies, tax exemption and price control stimulates local production in the short-run, however it is harmful for regional efficiency and rates of economic development in the long - run.

Hypothesis 6. Regional restrictions on import increase local prices and slow down trade activity and economic development in the regions in future.

To test two latter hypotheses indexes of regional economic development in different years will be regressed on activity of the regional price control.

Hypothesis 7. Assuming the regional authorities are unfriendly to the market (with very few exceptions) the regional regulation is more active where the government has got a wider constituency support.

To test the hypothesis activity of the regional regulation will be compared with the share of votes in favor of the governor came to power in the last election.

Hypothesis 8. The concentrated producer's interests means higher lobbying power to influence the government and to persuade it of the protection.

To test this hypothesis the correlation of the regional regulation and level of the regional specialization will be estimated.

The hypotheses of the empirical analysis will be developed in the course of the development of the theoretical model.

B. Methods of estimation

The observations have the panel structure and include characteristics of the regions (about 89) over time period (1992 – 2000), let $i=1, \dots, N$ is index for region, and $t=1, \dots, T$ is index for time. The system of the hypotheses shapes a system of the regression equations.

$$\begin{pmatrix} Subsidies_{it} \\ Price_control_{it} \\ Tax_exemptions_{it} \end{pmatrix} = f(Share_of_competing_sectors_{it-1}, Initial_conditions_{it-1},$$

$$Dummies_for_shocks_{it}, Transfers_{it-1}, Specialization_level_{it-1}, Constituency_support_i)$$

$$+ \mu_i + v_{it}$$

$$Indexes_of_economic_development_{it} = f(Subsidies_{it-1}, Price_control_{it-1}, Transfers_{it-1},$$

$$Restrictions_on_import_{it}, Initial_conditions_{it-1}, Indexes_of_economic_development_{it-1},$$

$$\sum_{s=0}^{t-2} Subsidies_{is}, \sum_{s=0}^{t-2} Price_control_{is}, \sum_{s=0}^{t-2} Tax_exemptions_{is}) + \mu_i + v_{it}$$

The suggested estimators for such kinds of systems are EC2SLS (error component two - stage least squares) and GMM (generalized method of moments) methods (Baltagi, 2001; Hsiao, 1986).

C. Information

Testing of the formulated hypotheses assumes data on price regulation at the regional level in Russia, on subsidies, on tax exemptions, on structure of regional economies, dynamics of their economic development and efficiency of production, on budgets of regions and their structure and the electoral statistics by regions.

The documents adopted at regional level since 1992 are collected in the legislative database "Consultant. Plus: Regional Legislation". Materials on detailed structure of regional budget incomes and expenditures (including subsidies) for 1996 - 2000 are available in Ministry of Finance of the Russian Federation. The characteristics of regional economic development, including dynamics, efficiency and structure are presented in statistical yearbook "Regions of Russia ". Data on the results of governors' election are presented on the web-site of the Central Election Commission.

D. Results

The preliminary empirical estimations are presented in the table below. Sign (+) means positive significant dependence, sign (-) means negative significant dependence, blank cell mean absence of a significant dependence.

	Subsidies	Price control	Tax exemptions	GRP per capita	Industrial output per capita
Share of competing sector					
GRP (t-1)	-	-	+	+	+
Dummy for shocks		+			
Transfers	+		+		
Specialization level					
Constituency support					
Subsidies				-	-
Price control				-	-
Transfers				-	-
Share of successful industries				+	+
Sum of subsidies				-	-
Summarized level of price control				-	-
Summarized of tax exemptions					

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Appendix 1.**Goods and services subject to price regulation at regional level in Russia**

Housing

Land

Monopolized sectors: oil processing, metallurgy, engineering, chemical, petrochemical, wood-processing industry, pulp and paper, textile, food, extracting, timber, non-ferrous metallurgy, construction materials

Agriculture products

Public transport

Construction

Electric power

Heating

Medical services

Service of municipal firms and organizations

Educational services

Architecture and city designing

Social services

Culture service

Gas natural and liquefied, solid fuel

Glass

Grain, alcohol, sugar, salt, oil, flour, potatoes, children's meal, meat, sausage, eggs, matches, bread, milk and dairy production, pasta, butter, fish, canned food, dry milk, tea, vegetables, synthetic detergents, soap.

Water-supply and sewage

Source: Legislative data base «Consultant Plus. Regional Legislation»,

Appendix 2.**Number of documents on price control adopted in regions of Russia**

	1992	1993	1994	1995	1996	1997	1998
Republic Adigeia			1	0	1	1	4
Republic Altai							14
Altaiskei krai			4	19	48	9	32
Amurskaya oblast			25	2	1	6	16
Arkhangelskaya oblast					3	2	22
Astrakhanskaya oblast				18	3	2	2
Republic Bashkortostan			2	35	4	1	3
Belgorodskaya oblast	4	15	23	35	9	6	24
Bryanskaya oblast					1		1
Republic Buryatiya					17	15	7
Vladimirskaya oblast	11	1	1	18		1	21
Volgogradskaya oblast				2	1		
Vologodskaya oblast	1	5	2	2	5	8	11
Voronezhskaya oblast		34	15	20	8	8	17
Republic Dagestan							3
Ivanovskaya oblast	6	2	2	2	19	2	17
Irkuskaya oblast				16	2	1	6
Kabardino – Balkarskaya Republic			1				15
Kaliningradskaya oblast		1	2	4	1	1	26
Republic Kalmikiya							12
Kaluzhskaya oblast			2	22	3	1	1
Relublic Kareliya						3	1
Kemerovskaya oblast		2		3	4	2	17
Kirovskaya oblast	16			16	1	11	19
Republic Komi	10	1	2	4	9	10	23
Kostromskaya oblast				1	2	2	1
Krasnodarskei krai		5	7	22	5	6	28
Krasnoyarskei krai			2	18	4	15	21
Kurganskaia oblast					17	4	31
Kurskaya oblast			1	1	4	15	19
Lipetskaya oblast				5	6	14	27
Republic Marei –El				40	6	1	1
Moscow	7	24	7	37		5	23

Moskovskaya oblast	25		1	25			
Republic Mordiviya	1	6	8	2	35	3	29
Murmanskaya oblast	3	7	13	5	3	19	1
Nenetskei AO						1	17
Nizhegorodskaya oblast	26	26	24	27	3	4	2
Novgorodskaya oblast			4				
Novosibirskaya oblast		2	9	22	8	16	26
Omskaya oblast			3	2	18	2	19
Orenburgskaya oblast					11		18
Orlovskaya oblast	11		1				
Penzenskaya oblast		1	21	22	6	1	20
Permskaya oblast				16		2	8
Primorskei krai		1	4	8	11	21	30
Pskovskaya oblast				2	7		6
Rostovskaya oblast	24	22	1	16	4	16	26
Pyazanskaya oblast		15	11	2	4		26
Samarskaya oblast	8		1	1	3	5	
Saratovskaya oblast						1	11
Republik Sakha (Yakutiya)							29
Sakhalinskaya oblast		17	1	17	12	5	31
Sankt – Petersburg and Leningradskaya oblast	33	1	3	5	2	3	13
Sverdlovskaya oblast	33	24	12	7	35	3	19
Smolenskaya oblast		6	8	1	2	3	25
Stavropolskei krai		1	1	1	6	4	4
Tambovskaya oblast			0	2	4	29	17
Republic Tatarstan	1	2	12	26	7	5	10
Tverskaya oblast				4		2	22
Tomskaya oblast		2	7	12	2	4	14
Tulskaya oblast			1	26	5	2	3
Tumenskaya oblast				3	2	1	15
Republic Udmurtiya	7	11	1	20	0	2	35
Ulianovskaya oblast	1		6	29	1		39
Khabarovskei krai		23	17	6	40	13	20
Republic Khakasiya				15		2	8
Khanti-Manseiskei AO				3	17	23	38
Chelyabinskaya oblast	21	18	12	15	16	7	6
Chitinskaya oblast					1	1	
Republic Chuvashskaya	4	2	1		1	4	11
Yaroslavskaya oblast	6	1	5	8	7	8	7

Source: Legislative data base «Consultant Plus. Regional Legislation»,

Appendix 3. Descriptive statistics and preliminary estimations

Table 1

Subsidies to enterprises from federal and regional budgets, percent of GNP

	1992	1993	1994	1995	1996	1997	1998
Subsidies from federal budget	5,8	2,5	3,1	2,2	1,6	1,8	1,9
Subsidies from the regional budgets	5,3	6,8	7,3	5,2	6,3	6,9	7,2

Source: Russian Statistical Yearbook, 1999

Table 2

Regional subsidies and documents regulating price

	1992	1993	1994	1995	1996	1997	1998	1999
Share of the regional subsidies in the budget expenditures (average level for Russia)	-	-	-	-	18,5	18,3	<u>21,9</u>	18,8
Number of documents adopted at regional level in Russia directed on price regulation, total	312	321	288	<u>692</u>	457	364	<u>1070</u>	-

Source: Legislative data base «Consultant Plus. Regional Legislation», data of Ministry of Finance RF

Table 3.

Summary statistics on the regional subsidies, (share of budget expenditures, percentage)

	Total subsidies				Subsidies to industry, agriculture and construction			
	1996	1997	1998	1999	1996	1997	1998	1999
Minimum	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Maximum	50,0	48,5	44,3	47,5	11,6	14,2	13,7	8,7
Median	18,9	19,0	22,8	19,1	3,9	3,6	3,9	2,8
Average	18,5	18,3	21,9	18,8	4,2	4,1	4,0	3,0
Standard deviation	10,8	9,7	9,3	7,9	3,1	3,2	2,6	2,0

Source: data of Ministry of Finance RF

Table 4

Branch structure of the regional subsidies, percentage

	1996	1997	1998	1999
Industry, construction and power engineering	8,4	2,9	4,8	3,4
Agriculture and fishing	10,9	12,8	9,9	10,0
Protection of environment	0,7	0,3	0,6	0,9
Transport, road construction, communication	15,9	12,6	15,3	14,1
Market infrastructure	0,1	0,3	0,3	0,2
Public utilities	63,2	68,9	69,1	66,4
Others	0,7	2,2	0,0	4,9

Source: data of Ministry of Finance RF

Table 5

Regions granting tax exemptions, percentage

	1992	1993	1994	1995	1996	1997	1998
Tax relief for particular enterprises	1	3	8	17	26	26	28
Tax relief for branches of industry	1	6	14	25	38	40	47
Tax relief for small business	0	1	3	4	11	14	19
Free economic zones	1	1	3	6	7	10	11
Tax relief for investors	1	3	4	11	22	51	79

Source: Legislative data base «Consultant Plus. Regional Legislation»

Table 6

Estimations of the regression of subsidies on price regulation

	Fixed effect model		Random effect model	
	α	P-value	α	P-value
Number of documents adopted at regional level regulating prices and tariffs	0.12	0.028	0.11	0.022

Table 7

Estimations of correlation between subsidies and transfers

	Fixed effect model		Random effect model	
	Coefficient	P-value	Coefficient	P-value
VAT transfers	0.266	0.000	0.217	0.000
«Pure» transfers	-0.200	0.136	-0.223	0.090

Table 8

Estimations of correlation between tax exemptions and transfers

	Fixed effect model		Random effect model	
	Coefficient	P-value	Coefficient	P-value
<i>Tax relief for particular enterprises</i>				
VAT transfers	0.007	0.451	0.013	0.065
«Pure» transfers	-0.004	0.450	0.007	0.057
<i>Tax relief for branches of industry</i>				
VAT transfers	-0.018	0.047	-0.024	0.001
«Pure» transfers	0.013	0.011	0.008	0.040

Table 9

Variation of price indicators in Russia, percentage

	1992	1993	1994	1995	1996	1997
Index of consumer prices	26,1	22,3	8,9	6,7	3,6	10,1
Index of electric-power prices	43,5	33,5	24,8	19,9	19,0	17,8
Value of consumer good basket, consisting of 25 food products	-	33,7	30,2	33,6	35,7	47,3
Share of value of the consumer good basket into money income of population	-	31,8	27,7	44,2	44,1	49,6

Source: Prices in Russia. Statistical Yearbook: Goskomstat of Russia, M.-1998.

Appendix 4

A special case of the model

$P_{d,local}(q)=a-bq$, $P_{s,local}(q)=c+dq$, $P_{s,outside}(q)=P^*$ and $P^*<P$. Protection decisions are restricted in subsidizing. The case is illustrated at Figure 2.

I. A benevolent government

The government's task is to maximize $U=CS+\alpha PS$, subject to budget constrain $s^*Y<\beta tY$.

$$CS = \frac{1}{2}(a-p^*)Q_3 = \frac{1}{2}(a-p^*)\left(\frac{a-p^*}{b}\right) = \frac{(a-p^*)^2}{2b}$$

$$PS = \frac{1}{2}(p^*-c+s)Y = \frac{1}{2}(p^*-c+s)\left(\frac{p^*-c+s}{d}\right) = \frac{(p^*-c+s)^2}{2d}$$

Hence

$$U = \frac{(a-p^*)^2}{2b} + \alpha \frac{(p^*-c+s)^2}{2d} \xrightarrow{s} \max$$

Such that

$$\left(\frac{p^*-c+s}{d}\right)(s-bt) \leq 0$$

The Lagrangian for this problem is

$$L = \frac{(a-p^*)^2}{2b} + \alpha \frac{(p^*-c+s)^2}{2d} + \lambda \frac{p^*-c+s}{d}(s-\beta t)$$

The differentiation with respect to subsidies gives one first-order condition

$$s = \frac{(c-p^*)(\alpha + \lambda) + \beta \lambda t}{\alpha + 2\lambda}$$

If we insert the expression for s into the budget constrain we receive values for the Lagrange multiplier. The calculations gives $\lambda=0$ and $\lambda=-\alpha$.

When $\lambda=0$, $s=(c-p^*)<0$, hence $\lambda=-\alpha$, $s=\beta t$ and $Y=1/d(p^*-c+\beta t)\beta t$.

II. Leviathan government

The government's task is to maximize $U=\varphi tY$, subject to budget constrain $sY+\varphi tY<\beta tY$.

$$Y = \frac{p^*+s-c}{d}$$

The Lagrangian for this problem is

$$L = \frac{t(p^*-c+s)}{2d} + \lambda \frac{p^*-c+s}{d}(s-\beta t-\varphi t)$$

The first-order condition is

$$s = \frac{c-p^*}{2} + \frac{\beta t \lambda - t(I+\varphi)}{2\lambda}$$

There are two expressions for the Lagrange multiplier:

$$\lambda_1 = \frac{t(I+\varphi)}{p^*-c} > 0 \quad \text{and} \quad \lambda_2 = \frac{t+\varphi}{2\varphi t - \beta t + c - p^*}$$

$$\text{Hence, we take } \lambda=\lambda_2, \text{ and } s = \frac{c-p^*}{2} + \frac{\beta t}{2} - \frac{t(I+\varphi)(2\varphi t - \beta t + c - p^*)}{2(t+\varphi)}$$

Compare this value with $s=\beta t$ when the government is a benevolent.

Let reorganize the equation

$$s = \beta t + \left(-\frac{\beta t}{2} + \frac{c-p^*}{2}\left(1 - \frac{t}{t+\varphi}\right) + \frac{-2t^2(I+\varphi)\varphi}{2(t+\varphi)} + \frac{-ct(I+\varphi)}{2(t+\varphi)} + \frac{\beta t^2(I+\varphi)}{2(t+\varphi)}\right)$$

The only positive term in the bracket is the last one. Let prove that the expression in the bracket is negative. The sufficient condition is

$$\frac{\beta t^2(I+\varphi)}{2(t+\varphi)} \leq \frac{\beta t}{2}, \quad t(I+\varphi) \leq I+\varphi \quad \text{it is true because of } t \in [0,1]$$

So, Leviathan government provides less subsidies and, consequently, the local production is also less compare to the case of benevolent government.