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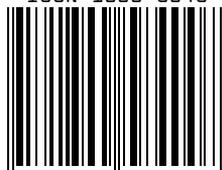
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## OPTIMALITY AND EQUILIBRIUM IN A SINGLE-PRODUCT ECONOMIC MODEL WITH COLLECTIVE GOOD (COMPUTER EXPERIMENTS)

YURIY N. GAVRILETS<sup>1</sup>, and IRINA V. TARAКANOVA<sup>2</sup>

### ABSTRACT

*This paper considers some of the simplest models of the economy with the collective good. Used computer simulations illustrate the relationship between equilibrium and the optimum. We propose a heuristic method for finding the economic equilibrium with the collective goods, which is a variant of the tâtonnement process.*

**KEY WORDS:** computer simulations, collective good, equilibrium, optimum, tâtonnement process.

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### 1. INTRODUCTION

Models of using collective goods initially emerged to describe simple situations where the same goods are consumed simultaneously by different individuals who have different preferences (joint purchase of the TV, smoking in a public place, gatecrasher in public transport, etc.) [2;7]. Generalization of these models to the case of models of economic equilibrium, and others has borne to the present time numerous publications. The situations with several kinds of collective goods have been considered, these goods can include the production function, can be measured by discrete values, can consider the role of the state, etc. etc. [8;3]. Much attention is paid to the analysis of game-theoretic features of models, Pareto optimal equilibrium and the process of equilibrium tâtonnement. [3]. In the context of experimental economics studies the behavior of people living in situations similar to the process of formation on private manner social benefits. [1]

Our work does not deal with complex mathematical structures and abstract schemes. It built and analyzed a simple mathematical economics equilibrium model, in which along with the private consumption of the product produced in the system, is created and consumed the public (collective) product. Important lever of regulation of economic relations is the tax policy of the state, and this effect on the equilibrium should be considered in the economic and mathematical models [4]. The paper discusses several ways of forming the rules of formation of taxes (see also [5]). The main goal - to show with some simple computer models, how an economic system can behave, seeking for equilibrium, and how it deviates from the Pareto-optimal state.

Process of simulation will represent the interaction of the market with a certain Center, with specification certain corrective parameters (taxes, government subsidies, and sometimes part of the collective good, etc.) and fixing total "burden" (defense, balance of exports and imports, etc.). Modeling of this process is based on two ideas. The first is that taxes on the participants can be given not only to fixed shares total planned budget, but under a special rule that (in some cases) provides a "social justice".[6] The second idea is that each participant performing their investment to the collective goods assumes that others will do as they did before. Center behaves similarly, predicting some general characteristics of the market process. This is explained in detail.

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## 2. BASIC MODEL RELATIONS.

Main relation of equilibrium:

$$y - \sum_k x_k - \sum_k F_k - Z \geq a, \quad (1)$$

where  $y = y(l)$  - production volume depending on the amount of labor  $l$ ,  $k$  - numbers of participants

(groups), and consuming the product involved in the production ( $k = 1, 2, \dots, n$ ).

Where:

- $x_k$  - consumption of private goods to  $k$ -th participant,
- $l_k$  - labor costs to  $k$ -th participant,
- $F_k$  - investments in the collective good to  $k$ -th participant,
- $Z$  - government investment in the public good,
- $a_k$  - factor of comparing the usefulness of collective good and usefulness labor consumption,
- $a$  - fixed burden on the economy.

The utility function (concave)  $k$ -th participant

$$u_k = v_k(x_k, l_k) + a_k \cdot \Phi(Z + \sum_k F_k) \quad (2)$$

As can be seen from the formula (2), the usefulness of collective goods for participants is comparable with usefulness labor-consumption, but with different coefficients.

Equilibrium is defined as the set of behavior variables of all participants ( $l_k^*, x_k^*, F_k^*, Z^*$ ), the price  $p^*$ , wages  $q^*$  and tax requirements prescribed by Center  $D_k^*$ , satisfying the four conditions.

### I. Natural Balance:

$$y^* - \sum_k x_k^* - \sum_k F_k^* - Z^* = a,$$

### II. Maximizing profit by producer

$$\Pi^* = p^* \cdot y^* - q^* \cdot \sum_k l_k^* = \max, \quad y=f(l), \quad l \leq \sum l_k.$$

### III. Maximizing utility function by consumer

$$u_k(x_k^*, l_k^*, \sum_k F_k^*) \geq u_k(x_k^*, l_k^*, F_k + \sum_{i \neq k} F_i^*), \quad i \neq k,$$

under the budget constraint

$$p \cdot x_k \leq q^* \cdot l_k - p^* \cdot F_k - D_k^*,$$

### IV value balance (Walras law), $\Pi^*$ - profit:

$$\sum_k D_k^* + \Pi^* - p^* \cdot a = 0.$$

Note that the equilibrium I-IV is a typical point of the corresponding Nash game, as his utility function depends on the choice of the other participants. Further, several variant of models will be discussed.

**Model 1.** Equilibrium, when the Center is not involved in the creation of the collective good ( $Z = 0$ ) by determining only the tax requirements.

**Model 2.** In the constraint (1) and in the argument of the utility function (2)  $F_j = 0$  for all  $j \neq k$ . Taxes to k-th user defined as a fixed percentage of the total budget, and the collective good is formed by the participants in the market and the Centre, so that each participant has a collective good, consisting of his own contribution and the same for all the Centre's contribution.

**Model 3.** Center forms a general tax on the basis of the behavior of market participants in previous time (by value balance). Taxes on the participants in the first and third variant are formed in a manner that ensures compliance with the principle of justice in the form of a utilitarian social welfare function with constant coefficients of comparing interest when there are no social benefits [7, 8]. This method consisted in the fact that the Centre, specifying the proportion of taxation, continuously determines by some standard  $\lambda_k$  the amount of taxes, providing equality

$$\lambda_k \cdot \beta_k(D_k) = \lambda_i \cdot \beta_i(D_i), \text{ for all } j \neq k, \quad (3)$$

where  $D_k, D_i$  - the amount of taxes,  $\beta_k$  - the marginal utility of household income,  $\lambda_k$  - coefficients of utility comparison of public welfare ( $w$ ). This ensures that system enters in equilibrium, maximizing  $w$  (without collective goods).

$$w = \sum_k \lambda_k \cdot u_k(x_k, l_k, F) \quad (3a)$$

with (1) - (5).

### 3. ANALYSIS OF THE MODELS

**Model 1.** Center is not involved in the creation of a collective good. The utility function of participants has the form

$$u_k = v_k(x_k, l_k) + a_k \cdot \Phi\left(\sum_k F_k\right)$$

Value balance and natural one (without Z) - similar to the former. Let us to analyze the situation at the equilibrium point obtained with the fulfillment of the condition (3) in the general case and compares it with the optimal solution. Optimization to k-th user its utility function, at the equilibrium point, leads to the equations:

$$\frac{dv_k}{dx_k} = a_k \cdot \frac{d\Phi}{dF_k} = \beta_k^* \cdot p^* \quad (4)$$

where  $\beta_k^*$  - the marginal utility of income. For any equilibrium can choose coefficients  $\lambda_k$  so that  $\beta_k^* \lambda_k = H = \text{const}$ .

We now show that the solution  $(x_k^*, l_k^*, F_k^*)$  is optimal for  $W$  c coefficients  $\lambda_k$ , only when  $a_k \lambda_k = a_i \lambda_i$  for all  $i, k$ .

Indeed, the optimum point must be satisfied:

$\lambda_k \cdot \frac{dv_k}{dx_k} = p^0$ , - where  $p^0$  - Lagrange multiplier to balance constraints (1) and at the equilibrium

point  $\frac{dv_k}{dx_k} = p^* \cdot \beta_k^* = a_k \cdot \frac{d\Phi}{dF_k}$  for all  $k$ . Since all partial derivatives  $\frac{d\Phi}{dF_k}$  in the optimum point are equal, then the products  $\lambda_k \cdot a_k$  must be constants. Also see that  $p^0 = Hp^*$ .

On the other hand, if in the equilibrium model, all these products  $\lambda_k \cdot a_k$  equal, then (with  $\beta_k^* \lambda_k = \text{const}$ ) multiplying all the coefficients  $\lambda_k$  for some constant, we obtain the equality of derivatives  $\frac{dv_k}{dx_k}$ , that the logarithmic utility functions implies equality of  $x$ -s themselves. Calculations on the model are given in Annex 2.

When modeling entrances of the economy in equilibrium (the process of "groping"), we have assumed that at each step Center trace for fulfillment of equality (3). This procedure in the absence of collective good results in an equilibrium that maximize social welfare  $W$  by these coefficients  $\lambda_k$  and at the same balance constraint. We are finding the optimal solution when determining the value of all the undivided public good  $F$  (see Table 1.2). For the problem

$$y - x - F = a, \quad W = \max, \quad (7)$$

we write the Lagrange conditions when in balance (1), and in the utility functions of centralized investments  $Z$  is absent, and the letter  $F$  denotes undivided amount of private investment in the collective good (we assume that the functions  $v(x, l)$  and  $\Phi(F)$  - logarithmic).

$$(A1 \cdot l1^{\alpha1} + A2 \cdot l2^{\alpha2} - a) \cdot p = \lambda1 \cdot (1 + a1) + \lambda2 \cdot (1 + a2),$$

$$\frac{-\lambda1 \cdot b1}{T1 - l1} + p \cdot A1 \cdot \alpha1 \cdot l1^{\alpha1-1} = 0,$$

$$\frac{-\lambda2 \cdot b2}{T2 - l2} + p \cdot A2 \cdot \alpha2 \cdot l2^{\alpha2-1} = 0,$$

$$\frac{\lambda1 \cdot a1 + \lambda2 \cdot a2}{F} \leq p.$$

Letter  $p$  denotes a Lagrange multiplier (the "shadow price") produced and consumed product. Consumption of participants is as follows

$$x1 = \frac{\lambda1}{p}, \quad x2 = \frac{\lambda2}{p}.$$

The total value of the collective good is

$$\frac{\lambda1 \cdot a1 + \lambda2 \cdot a2}{p} = F$$

It is quite obvious that arbitrarily breaking between participants this value (in the absence of the market), we obtain the state of the economic system  $(y^0, x_k^0, l_k^0, F_1^0, F_2^0)$ , which maximizes the function  $W$  – in contrast to equilibrium. In other words, the market equilibrium (in the language of model 1) is less efficient in terms of the social welfare function if products  $\lambda_k \cdot a_k$  is different.

We write down the expressions for the parameters of rational behavior of households in the market conditions, with the presence of the collective goods, derived from the conditions for the Lagrange

$$u_k = \ln(x_k) + b_k \cdot \ln(T_k - l_k) + a_k \cdot \ln(z_1 + z_2),$$

where  $p, q_1, q_2$  - the price of the product and work evaluation;  $D_1, D_2$  - tax payments to the budget,  $x_1, z_1, x_2, z_2$  - private consumption and contribute to the collective good.

$$\begin{aligned} x_1 &= \frac{T_1 \cdot q_1 - D_1 + p_t \cdot z_2}{p \cdot (1 + a_1 + b_1)} & x_2 &= \frac{T_2 \cdot q_2 - D_2 + p \cdot z_1}{p \cdot (1 + a_2 + b_2)} \\ l_1 &= T_1 - \frac{b_1 \cdot (T_1 \cdot q_1 - D_1 + p z_2)}{q_1 \cdot (1 + a_1 + b_1)} & l_2 &= T_2 - \frac{b_2 \cdot (T_2 \cdot q_2 - D_2 + p z_1)}{q_2 \cdot (1 + a_2 + b_2)} \\ z_1 &= \max \left[ \frac{a_1 \cdot [T_1 \cdot q_1 - D_1 + p \cdot (z_2)]}{p \cdot (1 + a_1 + b_1)} - z_2, 0 \right] & z_2 &= \max \left[ \frac{a_2 \cdot [T_2 \cdot q_2 - D_2 + p \cdot (z_1)]}{p \cdot (1 + a_2 + b_2)} - z_1, 0 \right] \\ \beta_1 &= \frac{1 + a_1 + b_1}{T_1 \cdot q_1 + z_2 \cdot p - D_1} & \beta_2 &= \frac{1 + a_2 + b_2}{T_2 \cdot q_2 + z_1 \cdot p - D_2} \end{aligned} \quad (8)$$

Further provides the results of computer calculations of equilibrium based on formulas and optimum. In Table 1, the parameters imposed condition  $\lambda_k \cdot a_k = \lambda_2 \cdot a_2$ . We see that all physical indicators coincide. Between price indices (see Table 2) remains constant ratio 0.904. If you violate the condition of product  $\lambda_k \cdot a_k$ , all values of indicators - different. We can assume that the deviation values of parameters these equations in some sense characterizes the difference between equilibrium and optimality.

Table 1: Model parameters

a	a <sub>k</sub>	b <sub>k</sub>	a <sub>k</sub>	T <sub>k</sub>	α <sub>k</sub>	λ <sub>k</sub>
75	0.258	0.156	11	16	0.9	9.5
75	0.31	0.23	10	14	0.88	7.9

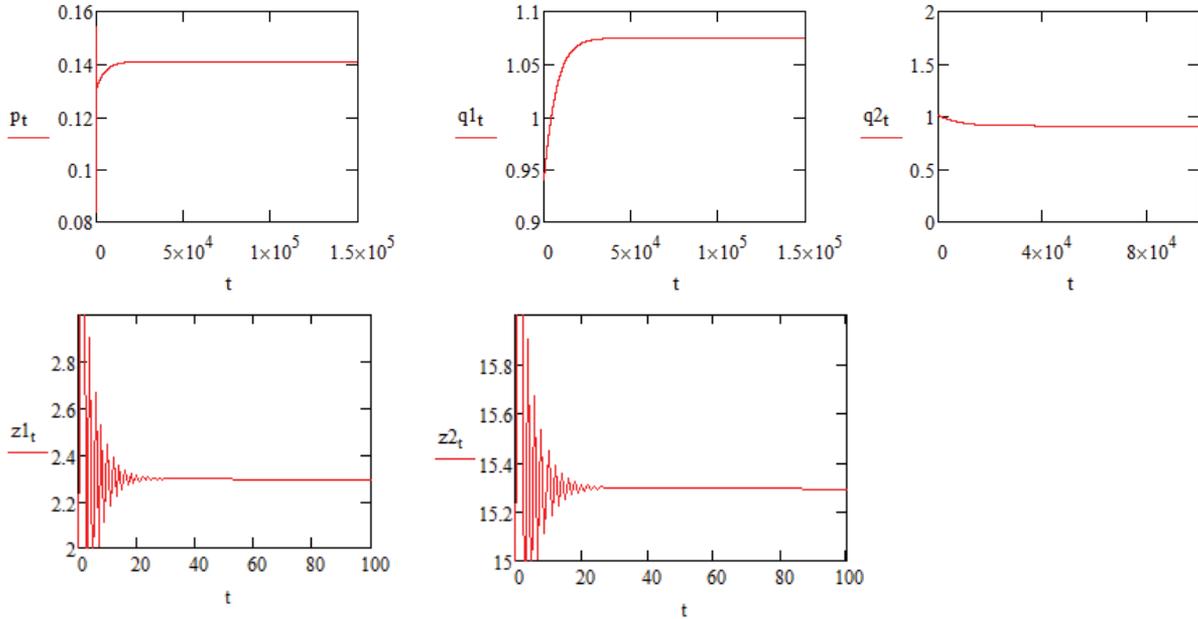
Table 2: Found model indicators

	X1	X2	l1	l2	y1	y2	F1+F2	p	q1	q2
Equilibrium	65.84	54.7	14.64	12.55	123.2	89.42	16.98+0	0.144	1.092	0.942
Optimum	59.53	49.50	14.77	12.24	124.1	90.6	30.	0.16	1.207	1.04

As mentioned above, for the calculation of equilibrium an iterative process was used, so that at each time  $t$  values leading price variables  $p_t, q_{1,t}, q_{2,t}, D_{k,t}$  and the value  $x_{k,t}, y_{k,t}, l_{k,t}, F_{k,t}$  are determined by the "law of supply and demand." Maximization of consumer utility function runs on the assumption that others do not change their last choice. (In Annex 1, we specifically pointed way of finding solutions of the game when players making choices, are guided by previous decisions of the others). Similarly act and the Centre, setting the general tax level  $D$ , such as it was

formed in the previous moment. Computer calculations given here are actually an example of heuristic modeling, as we used in the calculation formula (3), which as has been proven guarantee access to the equilibrium in the absence of collective goods. Iterative finding solutions of games (Nash point) by using information on the previous choice of the other participants are heuristic (cf. the results of calculations in annex 1)....

Figure 1: The trajectories of convergence to equilibrium performance model 1



**Model 2.** Taxes to k-th user defined as a fixed percentage of the total budget, and the collective good is formed by the participants in the market. Z value of centralized investments in collective good is formed by the rule, which actually performs while optimizing Model 1 (see above formula for F).

The behavior of each market participant is to maximize the function (2) (with logarithms) under conditions provided  $p_k = q_k - D - p_k F_k$ . Manufacturer, as usual, maximizes profit. Centre appoints taxes  $D_k$ , focusing on the value of total tax revenues  $D$  previous moment of time:  $D_k = \psi_k D$ . Here the rule (3) does not work. For completeness of comparison "conditionally optimal" state is calculated by implementing  $\lambda$ -coefficients, what is inversely proportional to the marginal utility of income equilibrium.

Former algorithm entrance in equilibrium for two participants and logarithmic utility functions leads to a state of the economy, with the variables, which do not reveal any regular connection as "optimal".

The results of the calculations are presented in the tables below.

Table 3: Model 2 parameters

a	$a_k$	$b_k$	$A_k$	$T_k$	$\alpha_k$	$\lambda_k$
35	0.5	0.156	15	16.1	0.9	21.577
35	0.581	0.28	18	14	0.88	17.504

The resultant state of the market economy, as noted earlier, is not Pareto optimal. As the table shows, the distribution of the tax burden between the two parties on shares  $\psi_k$  and  $1 - \psi$  leads to a condition significantly different from optimal.

Table 4: Founded Figures Model 2

	X1	X2	I1	I2	y1	y2	F1+F2	F	p	q1	q2
Equilibrium	122.19	99.12	14.26	11.65	163.96	156.16	6.2+2.7	54.87	0.177	1.83	2.08
Optimum	104.82	85.08	14.5	11.9	166.64	160.02	0	101.8	0.206	2.13	2.42

As can be seen from Table 4, the resulting "optimum" is characterized by increased labor costs, reduction in private consumption, but growing volumes of collective consumption.

**Model 3.** In the third version of the model, it is assumed that the Centre sets the value of its investments in the collective good, depending on the current prices by type of optimizing the overall collective good considered in accordance with these models.

$$Z = \frac{\lambda_1 \cdot a_1 + \lambda_2 \cdot a_2}{p_i}$$

In addition, it determines the amount of general taxes, setting it equal to what it was at the previous moment. Further, it divides this value by the formula (3). It is clear that the multiplication of  $\lambda$ - coefficients to a positive value will not change the rules for the distribution of taxes between the parties, but the Z value of centralized investments in collective goods will vary. In computer calculations we assumed (in contrast to the previous case), that the utility function of each participant now depends on all three components of the collective good:  $F1 + F2 + Z$ . Calculations showed that the consumption value  $x_k$ , labor supply issue will stabilize over time, but the price variables  $p, q, D$  go out on a constant rise, keeping together the same proportion. Interestingly, in model 3, as in model 1, when the equation  $a_k \lambda_k = a_i \lambda_i$  is fulfilled, all equilibrium natural values coincides with optimal performance (using in the function W these coefficients  $\lambda$ ).

To determine the optimal values of the variables we solve the system of equations:

$$A1 \cdot I1^{\alpha1} + A2 \cdot I2^{\alpha2} - a - \left( \frac{\lambda1}{p} + \frac{\lambda2}{p} \right) - F = 0$$

$$\frac{\lambda1 \cdot a1 + \lambda2 \cdot a2}{F} - p \leq 0 = 0$$

$$\frac{-\lambda1 \cdot b1}{T1 - I1} + p \cdot A1 \cdot \alpha1 \cdot I1^{\alpha1-1} = 0 \quad F \geq 0$$

$$\frac{-\lambda2 \cdot b2}{T2 - I2} + p \cdot A2 \cdot \alpha2 \cdot I2^{\alpha2-1} = 0 \quad F \cdot \left( \frac{\lambda1 \cdot a1}{F} - p \right) = 0$$

The values obtained are presented in Table 6.

Table 5: Parameters of the model 3

a	a <sub>k</sub>	b <sub>k</sub>	a <sub>k</sub>	T <sub>k</sub>	α <sub>k</sub>	λ <sub>k</sub>
35	0.39	0.156	15	16.1	0.9	8
35	0.58	0.23	18	14.6	0.88	5.38

Table 6: Founded indicators model 3 under condition (3)

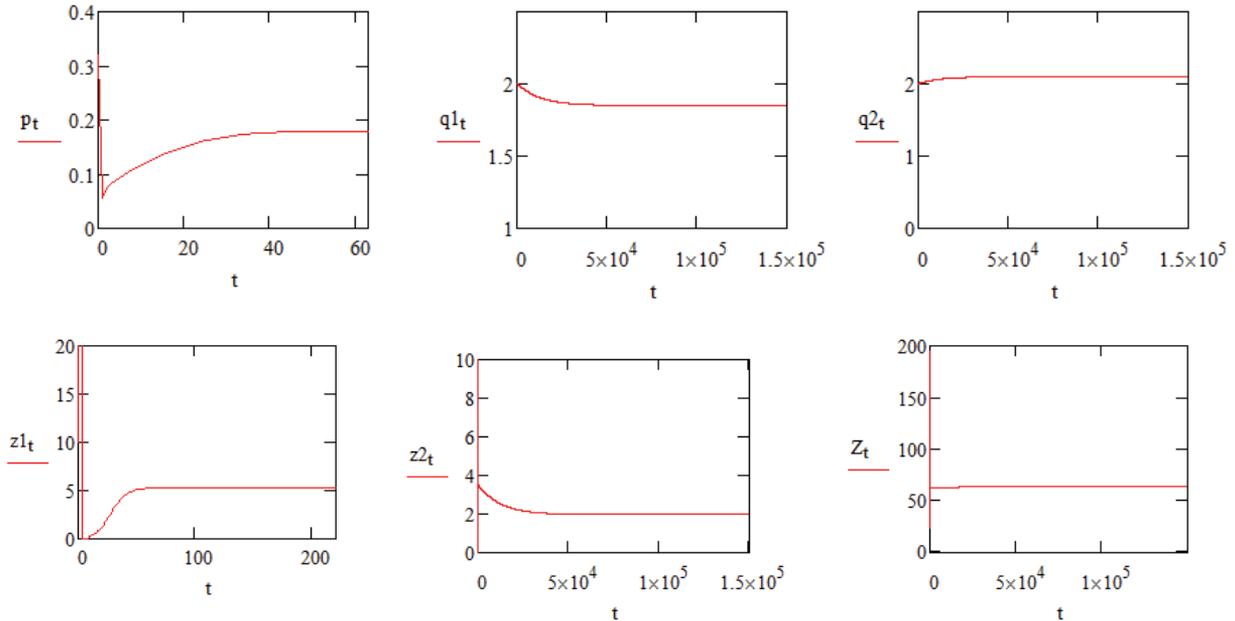
	X1	X2	I1	I2	y1	y2	F1+F2+Z	p	q1	q2	λ1	λ2
Equilibrium	140.79	94.671	13.98	12.34	161.103	164.27	5.5+12+37.4	0.167	1.732	1.957	8	5.38
Optimum	140.79	94.671	13.98	12.34	161.103	164.27	54.91	0.057	0.589	0.667	8	5.38

Table 7: Founded indicators model 3

	X1	X2	l1	l2	y1	y2	F1+F2+Z	p	q1	q2	λ1	λ2
Equilibrium	141.87	93.99	14.38	12.39	161.217	164.97	19.6+0+35.71	0.73	1.8	2.03	8	5.3
Optimum	141.54	93.77	13.97	12.36	160.99	164.52	55.199	0.06	0.6	0.66	8	5.3

Price ratio 3.068 and the following graphs for Table 6.

Figure 3: The trajectories of convergence indicators to equilibrium model 3



#### 4. CONCLUSION

With the advent of computer technology opportunities analysis of complex socio-economic objects have increased dramatically, not only due to the growth rate of statistical information processing, but also due to the possibilities of the qualitative analysis of the virtual world, reality counterparts. In spite of the greater complexity of the objects being studied, in order to understand some of the most common properties reality, we often can and should reflect these properties in the form of simple models.

We used a single-product economic model with two participants and the most simple expressions for their utility functions - in the form of Cobb-Douglas function. (Note that in many other models our methods work equally well for other functions, such as functions of CES).

In the models considered above we clearly distinguished role of the Centre (the state) and market participants - industries and households. Households own labor involved in manufacturing the product, salary spend on consumption and the creation of a collective good. Center always asks one or another method of distribution of the tax burden, and may also generate the value of its contribution to the collective good.

Note that although the policy of the Centre depends on the nature of equilibrium, the market equilibrium can not increase the value of the social welfare function, when the parameters of this function are fixed. It seems that using aggregate models, for example, any regional economies can be compared with market-based options-optimal planning, but it needs to be based on the real statistical data.

Original procedure that ensures social harmony without justifiable public good, we "recommend" to the Centre for Tax Policy and formation in the presence of the collective good. As shown in the simplest computable models, this procedure provides a stable equilibrium, but it does not

guarantee optimality. And although there are publications [3], in which presents theorems on Pareto optimality of equilibrium with public goods, yet they belong rather to other variants of models which consider additional conditions. Therefore, in our opinion, in the formulation of social and economic policy must always be considered and consolidated options and optimal equilibrium models.

We add that the scheme given in Annexes for finding equilibrium and simple program for calculating and constructing trajectories (here - in a package MATHCAD) can easily reproduce by any reader to view the dynamics of processes for different values.

### Appendix 1.

Consider the classical problem for using collective good for the two parties.  
Let the utility function of both players are expressed as follows:

$$u_k = \ln x_k + a_k \cdot \ln(F_1 + F_2), \quad (a)$$

with constraints:

$$\begin{aligned} x_k + F_k &\leq w, \\ x_k + F_k &\leq w, \quad x_k, F_k \geq 0, \quad k=1,2... \end{aligned} \quad (b)$$

If a Nash point exists, it satisfies the conditions maximizing  $u_k$  under the above restrictions. Lagrange conditions of equality implies:

$$\begin{aligned} F_1 &= \frac{w_1 \cdot a_1 - F_2}{1 + a_1}, \\ F_2 &= \frac{w_2 \cdot a_2 - F_1}{1 + a_2} \end{aligned}$$

from where it is easy to find its values.

Equilibrium point of this game can be computed (in our case) using the sequential procedure to improve their condition by each participant  $(x_k^*, F_k^*)$ , if he knows the aggregate remaining steps in the previous time  $t-1$ .

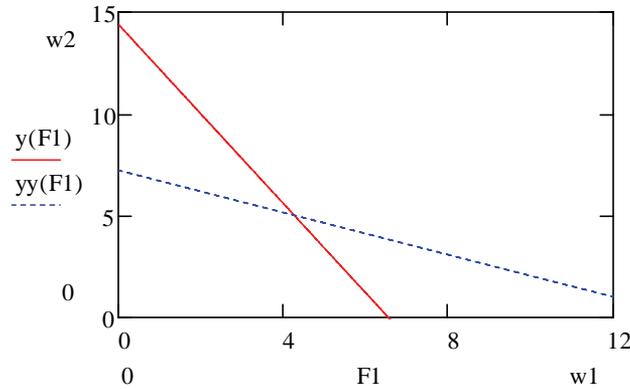
That is at every step  $t+1$  decides the conditions of utility maximization:

$$(F_k)^{t+1} = \arg \max u_k(w_k - F_k, \sum_{i \neq k} F_i^t), \quad 0 \leq F_k \leq w_k.$$

For logarithmic utility functions and for given values of the parameters of the game we get a convergent sequence of solutions shown in Figure.  
Let the parameters of game set

$$w_1=12, w_2=15, a_1=1.2, a_2=0.93$$

$$y(F_1) = -(1+a_1) \cdot F_1 + a_1 \cdot w_1, \quad yy(F_1) = \frac{-1}{1+a_2} \cdot F_1 + \frac{a_2 \cdot w_2}{1+a_2}$$



$$F := \begin{pmatrix} 4.264 \\ 5.018 \end{pmatrix}$$

In order that this solution is Pareto-optimal, it is necessary the existence of positive  $\lambda$ -coefficients, for which the function  $w=\lambda_1u_1+\lambda_2u_2$  has peaks in the specified rectangle. Conditions Lagrange prescribed for variables  $F1 \neq F2 \neq 0$  and 0, have the form:

$$\frac{\lambda_1}{w1 - F1} = \frac{\lambda_1 \cdot a1 + \lambda_2 \cdot a2}{F1 + F2} \quad \frac{\lambda_2}{w2 - F2} = \frac{\lambda_1 \cdot a1 + \lambda_2 \cdot a2}{F1 + F2}$$

Substituting in these relations founded values for  $F1$  and  $F2$ , we get a homogeneous linear system with respect to  $\lambda_1, \lambda_2$ . The existence of nonzero  $\lambda$  requires in order that determined  $D$  of the homogeneous system (conditions of Lagrange) would be equal to zero, but it is not so:

$$D := \begin{bmatrix} 9.283 + a1 \cdot (w1 - F0) & -a2 \cdot (w1 - F0) \\ -a1 \cdot (w2 - F1) & 9.283 + a2 \cdot (w2 - F1) \end{bmatrix} \quad |D|=258.51$$

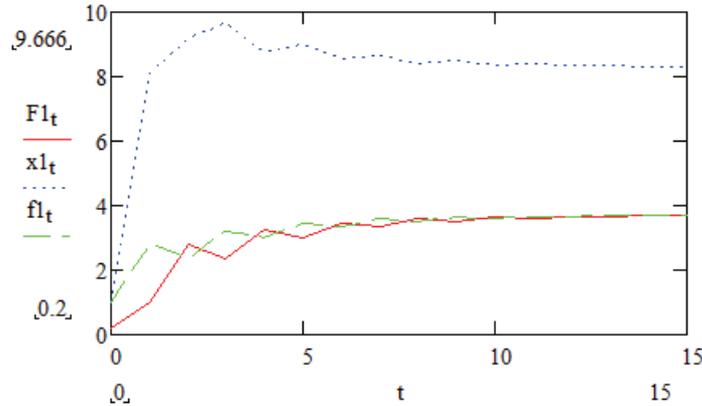
Hence, the value  $F$  cannot be optimal. For other values of the parameters we find the path to enter equilibrium.

$a1=0.52, a2=0.3, w1=12, w2=15$   
 $F1_0=0.2, F2_0=0.3, f1_0=1, f2_0=2, x1_0=1, x2_0=1$

Computing solutions

$t := 0..50$

$$\begin{pmatrix} x1_{t+1} \\ x2_{t+1} \\ F1_{t+1} \\ F2_{t+1} \\ f1_{t+1} \\ f2_{t+1} \end{pmatrix} := \begin{pmatrix} \min \left( w1, \frac{F2_t + w1}{a1 + 1} \right) \\ \min \left( w2, \frac{F1_t + w2}{a2 + 1} \right) \\ f1_t \\ f2_t \\ \max \left( 0, \frac{w1 \cdot a1 - f2_t}{1 + a1} \right) \\ \max \left( 0, \frac{w2 \cdot a2 - f1_t}{1 + a2} \right) \end{pmatrix}$$



The figure shows that the convergence achieving of equilibrium fast.

### Appendix 2.

Software calculations provide:

1. Solution of the linear equation to determine the taxation of households to ensure performing equations (3).
2. Iterative procedure to determine the trajectories of prices and private investments in the collective good .
3. Calculating the values of the economy indicators.
4. Plotting trajectories.

The size of step h, the number of iterations and the initial values of the variables are determined by researcher depending on the model parameters and capabilities of the computer Further we present program for calculating equilibrium paths for model 3. In this case, the number of steps N = 150000 .

$$h := \begin{pmatrix} 0.00001 & 0 & 0 & 0 & 0 \\ 0 & 0.000016 & 0 & 0 & 0 \\ 0 & 0 & 0.000011 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

The initial values of the variables:

$$P_0=0.101, q1_0=1.97, q2_0=1.8, z1_0=10, z2_0=22, Z_0=40.$$

Calculations for a model with two producers and two households in the package MATHCAD, executes with consistent procedures. At each time point t depending on the prices p, q1, q2 are calculated - the optimal demand for labor on the part of producers and their corresponding issues y1, y2. Household behavior is focused on the assumption that the other party execute e an investment in a collective good , as the average of the previous two - will be chosen (z1, z2). Next, we solve the problem of the Centre for allocation of taxes under the assumption that the total income will be the same. Algebraic system is solved

$$D1+D2=D \text{ and } \lambda_k \cdot \beta_k(D_k) = \lambda_i \cdot \beta_i(D_i)$$

After this price variables and investments in collective benefit determined by the system difference equations. Investment of Center Z computes by a single formula on the basis of the current price.

$$\begin{aligned}
 & \text{for } t \in 1..N \\
 & \quad \Pi_{t-1} \leftarrow \left( \frac{q_{t-1}^1}{p_{t-1} \cdot A1 \cdot \alpha 1} \right)^{\frac{1}{\alpha 1 - 1}} \\
 & \quad \Pi_{t-1} \leftarrow \left( \frac{q_{t-1}^2}{p_{t-1} \cdot A2 \cdot \alpha 2} \right)^{\frac{1}{\alpha 2 - 1}} \\
 & \quad y_{t-1}^1 \leftarrow A1 \cdot (\Pi_{t-1})^{\alpha 1} \\
 & \quad y_{t-1}^2 \leftarrow A2 \cdot (\Pi_{t-1})^{\alpha 2} \\
 & \quad \Pi_{t-1} \leftarrow p_{t-1} \cdot y_{t-1}^1 - q_{t-1}^1 \cdot \Pi_{t-1} + p_{t-1} \cdot y_{t-1}^2 - q_{t-1}^2 \cdot \Pi_{t-1} \\
 & \quad \text{if } t \geq 5 \\
 & \quad \quad z_{t-1}^1 \leftarrow \frac{z_{t-1}^1 + z_{t-2}^1}{2} \\
 & \quad \quad z_{t-1}^2 \leftarrow \frac{z_{t-1}^2 + z_{t-2}^2}{2} \\
 & \quad D2_{t-1} \leftarrow \frac{1}{1+B} \cdot [p_{t-1} \cdot a - \Pi_{t-1} + B \cdot [q_{t-1}^2 \cdot T2 + p_{t-1} \cdot (Z_{t-1} + z_{t-1}^2)] - q_{t-1}^1 \cdot T1 - p_{t-1} \cdot z_{t-1}^2] \\
 & \quad D1_{t-1} \leftarrow p_{t-1} \cdot a - \Pi_{t-1} + p_{t-1} \cdot Z_{t-1} - D2_{t-1} \\
 & \quad x1_{t-1} \leftarrow \frac{T1 \cdot q_{t-1}^1 - D1_{t-1} + p_{t-1} \cdot (Z_{t-1} + z_{t-1}^2)}{p_{t-1} \cdot (1 + a1 + b1)} \\
 & \quad x2_{t-1} \leftarrow \frac{T2 \cdot q_{t-1}^2 - D2_{t-1} + p_{t-1} \cdot (Z_{t-1} + z_{t-1}^1)}{p_{t-1} \cdot (1 + a2 + b2)} \\
 & \quad \begin{pmatrix} p_t \\ q_t^1 \\ q_t^2 \\ z_t^1 \\ z_t^2 \end{pmatrix} \leftarrow \begin{pmatrix} p_{t-1} \\ q_{t-1}^1 \\ q_{t-1}^2 \\ 0 \\ 0 \end{pmatrix} + h \cdot \begin{bmatrix} x1_{t-1} + x2_{t-1} - y_{t-1}^1 - y_{t-1}^2 + z_{t-1}^1 + z_{t-1}^2 + a + Z_{t-1} \\ \Pi_{t-1} - \left[ T1 - \frac{b1 \cdot [T1 \cdot q_{t-1}^1 - D1_{t-1} + p_{t-1} \cdot (Z_{t-1} + z_{t-1}^2)]}{q_{t-1}^1 \cdot (1 + a1 + b1)} \right] \\ \Pi_{t-1} - \left[ T2 - \frac{b2 \cdot [T2 \cdot q_{t-1}^2 - D2_{t-1} + p_{t-1} \cdot (Z_{t-1} + z_{t-1}^1)]}{q_{t-1}^2 \cdot (1 + a2 + b2)} \right] \\ \max \left[ \frac{a1 \cdot [T1 \cdot q_{t-1}^1 - D1_{t-1} + p_{t-1} \cdot (Z_{t-1} + z_{t-1}^2)]}{p_{t-1} \cdot (1 + a1 + b1)} - Z_{t-1} - z_{t-1}^2, 0 \right] \\ \max \left[ \frac{a2 \cdot [T2 \cdot q_{t-1}^2 - D2_{t-1} + p_{t-1} \cdot (Z_{t-1} + z_{t-1}^1)]}{p_{t-1} \cdot (1 + a2 + b2)} - Z_{t-1} - z_{t-1}^1, 0 \right] \end{bmatrix} \\
 & \quad Z_t \leftarrow \frac{(\lambda 1 \cdot a1 + \lambda 2 \cdot a2)}{p_{t-1}} \\
 & \quad v_0 \leftarrow p \\
 & \quad v_1 \leftarrow q1 \\
 & \quad v_2 \leftarrow q2 \\
 & \quad v_3 \leftarrow z1 \\
 & \quad v_4 \leftarrow z2 \\
 & \quad v_5 \leftarrow D1 \\
 & \quad v_6 \leftarrow D2 \\
 & \quad v_7 \leftarrow Z \\
 & \quad v
 \end{aligned}$$

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## THE IMPORTANCE OF SUSTAINING AND IMPROVING COMPANY'S BUSINESS SUCCESS BY USING INDICATOR OF THE DEGREE OF HEDGING NECESSITY

IVO ŠPERANDA<sup>1</sup>

### ABSTRACT

*This paper considers influence of hedging regarded as a technique for protecting companies against unforeseeable events which might seriously influence company's business, primarily its financial stability and its business results. The econometric model is thus created to test the impact of hedging on companies' EBIT and to determine the necessity of hedging usage. Regression method and model were used to assess the impact of change in dollar and kuna exchange rates in relation to EBIT measure in 10 year period. Additionally the completely new analytic tool named Indicator of the degree of hedging necessity IZI has been introduced. This paper shows huge efficacy of hedging as a protection tool, firstly evident through positive effects on EBIT and therefore on the company and the entire economy's improved competitiveness degree. In this paper the completely new indicator has been introduced and explained in order to assess the necessity of cash flow protection. Finally, it's obvious that hedging as a tool of protection, contributes a lot in achieving better operational and financial goals which leads to a higher degree of the company's competitiveness on the international market.*

**KEY WORDS:** *hedging, necessity, model, EBIT, protecting*

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### 1. INTRODUCTION

Companies having business activities abroad, and most of the modern ones have, are exposed to risk in different ways. Besides the political ones, there is a risk in foreign currencies exchange and in commodities and services price change.

Basically it is all about differences in spot and futures prices, i.e. current market prices and the prices in certain future. Bearing that in mind there are three basic and characteristic types of risk exposures: translation exposure, transaction exposure and finally economic exposure. Translation exposure relates to the change in accounting income in balance sheet as a result of exchange rate changes.

Transaction exposure relates to execution of certain transactions, while economic risk exposure includes changes (the negative ones) in expected and in projected future cash flows of a certain company, and therefore, most importantly in its economic value.

There are numerous ways to more or less manage the risk exposures in a company: classic insurance, swap businesses, diversification of business and investment portfolio, futures contracts and forward contracts.

This paper intends to demonstrate the possibilities of econometric modeling, i.e. measuring hedging necessity and its impact in companies.

It is important to mention that there is no, nor can there be, a unique and general hedging model and law for all companies. Every company, taking into account its own specificities creates its own hedging strategy and pursuantly its own model which pay respect to type of business, market share, market position and similar.

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Just as every company needs to determine its optimal hedging strategy which depends on numerous specific and variable parameters, the measuring, that is defining the impact of protection or hedging is also specific for every company and it depends on current conditions under which the company operates.

The most common and the most widely used method of hedging impact assessment is regression method including its variations (linear, exponential).

Relation between hedging and company's competitiveness is well demonstrated in the paper of American scientists Christine Parlour (University of California) and Tingjun Liu-a (Arizona State University) under symptomatic title: „Hedging and Competition“ (Parlour and Liu, 2008; 148-161) in which authors question the possibilities of direct hedging of company's cash flow and assume that it is being done in order to reduce the degree of risk in business, but simultaneously it increases the company's risk on financial markets as a result of using protection instruments, that is hedging (of options of different types and categories).

The purpose of this paper is, first of all, to analyze specific factors what might impact companies' business results i.e. cash flow, and to point out at the new analytical indicators of risk analysis of cash flow and the methods of protection in order to sustain and improve company's success by using mentioned  $|Z|$  indicator.

The goal of this paper is in performing and promoting hedging in general business operations by explaining and affirming the indicator of the degree of hedging necessity as an analytical tool.

And finally, the hypothesis, brought out in this paper, runs like this: *usage of the indicator of the degree of hedging necessity i.e.  $|Z|$  indicator will contribute to the adequate use of hedging as a protecting tool against risk significantly and thus the entire company's business success will be improved considerably.*

## 2. ASSESSMENT OF MODEL PARAMETERS

The term assessment of parameters of linear regression denotes calculation of value of parameter in a way that given direction represents approximation or relationship of phenomena in question.

In order to assess the parameters of regression model, one should firstly define the desirable model and its elements and assumptions.

Simple linear regression should be used to build a model which shows impact and necessity of hedging on forward markets for protection against sudden and unpredictable price movements on global market.

Data of the Atlantska plovidba Ltd<sup>ii</sup> from Dubrovnik, a respectable and successful company whose main activity is maritime transport, but also deals with tourism (hotel industry and charter air transport<sup>iii</sup>) are taken for the entry data.

The company obviously operates on international market and is thus exposed to currency risk, mostly to the risk related to the movements of the U.S. dollar as the most part of company's income is realized in that currency.

On the other hand, we can witness a high degree of dollar volatility which endangers the business success of the shipping company.

EBIT (Earnings Before Interest & Tax), representing business success of a company and its earning potential is taken here as a measure of business success.

## 3. MODEL ELEMENTS

Quartile EBIT information of Atlantska plovidba, in the period from 1998 to 2008 and appropriate averages of the U.S. dollar movements in relation to kuna are taken for the model purposes.

*Independent variable*

Table 1: Average quartile exchange rate USD/KN in the period from 1998 – 2008.

n	Currency (kn)
1	6,3991
2	6,4528
3	6,4011
4	6,2002
5	6,6498
6	7,1804
7	7,2545
8	7,3623
9	7,8124
10	8,2389
11	8,3593
12	8,7000
13	8,2948
14	8,4973
15	8,2837
16	8,2904
17	8,5109
18	8,0507
19	7,4812
20	7,4439
21	7,0687
22	6,6512
23	6,6771
24	6,4229
25	6,0876
26	6,1702
27	6,0431
28	5,8364
29	5,7265
30	5,8244
31	6,0366
32	6,2095
33	6,1092
34	5,7994
35	5,7300
36	5,7125
37	5,6204
38	5,4577
39	5,3211
40	5,0589
41	4,8699
42	4,6452
43	4,7777
44	5,4474

Source: <http://www.hnb.hr/tecajn/h080111.htm>

*Dependent variable*

Table 2: Quartile amounts of EBIT for the period of 1998 – 2008. (in 000 kn).

EBIT (000 kn)	n
-18.552	1
-21.501	2
-7.600	3
-9.023	4
-14.540	5
-11.818	6
-9.009	7
-15.619	8
-8.742	9
-11.250	10
-9.308	11
-1.066	12
-4.796	13
-7.502	14
-8.835	15
-20.587	16
-16.374	17
-11.601	18
-18.025	19
-8.186	20
-6.789	21
3.358	22
6.106	23
21.98	24
15.346	25
39.937	26
24.164	27
47.541	28
56.128	29
224.222	30
217.062	31
58.563	32
26.858	33
33.254	34
185.200	35
187.542	36
98.752	37
102.587	38
101.258	39
99.771	40
279.749	41
156.863	42
344.325	43
-20.569	44

Source: financial archives of Atlantska plovdba Ltd Dubrovnik

Basic assumption is that changes in exchange rate significantly affect the size of realized EBIT. For this model purposes, other influences on EBIT are neglected in order to be able to

observe and measure only the effects of changes in exchange rate. Thus, the exchange rate is marked as independent variable (X) and the measure of EBIT as dependent one (Y).

Table 3: Movements of USD/KN exchange rates and amounts of quartile EBIT in the period of 1998–2008.

<b>KN/\$ EXCHANGE RATE AND EBIT FOR THE PERIOD OF 1998-2008. (quarterly)</b>		
<b>n</b>	<b>The exchange rate (X) – exchange rate is arithmetic mean of monthly averages for each quarter</b>	<b>EBIT (Y) u 000 kn</b>
1	6,3991	-18.552
2	6,4528	-21.501
3	6,4011	-7.600
4	6,2002	-9.023
5	6,6498	-14.540
6	7,1804	-11.818
7	7,2545	-9.009
8	7,3623	-15.619
9	7,8124	-8.742
10	8,2389	-11.250
11	8,3593	-9.308
12	8,7000	-1.066
13	8,2948	-4.796
14	8,4973	-7.502
15	8,2837	-8.835
16	8,2904	-20.587
17	8,5109	-16.374
18	8,0507	-11.601
19	7,4812	-18.025
20	7,4439	-8.186
21	7,0687	-6.789
22	6,6512	3.358
23	6,6771	6.106
24	6,4229	21.981
25	6,0876	15.346
26	6,1702	39.937
27	6,0431	24.164
28	5,8364	47.541
29	5,7265	56.128
30	5,8244	224.222
31	6,0366	217.062
32	6,2095	58.563
33	6,1092	26.858
34	5,7994	33.254
35	5,7300	185.200
36	5,7125	187.542
37	5,6204	98.752
38	5,4577	102.587
39	5,3211	101.258
40	5,0589	99.771
41	4,8699	279.749
42	4,6452	156.863
43	4,7777	344.325
44	5,4474	-20.569

Source: <http://www.hnb.hr/tecajn/h080111.htm> and financial archives of AP Ltd.-Dubrovnik

Given data point out two things: firstly, changes in exchange rate affect the realized EBIT and therefore the financial business results, and secondly the business results are better if the dollar exchange rate is lower, which could have been concluded from the nature of the business activities of the observed company. By using statistic package within Microsoft Office the results are as follow:

- Correlation coefficient ( $r$ ) = -0,665
- Coefficient of determination ( $R^2$ ) = 0,443

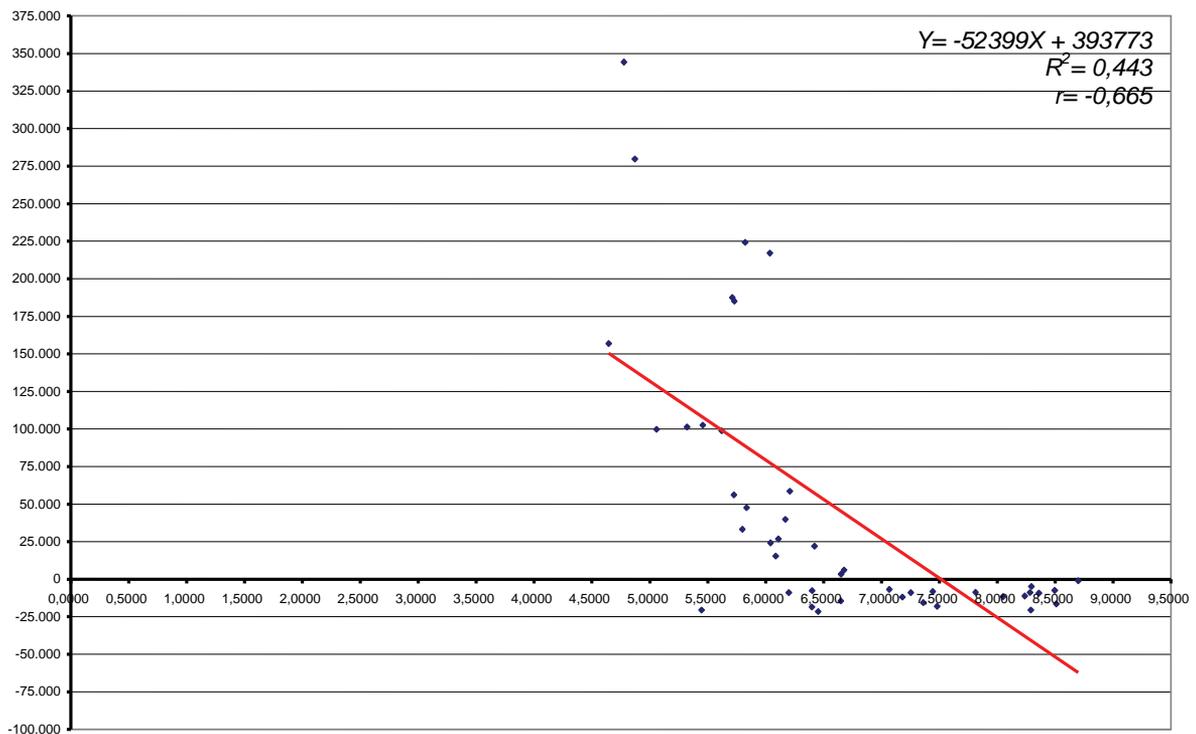
Given coefficients point out the following:

- Correlation coefficient ( $r$ ) is negative in range from 0,5 to 0,8 which, according to Chaddock's scale (Chaddock,1925; 248;303) demonstrates significant, but negative correlation of observed phenomena, meaning that the increase of one variable ( $x$ ) benefits from the linear fall of the other variable ( $y$ ).
- Coefficient of determination ( $R^2$ ) shows the existence of approximately 44 % of mutual factors among the observed sizes, or in other words: around 44 % of variation (changes) of EBIT is explained by the changes in the observed exchange rate. Moreover, this coefficient proves that hedging is the appropriate protection measure. Namely, if hedging is used and thus negative influences of exchange rate variation to the EBIT measure is annulled, such a protection would be efficient in the very size of coefficient of determination, as the risk is decreased for that size (44 %), i.e. its variant.

### 3.1 Basic Model or Model A

Graphically illustrated relations of movement changes in dollar exchange rate in relation to kuna and quartile changes of EBIT in the observed period are as follow:

Figure 1: The relation of exchange rate and EBIT in the period from 1998 to 2008



Source: author's calculation

On the grounds of one decade's historical data, the estimated regression model has the following form:

$$Y = - 52.399 X + 393.773 \quad (\text{MODEL A}) \quad (1)$$

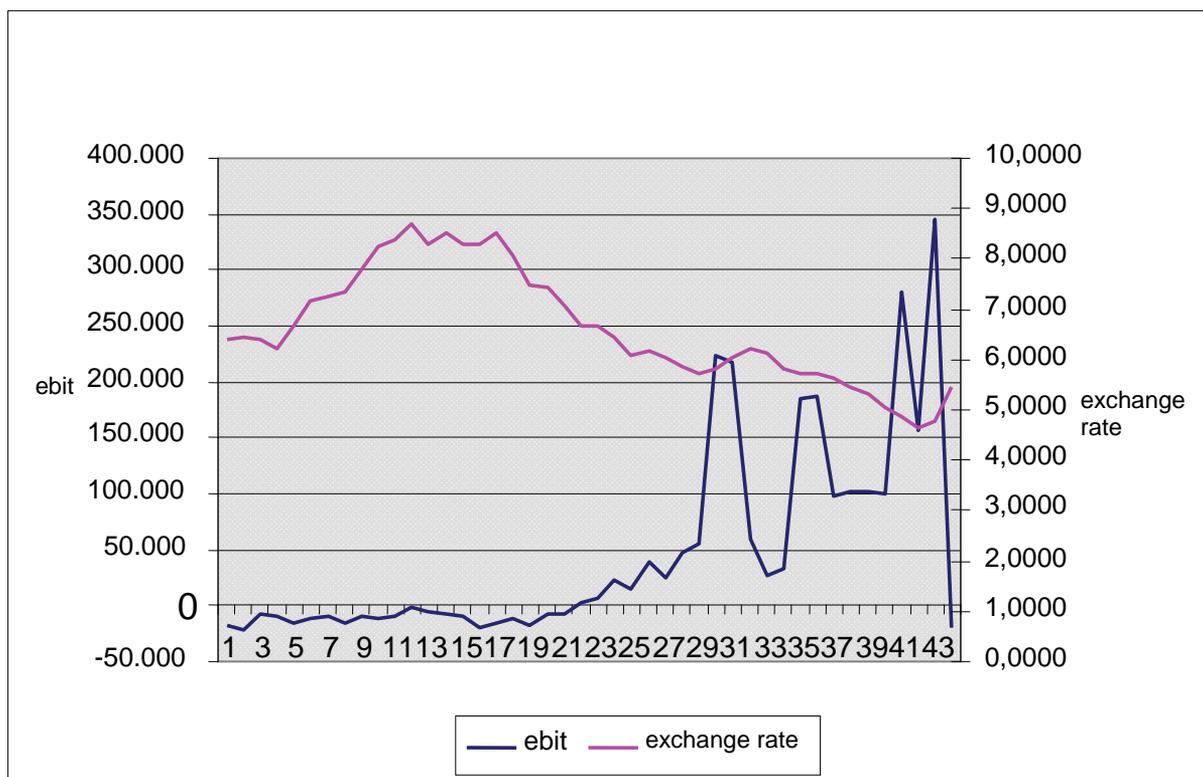
The size Y represents the dependent variable, i.e. value of EBIT that we want to protect against negative effects of changes of dollar exchange rate in relation to kuna. The size X represents the future changes of dollar and kuna exchange rates. Model A is obviously not good enough as there are relatively significant deviations of original data in relation to estimated direction (Fig. 1). In order for model to improve, it is necessary to arrange original data in a way that the relations among them are not changed.

### 3.2 Improved Model or Model B

Since the previous model does not entirely satisfy the original data, in the following model we will try to find the form of estimated curve, i.e. the model which, in satisfactory degree of deviation follows the scatter of original data.

In order to comply with that condition, the adequate exponential function of the general form:  $Y = a \times b^x$  should be found and the original data should be adequately arranged.

Figure 2: Movement of EBIT and dollar exchange rate



Source: author's calculation

The previous graph which illustrates simultaneous movement of dollar exchange rate and EBIT, demonstrates negative correlation of those two sizes, i.e. it is evident that EBIT increases when dollar exchange rate has a descending trend.

Table 4: Base indices of original data

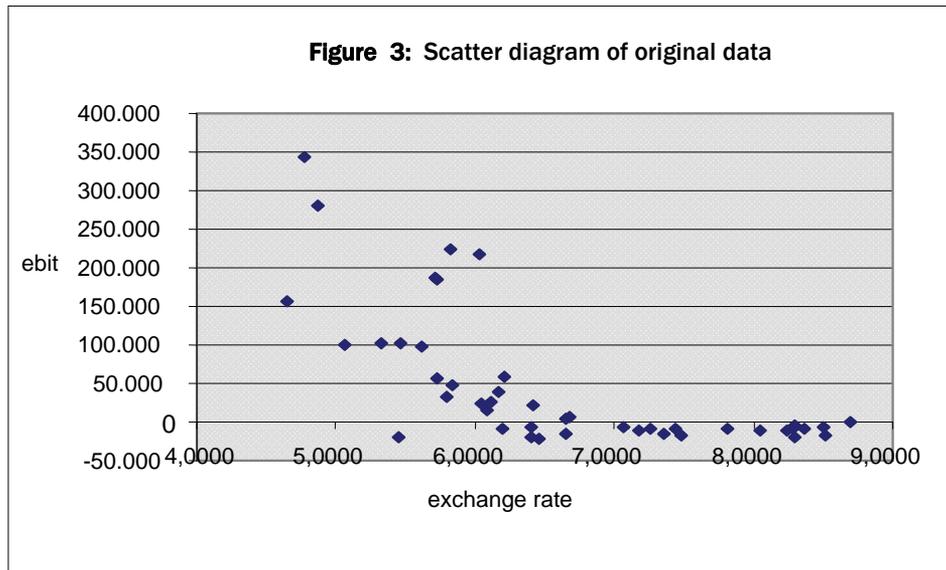
n	EBIT (Y) in 000 kn	Currency (X) -	B Y	B X	log BY	log BX
1	-18.552	6,3991	100,0000	100,0000	2	2
2	-21.501	6,4528	84,1041	100,8392	1,924817	2,003629
3	-7.600	6,4011	159,0341	100,0313	2,20149	2,000136
4	-9.023	6,2002	151,3637	96,8918	2,180022	1,986287
5	-14.540	6,6498	121,6257	103,9177	2,085025	2,01669
6	-11.818	7,1804	136,2980	112,2095	2,134489	2,05003
7	-9.009	7,2545	151,4392	113,3675	2,180238	2,054489
8	-15.619	7,3623	115,8096	115,0521	2,063745	2,060895
9	-8.742	7,8124	152,8784	122,0859	2,184346	2,086666
10	-11.250	8,2389	139,3596	128,7509	2,144137	2,10975
11	-9.308	8,3593	149,8275	130,6324	2,175592	2,116051
12	-1.066	8,7000	194,2540	135,9566	2,28837	2,1334
13	-4.796	8,2948	174,1483	129,6245	2,240919	2,112687
14	-7.502	8,4973	159,5623	132,7890	2,20293	2,123162
15	-8.835	8,2837	152,3771	129,4510	2,18292	2,112105
16	-20.587	8,2904	89,0308	129,5557	1,94954	2,112457
17	-16.374	8,5109	111,7400	133,0015	2,048209	2,123857
18	-11.601	8,0507	137,4677	125,8099	2,138201	2,099715
19	-18.025	7,4812	102,8407	116,9102	2,012165	2,067852
20	-8.186	7,4439	155,8754	116,3273	2,192778	2,065682
21	-6.789	7,0687	163,4056	110,4640	2,213267	2,043221
22	3.358	6,6512	218,1005	103,9396	2,338657	2,016781
23	6.106	6,6771	232,9129	104,3444	2,367194	2,018469
24	21.981	6,4229	318,4832	100,3719	2,503087	2,001612
25	15.346	6,0876	282,7188	95,1321	2,451355	1,978327
26	39.937	6,1702	415,2706	96,4229	2,618331	1,98418
27	24.164	6,0431	330,2501	94,4367	2,518843	1,975141
28	47.541	5,8364	456,2581	91,2066	2,659211	1,960026
29	56.128	5,7265	502,5442	89,4891	2,701174	1,95177
30	224.222	5,8244	1408,6136	91,0190	3,148792	1,959132
31	217.062	6,0366	1370,0194	94,3351	3,136727	1,974674
32	58.563	6,2095	515,6695	97,0371	2,712371	1,986938
33	26.858	6,1092	344,7715	95,4697	2,537531	1,979865
34	33.254	5,7994	379,2475	90,6284	2,578923	1,957264
35	185.200	5,7300	1198,2751	89,5438	3,078557	1,952036
36	187.542	5,7125	1210,8991	89,2704	3,083108	1,950707
37	98.752	5,6204	732,2984	87,8311	2,864688	1,943648
38	102.587	5,4577	752,9700	85,2886	2,876778	1,930891
39	101.258	5,3211	745,8064	83,1539	2,872626	1,919883
40	99.771	5,0589	737,7911	79,0564	2,867933	1,897937
41	279.749	4,8699	1707,9183	76,1029	3,232467	1,881401
42	156.863	4,6452	1045,5315	72,5915	3,019337	1,860886
43	344.325	4,7777	2055,9994	74,6621	3,313023	1,8731
44	-20.569	5,4474	89,1279	85,1276	1,950013	1,93007
	47.029	6,6174				
	89038,58	1,130837				

Source: author's calculation

Table 5: Analysis of indexed data

	EBIT (Y) u 000 kn	Tečaj (X)-	B Y	B X	log BY	log BX
Ebit (Y) u 000 kn	1					
Tečaj (X) –	-0,665491	1				
B Y	1	-0,66549	1			
B X	-0,665491	1	-0,66549	1		
log BY	0,9294671	-0,72627	0,929467	-0,72627	1	
log BX	-0,697284	0,996301	-0,69728	0,996301	<b>-0,74883</b>	1

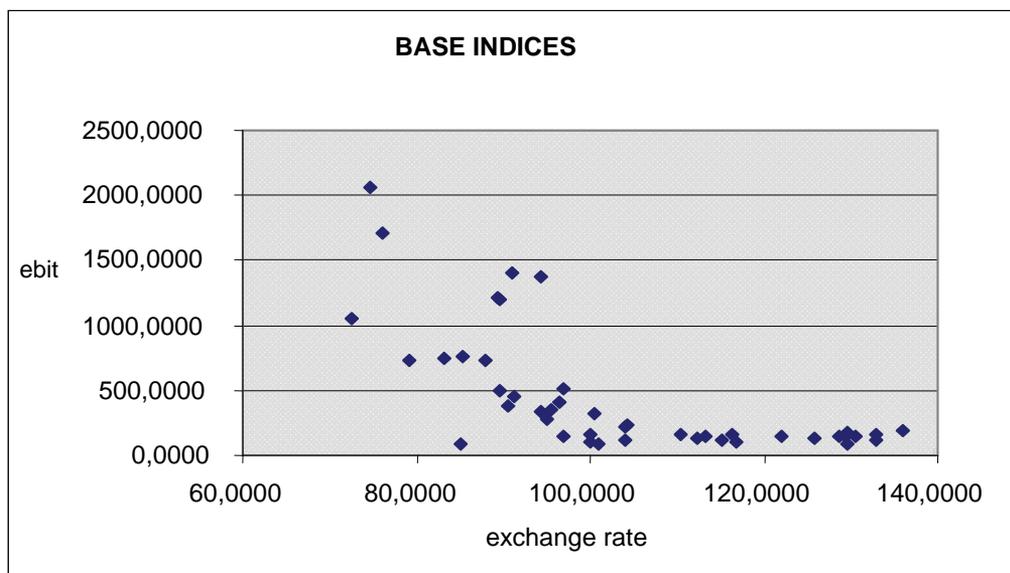
Source: author's calculation



Source: author's calculation

Previous tables contain the base of original and indexed data required for modeling.<sup>iv</sup>

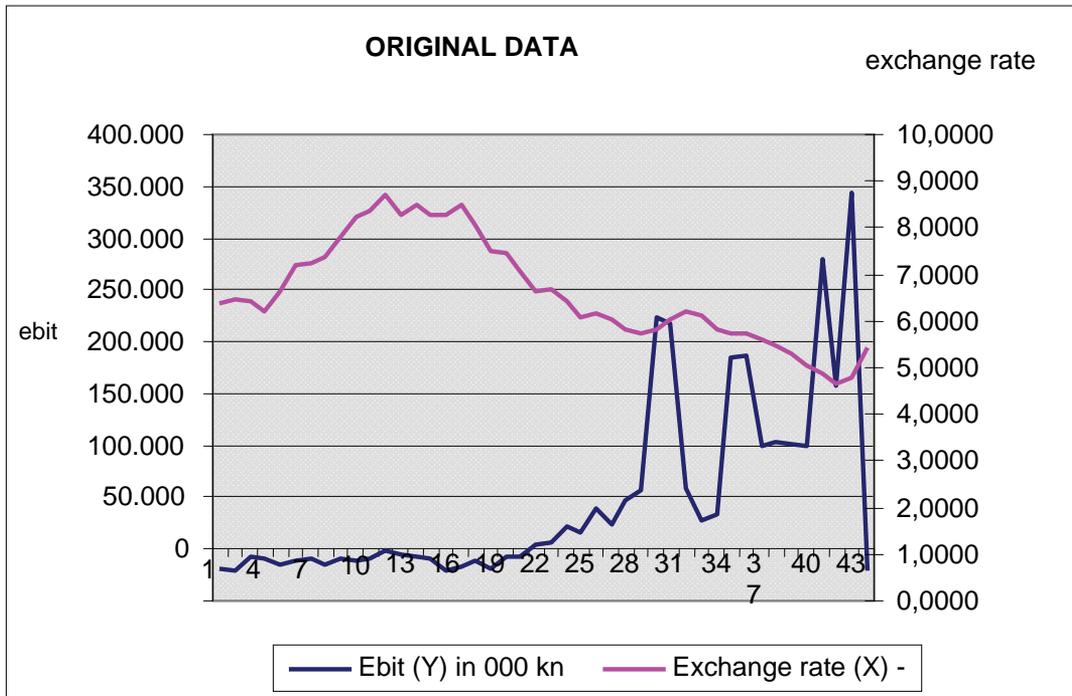
Fig. 4: Scatter diagram of indexed data



Source: author's calculation

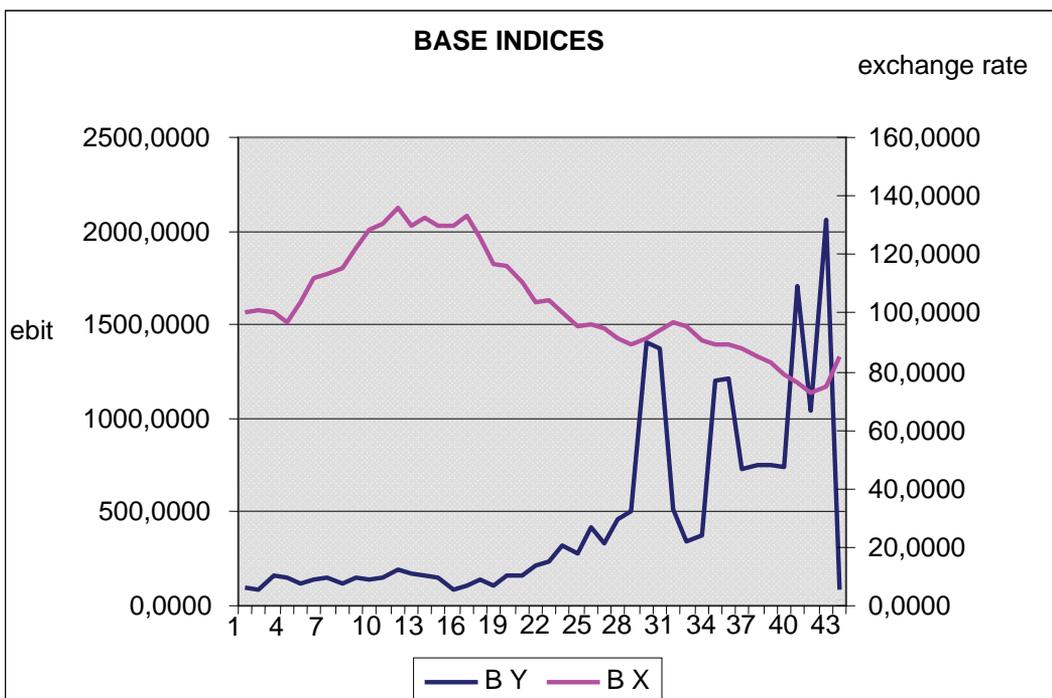
By comparing scatter diagram of original data (Fig. 3) and scatter diagram of indexed (Fig. 4) it can be concluded that the indexing process did not derange the rhythm of distribution.

Figure 5: Movement of curves of original data



Source: author's calculation

Fig. 6: Movement of curves of indexed data



Source: author's calculation

From the previous tables and graphs (Figs. 5 and 6) it is evident that essence and character of phenomenon has not slightly changed during conversion of original data into base indices because the relations between phenomena remained identical. This conclusion enables the construction of the regression model (Model B).

Table 6: Values of logarithmized data

log BY	log BX	Byc		B Y	B X
2	2	310,2968	2,491777	100	100
1,924817	2,003629	300,0249	2,477157	84,10414	100,8392
2,20149	2,000136	309,9064	2,491231	159,0341	100,0313
2,180022	1,986287	352,3854	2,547018	151,3637	96,89175
2,085025	2,01669	265,7948	2,424546	121,6257	103,9177
2,134489	2,05003	195,0937	2,290243	136,298	112,2095
2,180238	2,054489	187,1896	2,272282	151,4392	113,3675
2,063745	2,060895	176,391	2,246476	115,8096	115,0521
2,184346	2,086666	138,8876	2,142664	152,8784	122,0859
2,144137	2,10975	112,117	2,049671	139,3596	128,7509
2,175592	2,116051	105,7525	2,024291	149,8275	130,6324
2,28837	2,1334	90,03315	1,954402	194,254	135,9566
2,240919	2,112687	109,1043	2,037842	174,1483	129,6245
2,20293	2,123162	99,00229	1,995645	159,5623	132,789
2,18292	2,112105	109,6944	2,040184	152,3771	129,451
1,94954	2,112457	109,3377	2,03877	89,03083	129,5557
2,048209	2,123857	98,36655	1,992847	111,74	133,0015
2,138201	2,099715	123,0546	2,090098	137,4677	125,8099
2,012165	2,067852	165,3669	2,218448	102,8407	116,9102
2,192778	2,065682	168,7302	2,227193	155,8754	116,3273
2,213267	2,043221	207,8127	2,317672	163,4056	110,464
2,338657	2,016781	265,5695	2,424178	218,1005	103,9396
2,367194	2,018469	261,4441	2,417379	232,9129	104,3444
2,503087	2,001612	305,691	2,485283	318,4832	100,3719
2,451355	1,978327	379,3861	2,579081	282,7188	95,13213
2,618331	1,98418	359,3382	2,555503	415,2706	96,42293
2,518843	1,975141	390,7661	2,591917	330,2501	94,43672
2,659211	1,960026	449,5763	2,652803	456,2581	91,20658
2,701174	1,95177	485,3556	2,68606	502,5442	89,48915
3,148792	1,959132	453,3192	2,656404	1408,614	91,01905
3,136727	1,974674	392,4638	2,5938	1370,019	94,33514
2,712371	1,986938	350,2642	2,544396	515,6695	97,03708
2,537531	1,979865	374,0115	2,572885	344,7715	95,46968
2,578923	1,957264	461,2426	2,663929	379,2475	90,62837
3,078557	1,952036	484,1624	2,684991	1198,275	89,54384
3,083108	1,950707	490,165	2,690342	1210,899	89,27037
2,864688	1,943648	523,3328	2,718778	732,2984	87,8311
2,876778	1,930891	589,0729	2,770169	752,97	85,28856
2,872626	1,919883	652,3992	2,814513	745,8064	83,15388
2,867933	1,897937	799,6785	2,902915	737,7911	79,05643
3,232467	1,881401	932,2393	2,969527	1707,918	76,10289
3,019337	1,860886	1127,639	3,05217	1045,531	72,59146
3,313023	1,8731	1006,855	3,002967	2055,999	74,66206
1,950013	1,93007	593,5726	2,773474	89,12786	85,1276

Source: author's calculation

Table 7: Regression analysis indices

Summary Output - Regression Statistics	
Multiple R	0,748832799
R Square	0,560750561
Adjusted R Square	0,550292241
Standard Error	0,270157928
Observations	44

Source: author's calculation

Table 8: Statistical analysis of model data /ANOVA/

ANOVA	df	SS	MS	F	Significance F		
Regression	1	3,91330075	3,913301	53,6177	5,0449E-09		
Residual	42	3,06538286	0,072985				
Total	43	6,9786836					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Upper 95,0%
Intercept	10,54835	1,10555805	9,541199	4,5E-12	8,317243353	12,7794562	12,779456
log BX	-4,028286	0,55013139	-7,32241	5E-09	-5,13849635	-2,9180762	-2,918076

Source: author's calculation

The value of estimated parameters can be determined upon previous analysis.

Regression (MODEL B)

$$Y = \alpha \cdot x^\beta$$

$$\log Y = \log \alpha + \beta \cdot \log x \quad (2)$$

Where:

Y=values of EBIT

x= USD/KN exchange rate

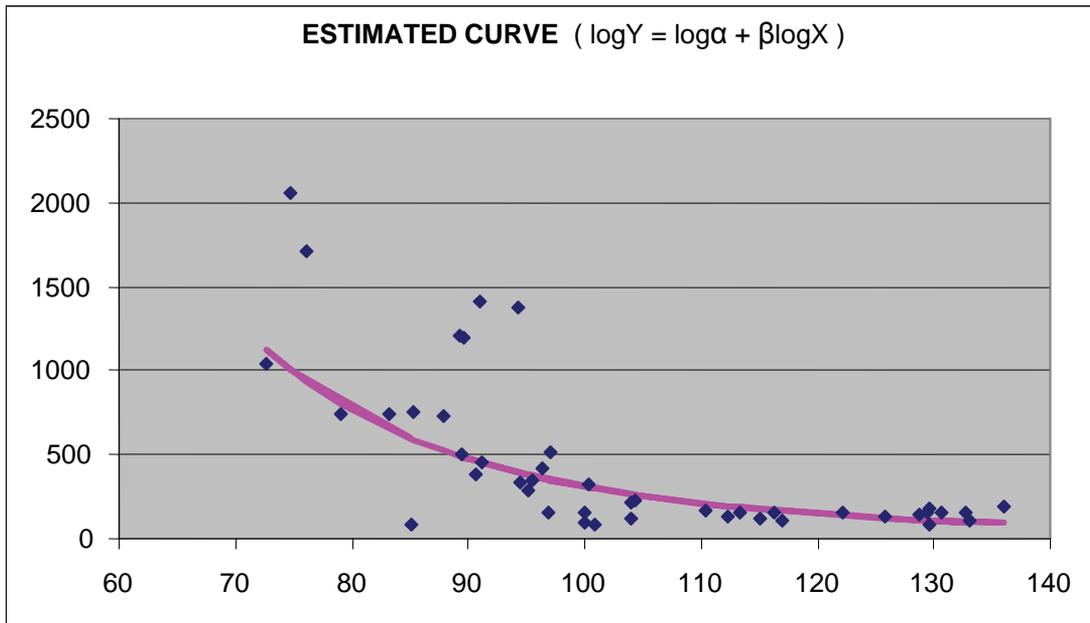
$\alpha$ = parameter

$\beta$ = parameter

Value of parameters is expressed as follows:

- $\alpha = 35346774650$
- $\beta = -4,02828627$

Figure 7: Interdependence of base indices of exchange rate (x) and EBIT value (y)



Source: author's calculation

The model is built on the grounds of base indices of original data in order to avoid inevitable negative data in the values of dependent variable (EBIT).

From the exponential the model was transformed into logarithmic-linear form (log y) in order to assess model parameters.

Explanation for such a model is: *when index of change in exchange rate changes (increases) for 1 %, the value of base index of EBIT changes (decreases) for 4,03 %*. Coefficient  $\beta$  represents the assessment of movement of dependent variable and, at the same time is the coefficient of elasticity according to the rule that elasticity of homogeneous exponential function is always equal to the exponent's value. (Martić,1987; 96-105) So,  $\beta$  demonstrates as well how much financial results of a certain company depend on changes in exchange rates. Since coefficients of elasticity are always absolute numbers, it means that the numbers can be compared and ranked.

Table 9: Results of the DW test

Durbin-Watson Statistic =	0,91176453	DW
1,475	1,566	
0,911765	<	1,475

Source: author's calculation

Since there is a time sequence in this model, the apparition of autocorrelation, which in this case is around 0,91176 was expected. Since the values of DW test are in the range of 0 to 4, and the size of indicator is less than 2 ( $DW \leq 2$ ), the presence of autocorrelation is obvious, but can be tolerated.

Coefficient of determination is 0,5608, which point to the fact that more than 56 % of variations of dependent variable is explained by the changes of independent variable. In other words, the changes in exchange rate caused the 56 % of changes in the EBIT values.

It can be concluded that the changes in exchange rate affect the financial results (Cash-Flow), i.e. EBIT. How and how much? It is the indicator  $\beta$  that answers those questions, while coefficient of determination answers the question about the size of protection, i.e. whether hedging is successful.

General form of the model expressed as:

$$y = \alpha \cdot x^\beta \quad (3)$$

answers the above questions, but each company needs to do its own calculation in order to get quality parameters and reliable answers.

Coefficient of determination ( $R^2$ ) is squared coefficient of correlation ( $r$ ) and it indicates model quality. In this concrete case we are dealing with the profit and loss account, i.e. cash flow and analysis of the way one size (\$/Kn) affects the other (EBIT). Since EBIT is composite measure influenced by large number of factors (price policy, investment policy, company's size, activities, market share, human resources, technical equipment, tax policy etc.) value of coefficient of determination  $R^2 \geq 0,33$  can be acceptable, i.e. that  $r \geq 0,57$  which denotes the relationship between variables is at least of middle strength.<sup>v</sup>

This individual model is used to determine the value of base parameters  $R^2$  and  $\beta$  which demonstrate strength and quality of protection, i.e. hedging.

Mathematical form of parameters is:  $\beta$  is both exponent in model function and coefficient of elasticity<sup>vi</sup>, i.e.  $E_{y,x} = \beta$

Mathematically,  $\beta$  is expressed as:  $y = \alpha \cdot x^\beta / \log$  (4)

$$\begin{aligned} \log y &= \log \alpha + \beta \cdot \log x \\ -\beta \cdot \log x &= -\log y + \log \alpha \\ \beta \cdot \log x &= \log y - \log \alpha \end{aligned}$$

$$\beta = \frac{\log y - \log \alpha}{\log x} \quad (5)$$

$R^2$  is in fact the squared coefficient of correlation, i.e. ratio of the sum of the square of deviation explained by regression and sum of squared of total deviations<sup>vii</sup>, or in mathematical formula:

$$R^2 = \frac{\sum_{i=1}^n (\hat{y}_i - \bar{y})^2}{\sum_{i=1}^n (y_i - \bar{y})^2}, 0 \leq R^2 \leq 1 \quad (6)$$

#### 4. INDICATOR OF THE DEGREE OF HEDGING NECESSITY |Z|

Previous example showed the meaning of coefficient of determination and coefficient of elasticity. Both indicators demonstrate the relationship between the observed variables and the way and to which extent the independent variable affects the dependent one.

Product of those two coefficients demonstrates how important it is to protect (to hedge) the dependent variable against the changes in independent variable, in this concrete case to protect the EBIT against changes in exchange rate.

Consequently:  $|Z| = R^2 \times \beta$  (7)

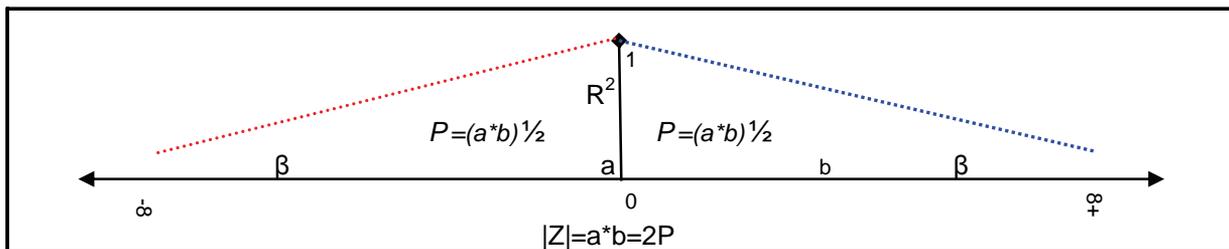
The meaning of symbols in the above relation is: IZI relates to the degree of hedging necessity;  $R^2$  is the coefficient of determination or the ratio of explained and total deviations;  $\beta$  is coefficient of elasticity. Detailed mathematical explanation of the above relation, by using the relations number (5) and (6) is:

$$\frac{\sum_{i=1}^n (\hat{y}_i - \bar{y})^2}{\sum_{i=1}^n (y_i - \bar{y})^2} \cdot \frac{(\log y - \log \alpha)}{\log x} = |Z| \quad (8)$$

Indicator IZI is synthetic absolute indicator representing the product of quotient of sum of squares of deviations of estimated values in relation to arithmetic mean and sum of squares of deviation of original results in relation to arithmetic mean of regression model and coefficient of elasticity of homogeneous function, as it is obvious that Y increases / decreases when X increases / decreases, even more intensively when  $\beta$  is bigger.

Coefficient of elasticity value, i.e.  $\beta$ , can become any real number, and coefficient of determination ranges from 0 to 1. Graphic illustration of that relationship would be as in figure 8.

Figure 8: The relationship of coefficient of elasticity ( $E_{y,x} = \beta$ ) and coefficient of determination ( $R^2$ )



Source: author's calculation

So, the value of the indicator IZI is equal to double value of surface (P) of right-angled triangle closed by sides a ( $R^2$ ) and b ( $\beta$ ) which is correct, as it is an absolute indicator.  $R^2$  is evidently a "corrective" factor, ranging from 0 to 1, it "corrects" the value  $\beta$ . So, coefficient of elasticity is "corrected" by the degree of model reliability.

The bigger absolute amount IZI is, the necessity of hedging is bigger as well, because this indicator shows how strongly the dependent variable reacts to the change of independent one and how important the changes of independent variable are to the changes of the dependent one.

The notation  $\beta$  is taken in this relation because it is expressed like:  $E_{y,x} = \beta$  as already stated on the page 14.

The importance of usage of indicator IZI can be shown by the following examples.

The values of model indicators of determination  $R^2$  and coefficient of elasticity  $E_{y,x}$  are:

- $R^2 = 0,561$
- $E_{y,x} = -4,0283$

Here are the obtained values in a case when data of some other company<sup>viii</sup> of similar branch like Atlantska plovdba are introduced into the general form of the model  $y = \alpha \cdot x^\beta$  (Tab.10)

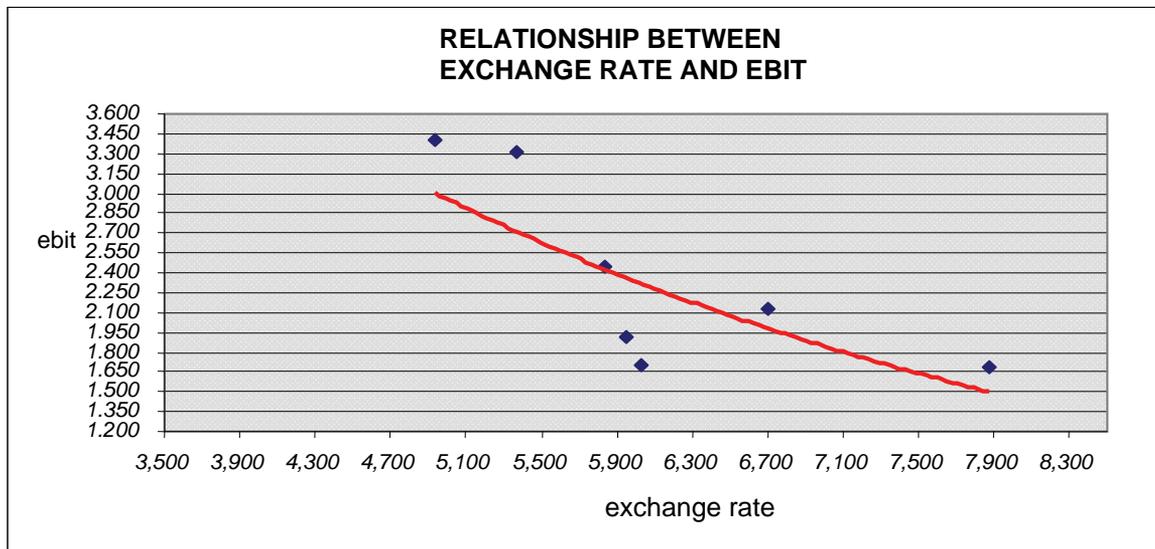
Table 10: Values of changes in exchange rate and EBIT

n	year	Exchange rate Kn/\$	EBIT (000)
1	2002	7,872	1.680
2	2003	6,704	2.125
3	2004	6,031	1.705
4	2005	5,950	1.908
5	2006	5,839	2.450
6	2007	5,366	3.313
7	2008	4,934	3.402

Source: author's calculation

General form of the model illustrates the relationship of the observed sizes, in this case the change in dollar exchange rate in relation to kuna and the movement of EBIT.

Figure 9: The relationship of value of exchange rate and EBIT



Source: author's calculation

Values of estimated parameters:

- $R^2 = 0,716$
- $E_{y,x} = -1,9209$

The necessity and impact of hedging cannot be determined only based upon the calculated parameters  $R^2; E_{y,x}$ , i.e.  $\beta$ , because in the first case  $\beta$  is bigger and  $R^2$  smaller, and in the other case it is opposite.

That is why IZI indicates to the level of hedging necessity of EBIT which is in the example I (Tab. 11) significantly bigger, obviously by being strongly influenced by the coefficient of elasticity which is double its size.

Table 11: Values of parameters of IZI indicator

Example	R <sup>2</sup>	β	Z
I	0,561	-4,0283	2,260
II	0,716	-1,9209	1,375

Source: author's calculation

IZI indicator regarded as an indicator of hedging necessity, being the weighted composite indicator in which the coefficient of elasticity is weighted by the coefficient of determination size, is not very worthy unless it is followed by the measure of protection of "threatened" or risky item, or in other words unless it is followed by hedging.

As already stated numerous times, each company needs to calculate adequate parameters of model and accordingly build a calculation of indicator IZI. Which variables will be taken into consideration depends on many factors such as: company's size, business branch, market situation, development policy, fiscal policy, macroeconomic movements etc.

## 5. CONCLUSION

This paper demonstrates the necessity of detailed business analysis in a given time frame of each company. Such an analysis determines the degree of sensitivity of cash flow, i.e. of financial results to cardinal exogenous variable change and defines an adequate econometric model and an indicator of hedging necessity. Econometric model and appropriate indicators |Z| indicate the direction of protection (meaning: what and against what to protect) and it provides an optimal hedging strategy.

Given model and indicator can be useful like an instruction to practical usage in the analysis of business activities as a thorough preparation for selection of adequate protection strategy of cash flow. Theoretically, regression model and indicator IZI represent a benefit to sophisticated techniques of business analysis in modern business.

This paper confirms the thesis that using hedging in regular business of modern companies contributes to better business and insurance of cash flows which grant normal business, development and higher degree of competitiveness, thus, it can be undoubted concluded that the introductory hypothesis is attested and validated.

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## Notes

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- <sup>i</sup> Kuna (HRK) is Croatian currency
- <sup>ii</sup> By courtesy of the authorized in Atlantska plovidba Ltd – Dubrovnik, the author got plenty of valuable information and the approval for their publishing.
- <sup>iii</sup> Atlantska plovidba Ltd. no longer owns a company for air transport since October 2011.
- <sup>iv</sup> Available tools of Microsoft Office package are used in this paper for the statistical analysis.
- <sup>v</sup> See: Chaddock R.E.: „Principles and Methods of Statistics“ (1st Edition)- Houghton Mifflin Company,The Riverside Press Cambridge, 1925. p.248; p.303
- <sup>vi</sup> Proof can be found by looking at: Martić Lj.: “Matematičke metode za ekonomske analize (I)“- Udžbenici Sveučilišta u Zagrebu, NN,1987. p.100.
- <sup>vii</sup> See, for an exemple: Kmenta J.: “Počela ekonometrije“ (II izdanje)-Mate d.o.o., Zagreb, 1997.p.240-242.
- <sup>viii</sup> In this case the author did not get the company’s approval to publish its name along the data

**ECONOMIC POLICY FOR REAL SECTOR AND R&D FINANCING: BASIC INSTITUTIONAL MODELS<sup>1</sup>**

SVETLANA KIRDINA<sup>2</sup>

**ABSTRACT**

*The paper considers institutional models that define the macroeconomic policies for real sector financing as well as the R&D financing serving further as a technological base for real sector development in various nation-states. The hypothesis is tested that two institutional models in these spheres could be singled out, so called "a state as the main investor" and "a state as the regulator". To check this hypothesis, data about the 20-year dynamics of financing in Russia (and China) and in the USA are used. Institutional matrices theory, or X- and Y-theory (Kirdina, 2012) is used to explain the differences. In this regard, a reflection of the investment characteristics in national statistics of the two countries due to institutional differences is also discussed.*

**KEY WORDS:** *real sector financing, R&D financing, finance institutions, Russia, China, the US*

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**1. INTRODUCTION**

It is impossible to reproduce the real sector of economy and the sphere of R&D, ensuring the economic growth, without mobilization of the relevant financial resources. Economic entities are provided with the necessary financial funds through the activity of set of institutions that form various institutional models of financing of the real economy and R&D sector. To the greatest extent the differences between these models are determined by the ratio of the market and the government institutions.

Generally, the study of economic growth in mainstream economics explicitly or implicitly assumes the domain of neoclassical market model where the growth is the product of innovation activity of competing companies. This assumption is deemed to be a fundamental truth. This approach assumes that the government shall just search for the optimal level of interfering in the economy, which allows the whole economy to overcome all sorts of obstacles and traps for the stable economic growth.

At the same time, there is another point of view on the problem of the government, markets and economic growth. It is based on the fact that we need to examine carefully the empirical data in order to understand where and when government economic intervention is good, and where and when it is bad, as well as the way it affects the overall economic growth (Fligstein 2005).

The paper is aimed at identification of alternative institutional models of financing of the real sector and the R&D sector, ensuring economic growth and economic reproduction on the basis of empirical-statistical investigation, as well as analyzing the reasons of their operation. Two countries, the Russian Federation (Russia) and the United States of America (the US), with traditionally

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opposed to each other ways of organizing of economic life have been chosen a priori for the analysis.

The paper is organized as follows: Section 2 provides an overview of the statistical data analysis. The results of the statistical comparison of the composition of investments made in the real sector of Russia and the US with view of sources and the property structure are given. In this case some features of the national statistical accounting systems of each country, affecting the results of the comparative analysis, are also considered. The result of this comparison is the conclusion on the action of two different institutional models of financing of economic reproduction processes in the economies of Russia and the US - "state as an investor" and "state as a regulator", respectively, which are given in section 3. In order to explain the reason why in the analyzed countries prevail the identified models, the author uses the concept of X-and Y-institutional matrices. Its main provisions, the most significant in the present context, are given in section 4. The paper ends with the conclusions given in section 5.

## 2. STATISTICAL COMPARISON RESULTS

The term "institutional model" used in the article is understood as the structure of key institutions providing finance for a real sector as well as R&D sphere. They nominate the structure of major sources that invest in them. Fixed-asset investment is a main focus of the analysis. The data on fixed investment sources in the corporate sector of the US and Russian economies over the past 20 and 15 years respectively are used in the overview.

It is known that the comparison of fixed investment source structures in Russia and the US is made difficult by the different structure of data obtained by the Federal State Statistics Service of the Russian Federation (Rosstat) and the US Census Bureau.

The first difference concerns the composition of the enterprises examined. Thus there are data on fixed investment sources for companies of all forms of ownership (excluding small business entities) including profit and non-profit organizations in Russia. State and non-state property entities (private, state-owned, mixed, joint property, etc) are fused here. They include enterprises of all branches among them financial and agricultural enterprises (Metodologicheskie polozheniya ... , 2009).

As such the US statistic data has the investment sources structure represented for corporate, non-financial, non-agricultural sector (excluding individual businessmen and small enterprises), i.e. for a lesser range of economic entities as compared to the Russian data. However, the statistics used in Russia and the USA covers the bulk of the economic entities and therefore can be used for a comparative analysis of the major trends.

The second difference is related to the structure of sources and uses of financial funds. So, for the Russian enterprises analyzed statistics distinguishes accounting for fixed capital expenditures, highlighting internal and external sources. Internal sources structure includes profits after tax and dividends, capital consumption allowance and other equity capital. External sources include bank loans, net new equity issues, high-level organizations' assets, government (of all levels) budget funds, non-budgetary funds and foreign investments (Ibid.).

In turn, the structure of financial funds for the US corporate sector, the resources for the economic reproduction of the real sector clearly do not singled out. Internal (with the same structure) and external sources are singled out here as well. But in this case corporation investment includes fixed investment as well as financial investment. In our overview we took into consideration net increase in liabilities to evaluate "raised funds". This "net increase" includes, on the one hand, net funds raised in markets with net new equity issues and credit market instruments, i.e. corporate bonds, bank loans, other loans and advances, trade payables, and on the other hand, "other issues" i.e. trade payables, miscellaneous liabilities, and foreign direct investment in the US etc.

As such, there are no such sources outlined (apparently due to being non-characteristic and insignificant) as high-level organizations' assets and governments budget funds in the US statistic data for the corporate sector. However there are industrial revenue bonds (IRB) included in

municipal securities. They represent a kind of securities issued by municipal and regional governments to finance local capital investment projects. Peculiarities of this financial instrument attribute this expense group as an equivalent to investment financing at the expense of budgetary funds.

How can we explain the revealed features of statistical records of these two countries? For the Russian Federation the process of distinguishing the data on fixed capital expenditures has a long, at least, the Soviet history, when its capital investment programs were centrally formed. These programs required the special accounting for all funds for this purpose, that has been preserved in modern Russian statistics of fixed capital expenditures.

Table 1: Corporate Funds – Sources and Uses, current prices, 1990-2010

	Units	1990	1995	2000	2005	2006	2007	2008	2009	2010
Funds for investment total	\$ bn	608	1,001	1,972	2,050	1,925	2,336	1,400	1,141	2,008
	%	<b>100</b>								
Internal funds (+IVA), including	\$ bn	424	610	735	1,089	1,089	1,058	1,069	1,049	1,181
	%	<b>69.8</b>	<b>60.9</b>	<b>37.3</b>	<b>53.1</b>	<b>56.6</b>	<b>45.3</b>	<b>76.4</b>	<b>91.9</b>	<b>58.8</b>
- profits after tax and dividends	\$ bn	27	114	13	515	342	264	73	25	227
	%	<b>4.4</b>	<b>11.4</b>	<b>0.6</b>	<b>25.1</b>	<b>17.8</b>	<b>11.3</b>	<b>5.2</b>	<b>2.2</b>	<b>11.3</b>
- capital consumption allowance	\$ bn	352	443	620	575	598	626	810	824	735
	%	<b>58.0</b>	<b>44.3</b>	<b>31.4</b>	<b>28.1</b>	<b>31.0</b>	<b>26.8</b>	<b>57.8</b>	<b>72.2</b>	<b>36.6</b>
- others	\$ bn	45	52	103	-2	149	169	186	200	220
	%	<b>7.4</b>	<b>5.2</b>	<b>5.2</b>	<b>-0.1</b>	<b>7.7</b>	<b>7.2</b>	<b>13.3</b>	<b>17.5</b>	<b>10.9</b>
Net increase in liabilities, including	\$ bn	184	391	1,237	961	836	1,277	331	92	827
	%	<b>30.2</b>	<b>39.1</b>	<b>62.7</b>	<b>46.9</b>	<b>43.4</b>	<b>54.7</b>	<b>23.6</b>	<b>8.1</b>	<b>41.2</b>
- Net funds raised in markets	\$ bn	72	179	244	-18	-99	-44	-43	-69	81
	%	<b>11.8</b>	<b>17.9</b>	<b>12.4</b>	<b>-0.9</b>	<b>-5.1</b>	<b>-1.9</b>	<b>-3.1</b>	<b>-6.0</b>	<b>4.0</b>
among them: local Industrial Revenue Bonds	\$ bn	0	3	1	8	5	8	3	6	8
	%	<b>0</b>	<b>0.3</b>	<b>0.1</b>	<b>0.4</b>	<b>0.3</b>	<b>0.3</b>	<b>0.2</b>	<b>0.5</b>	<b>0.4</b>
- Others	\$ bn	112	212	993	979	935	1,321	374	161	746
	%	<b>18.4</b>	<b>21.2</b>	<b>50.4</b>	<b>47.8</b>	<b>48.6</b>	<b>56.6</b>	<b>26.7</b>	<b>14.1</b>	<b>37.1</b>
- among them: Miscellaneous liabilities	\$ bn	83	131	673	782	826	1,285	601	220	555
	%	<b>13.6</b>	<b>13.1</b>	<b>34.2</b>	<b>38.1</b>	<b>42.9</b>	<b>55.0</b>	<b>42.9</b>	<b>19.3</b>	<b>27.6</b>
among them: Foreign direct investment in the US	\$ bn	59	55	249	99	191	287	235	101	169
	%	<b>9.7</b>	<b>5.5</b>	<b>12.6</b>	<b>4.8</b>	<b>9.9</b>	<b>12.3</b>	<b>16.8</b>	<b>8.8</b>	<b>8.4</b>

Source: Table 752. Corporate Funds - Sources and Uses: 1990 to 2010, U.S. Census Bureau, Statistical Abstracts of the United States, Washington, 2012. p. 495. (Covers nonfarm nonfinancial corporate business), and [www.census.gov/compendia/statab/2012/tables/12s0752.xls](http://www.census.gov/compendia/statab/2012/tables/12s0752.xls)

As for the US economy, the private nature of corporate ownership limits the completeness of business information disclosure. On the one hand, the presentation of the data in terms of depreciation, reducing the income tax, certainly profitable for corporations and is reported in full. At the same time, outsiders' access to the insider information on the investment portfolio profile is not always desirable. Therefore, US statistics does not allocate specific ways of uses for corporate funds.

Inconsistency of data structure for survey entities and peculiarities of external financing sources grouping outlined, impose certain restrictions on comparative analysis of the Russian Federation and the US statistical data. It is necessary to keep these restrictions in mind. However, as it will be shown below, these discrepancies do not cancel the validity of conclusions made.

What are the trends of the US corporate sector financing sources structure? The information is given in the Table 1.

As we can see, internal financing sources have been dominating in general in the US over the past 20 years (note that the same trend was in the years before). Their segment is 60% on average. If to take into account the abovementioned assumption that not all external resources are directed to the fixed capital expenditures, the share of internal sources is obviously much higher. In 2009 (the most difficult year of the global financial crisis) it increased to over 90%, e.g. The biggest percentage of internal investment sources is comprised of capital consumption allowance. It amounts in general to one third and more of an aggregate amount of sources and in the period under review it was no less than one half of corporate internal financing sources with maximum of 75-85%.

As such the raised funds in the form of credits, loans, security yields, direct foreign investment and other liabilities amount in general to less than one half. Thereat the percentage of market borrowings that are clearly identified (credit, loans, corporate securities, etc.) is steadily decreasing within the structure of raised funds, but the other parts increase, among them dominating miscellaneous liabilities. They include in general various instruments of risk hedging. Over the past 20 years their percentage exceeds that of traditional financial instruments.

Table 2: Composition of fixed investment according to financing sources in the Russian Federation, current prices, 1998-2010, %

	1995	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Funds for investment, total	100	100	100	100	100	100	100	100	100	100	100	100	100
Internal funds, including	49	52	48	49	45	45	45	44	42	40	39	37	41
- profits after tax and dividends	21	16	23	24	19	18	19	20	20	19	18	16	17
- capital consumption allowance	23	x	18	19	22	24	23	21	19	18	17	18	21
- others	5	x	7	6	4	3	3	3	3	3	3	3	3
Net increase in liabilities, including	51	48	52	51	55	55	55	56	58	60	61	63	59
bank credits and loans	-	9	10	9	12	13	15	14	16	17	18	18	15
- budgetary and non-budgetary funds	33	26	27	23	22	21	19	21	21	22	21	22	20
- high-level organizations' funds	x	x	x	x	12	13	13	11	13	11	14	16	18
- others	18	13	15	19	9	8	8	10	8	10	8	7	6
among them: Foreign direct investment	x	x	5	x	x	x	x	7	x	x	5	6	4

x – data is not available

Source: *Struktura investitsii v osnovnoi kapital po istochnikam finansirovaniya* (Composition of fixed investment according to financing sources), billions of rubles. Federal State Statistics Service of the Russian Federation web-site. <http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/enterprise/investment/nonfinancial/#>

The level of foreign investment in the US corporate sector is at 10% on average. The percentage of a budgetary fund counterpart such as industrial revenue bonds amounts to less than 1%.

The data on composition of fixed investment in the Russian Federation demonstrate to a certain degree the opposite (Table 2).

“Foreign direct investment” criterion, see: Investitsi v Rossiiskoi Federazii v 2011, (Investment in the Russian Federation in 2011) The table: Struktura investitsii v osnovnoi kapital po istochnikam finansirovaniia (Composition of fixed investment according to financing sources.)

First, there is a different ratio of internal and external fixed investment in Russia: it is on average 45% vs. 55%. In other words if the most part of real sector investment in the US is comprised of equity capital, the situation in Russia is completely reversed, that is more than a half of investment comes from external sources.

The second difference is a weak role of capital consumption allowance: while it is the biggest part of corporate equity capital used for real sector financing in the US, in the Russian Federation it amounts to less than a half. As a result capital consumption allowance in the whole fixed investment structure of Russian economic entities does not amount to 50% as in the US but in fact amounts to barely one fifth of assets used for these purposes.

The third difference deals with the external investment sources composition and quantitative difference in their structure. There is a predominant source in Russia; it involves central distribution from state budgets of different levels and non-budgetary state funds. It steadily surpasses the market raised funds. Thereat the percentage of credits and similar instruments is at the same time gradually increasing, and the percentage of government subsidies is slightly decreasing.

Peculiar to the Russian Federation is such source of investment as high-level organizations’ funds. Their percentage is gradually increasing that makes them as significant in investment as capital consumption allowance, profit, budget funds and credit market instruments.

The final difference is the percentage of direct foreign investment that is twice as low in the Russian Federation as in the US and amounts to more than 5%.

To better understand the outlined differences let’s compare the investment of the Russian Federation and of the US in terms of property forms although statistical views for property forms in the Russian Federation and in the US are not completely identical. First, let’s see the US related statistics.

The proprietary structure in the US includes two principal forms: state, or government property (federal, regional and local governments) and private property. Fixed investment data are represented in this very structure.

As it can be seen in the Table 3 the percentage of the state, or government sector in gross fixed investment was between 16% and 23% over the years.

Table 3: Gross fixed investment in the US, 2003-2010, %

	2003	2004	2005	2006	2007	2008	2009	2010
Private sector	82.8	83.7	84.4	84.2	82.9	81.0	77.2	77.4
Government sector	17.2	16.3	15.6	15.8	17.1	19.0	22.8	22.6

Source: Table 5.9. Changes in Net Stock of Produced Assets (Fixed Assets and Inventories) taken from Bureau of Economic Analysis, U.S. Department of Commerce web-site. <http://www.bea.gov/iTable/iTable.cfm?reqid=9&step=3&isuri=1&903=177>

Fixed investment structure of the two sectors reflects the percentage of state and private sectors in joint fixed assets of a country. Persistent data show that main state sector funds

percentage after the Great Depression (when the percentage amounted to 14-15%) was not more than 23%. As the state sector is represented only by governments of all levels (federal, state and local governments), it is clearly seen that the USA corporate sector is represented mainly by private enterprises. It is one of the reasons for practical absence of government subsidies in the USA corporate funds, we suppose.

As for the Russian Federation peculiarities it has a far more complex structure of property. There are 26 basic forms of property within the country according to the All-Russian Classifier of Property Forms introduced on the 1<sup>st</sup> of January 2000. One more form has been distinguished among federal property forms starting from 2010 – it is state corporation property. Fixed investment data based on property types in Russia is shown in the Table 4.

Table 4: Fixed investment in the Russian Federation, based on property types\*, %

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Funds for investment, total	100	100	100	100	100	100	100	100	100	100	100	100
- state property	27	25	22	24	19	21	21	20	20	21	18	17
- municipal property	6	6	5	6	4	4	4	4	4	4	3	3
- private property	34	42	47	47	52	51	53	56	56	60	62	61
- mixed property (no foreign participation)	32	25	21	19	18	15	13	12	11	8	9	12
- state corporation property	-	-	-	-	-	-	-	-	-	-	1	2
- joint property (with foreign participation)	1	2	5	4	7	9	9	8	9	7	7	5

\* Foreign property percentage between 12% in the beginning of 2000's and 6-8% in 2009 – 2011 was excluded from the overview.

Source: Investitsii v osnovnoii kapital v Rossiiskoi Federatsii po formam sobstvennosti (Fixed investment in the Russian Federation based on property types, current prices), billions of rubles. Federal State Statistics Service of the Russian Federation web-site. <http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite/main/enterprise/investment/nonfinancial/#>

First, it is obvious that the percentage of fixed investment in state property enterprises (20% average) is almost equal to budgetary funds and non-budgetary state funds percentage in investment over the same period as shown in the table 2. Moreover, the trend is similar as well. That is why it is quite reasonable to assume that state funds are invested predominantly in state enterprises.

Second, the presence of property types other than state and private property stands out. First of all it is mixed and joint enterprise property types with fixed investment over the years from one fourth to one fifth of the total investment amount. What is the reason for them being singled out? Is the only reason the transitional character of the Russian economy? But there is no such structure nowadays in the Eastern Europe countries that moved over as Russia from «socialism to capitalism» – their statistics on the matters discussed strictly reproduce that of the US<sup>3</sup>.

<sup>3</sup> It is characteristic that unlike western neighboring countries of the Russian Federation, the statistics of the People's Republic of China points out the same property types. The large-sized grouping includes state, municipal, private, mixed Chinese, joint Chinese and foreign property (Chung 2010, p. 13).

Ambiguity of property types in the Russian Federation has a long history and reflects one of the major civil law problems, still not solved, that is based on the understanding of a legal entity meaning. The modern Russian textbooks on the civil law theory state that in the Russian Federation “the question of a legal entity meaning is still open” (Status juridicheskikh lits, 2006, p. 6). Moreover the authors point that there is no significant advancement in the Russian civil law science (Tolstoy 2000, p. 103).

We think that the main difficulties are linked with a persistent inability to isolate economic and proprietary rights of any entity from state participation. There are theories prevailing in the global practice that compare legal entity with separate estate. If estate owners of any legal form are private individuals then these legal entities make up private proprietors. If the owners are government bodies of different levels (from the upper, federal, to the lower, municipal) then such kind of property is governmental. However, it has not been possible to separate property in such an obvious way over the whole period of the Russian history due to the fact that “the state property even with some legal entity based on it remained the state property anyway” (Status juridicheskikh lits, 2006, p. 4). In the USSR the way out of this juridical dead end was the theory of two-level state property proposed by Anatolii V. Venediktov (Venediktov 1940; 1948, p. 657-672) and supported by Sergei N. Bratus’ (1947), Olympiad S. Ioffe (1958) and many other civilists (Grazhdanskoe pravo 1998, p. 176). According to this theory “the juridical personality of a legal entity is based not only on the unity of state property but on operative administration of its parts as well” (Legal Entity Status (Status juridicheskikh lits 2006, p. 4). In other words at the upper level the unity of the state property was preserved that is belonging to the Soviet state and all the Soviet people was fixed. At the second level the right of operative administration was given to different legal entities that were able to enter legal relationship with each other.

During market-based reforms in Russia at the end of the 20<sup>th</sup> century and in the beginning of the 21<sup>st</sup> century as shown in the statistics the property types could not be fully segregated onto private and state (government) types due to, as we can see, a number of intermediate types. Moreover we think that the statistics have become complicated and inconsistent probably due to being oriented at the set political priorities.

According to official statistics, the share of investments in privately owned enterprises in the Russian Federation now makes 61%, compared to 77% in the US. In this case, if the US economy share of the latter is decreased in the last decade, then the Russian share, on the contrary, is growing. Does this mean that there is a corresponding decrease in the share and the impact of the government institutions in the investment process? Detailed analysis of the organization of statistical accounting in modern Russian Federation forces to put this statement in doubt.

Firstly, the structure of the property with the government participation becomes more representing: it includes the share of state-owned corporations.

Secondly, pursuant to the overview of the rules of Property type code assignment being in effect on the territory of the Russian Federation (Instruktsiya o porjadke ucheta juridicheskikh lits... 2001), sometimes private property is not always private in every sense of this word. For example, mixed property types include those founded by parties with governmental (federal, regional, municipal) and other structures, according to these rules. But if legal entities with any type of mixed property found other economic entities, the latter are considered as private property enterprises (Ibidem, Part 1, cl. 4.6.24). It is obvious that in such cases the function of the first-order founders (governmental structures) is preserved though officially this organization is recognized in statistics as private property.

The third example is the property codification of joint stock companies established in the course of privatization with a golden share in state property. According to the rules mentioned, such companies are identified as one of mixed property types (Ibidem), though it is more correct to identify it as modified state property.

Fourthly, the joint (with foreign participation) property includes enterprises established not only by private but also public institutions with foreign capital.

Taking into consideration the foregoing it is possible to assume that the official statistics on

the actual role of state funds in real sector financing are underrated in Russia.

The differences revealed in the financing channels of the real sector in the US and the Russian Federation allow to single out the two institutional models of the economic reproduction, which can be called "state as a regulator" in the first case and "state as an investor" - in the second. In the first model, the investment resources are concentrated in the business community, and the main task of government is to create conditions encouraging investment and economic growth. The second model involves the concentration of investment resources and its centralized management by government institutions.

It is typical that in times of crisis, accompanied by the general decline in investments the identified models appear to be more vivid. If in the US in times of crisis, the share of internal sources increases. In the Russian Federation in the same period of crisis the situation is vice versa. The share of internal sources decreases, while the typical for the "state as an investor" model the share of raised funds increases.

### **3. INSTITUTIONAL MODELS "STATE AS AN INVESTOR" AND "STATE AS A REGULATOR"**

Financing of the real sector is part of the process of economic reproduction, which also includes funding for Research and Development (R&D) sector and the provision by the banking system of "long-term money" necessary for economic growth. The difference in specified institutional models is observed in these spheres of the Russian and US economies too.

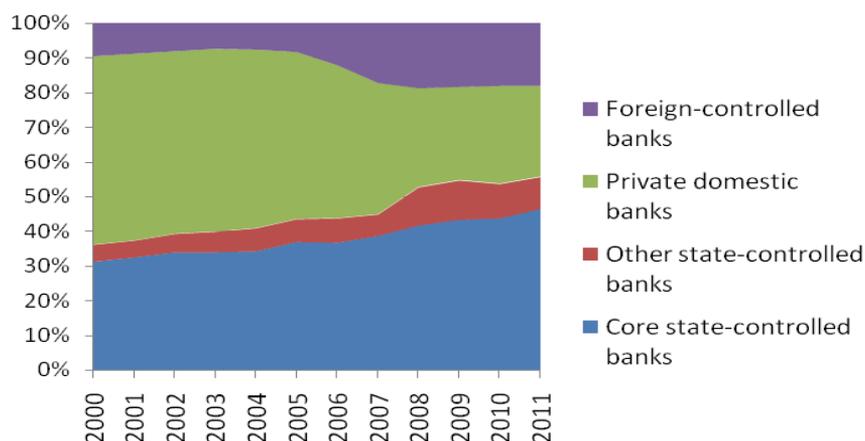
In addition to the above mentioned statistics for the Russian Federation we can add financing information of R&D – a necessary pre-phase for securing the growth of economy real sector. State (governmental entities) dominates in R&D activities in the Russian Federation and in the R&D financing structure serving further as a technological base for real sector development. Herewith the analysis of the dynamics of the Russian index in recent years shows that the state share of financing is gradually increased from 63.4% in 2007 to 70.7% in 2010 (Nauka, tehnologii i innovatsii Rossii 2011, p. 31). Apparently, in the Russian Federation the state is a major investor in R&D sector, in contrast to the US economy, where corporate (businesses) investment prevail. In the US economy, the share of public expenditures in the cost structure for R&D, providing the technological basis for the development of the real sector in 2009 made only 27.1% (Rossiiskii innovatsionnyi indeks 2011, p. 31).

The same situation is observed in the banking sector of these two countries compared. In the USA, as is known, there are practically no state-owned banks. Thus, the loans required for the development of the real sector issued by banks are the funds of private (by ownership) credit and banking system. The Russian economy in 1980-1990s in the early transformation period also attempted to replace the state banking system, historically prevailing in our country, by private one. For this purpose the state-owned banks were privatized, the organization of new private banks were allowed, foreign credit institutions with private capital entered on the territory of the country. However, the analysis of the dynamics of the Russian banking sector shows that there is a return of the state into the banking sector (Figure 1).

Already by 2000, the proportion of state-controlled banks has increased to one-third, and since 2010 to more than half, and continues to grow (Vernikov 2012). The reasons of such the banking system evolution have been shown in our studies (Kirdina and Vernikov, 2013). Thus, in the credit and banking system of the Russian Federation the state, in contrast to the US economy, plays more important role in the financing of the real sector compared to the private entities.

The model "state as an investor" domination does not cancel the state's role as an investment process regulator. Even more the harmony between these two models is a necessary condition for a successful development of any country. However for the countries with economic institutions of an X-matrix domination (besides the Russian Federation we also place China and a number of other countries in this group – it will be discussed in the next paragraph) such harmony is based on the frame character of the institutional model "state as an investor".

Figure 1: Combined market shares of Russian banks by form of ownership, end of respective year



Source: Kirdina and Vernikov 2013.

China showing progress in its economy modification over the last decades, can fully demonstrate this statement nowadays. As the specialists note the state plays a major role in China investment process (L'vova 2011, p. 10-11). First, we refer to the direct and indirect investment support of large-sized state companies. It is they who play the key role in and outside the Chinese economy. Moreover, as noted by worried observers from the western countries “the state-owned enterprises in China are potentially poised to alter the rules of global economic competition” (Schuman 2012). The state-owned companies receive financial support in the form of state subsidies, regulatory privileges and various benefits. Despite the ideological rejection of the following policy the western experts are nevertheless forced to acknowledge that such companies are “a potentially powerful mix that can reshape the global competitive environment” (Ibid.) and it contributes to the extension of influence of China over the international markets.

Second, in China with the domination of the “state as an investor” model the state banking system role is great as such the State development bank provides up to 80% of all loan portfolio (Zhifeng 2011). As a result there is a multistep investment system established in China. It includes state and private investment. Thereat the state acts as the main investor but at the same time attracts by all means private (including foreign) investment. The system includes development of long-term investment plans, activities to improve investment climate, and a scientific approach to price formation. Within investment area free pricing is coupled with measures of strict control over expenditures and prices. Auditions on price formation for infrastructure facilities are conducted as well as strategies and plans are openly developed. It often helps to avoid substantial errors.

The advantages of the institutional model “state as an investor” are central resource support of the branches with the highest priority and evasion from cyclical changes. At the same time its main problems are insufficient motivation of would-be innovators, risk of corruption and investment thieving at the local levels. It is noted in the expert’s publications (see for example, Yanrui Wu, Zhengxu Wang and Dan Luo 2009). Struggling with such risks implies the improvement of the model “state as an investor” itself as well as the necessary compensating action of the alternative model “state as a regulator”.

The institutional model “state as a regulator” that is characteristic to the USA is described in numerous publications on the state investment activity regulation. That is why we will give here only some examples.

So, such regulation results in the above-mentioned investment structure data (table 1) showing a high percentage of capital consumption allowance in the US corporations’ real sector

investment. It refers to the state policy of so called “accelerated capital allowance”. In the Russian academic literature this phenomenon is described in details by Michail M. Sokolov (2010) in his reviews of the US and the Russian Federation economic strategy concerning capital consumption allowance. The US took this strategy before the rest consistently improving the rate of fixed assets replacement and indirectly financing investment activities using state budget funds (Fedorovich and Patron 2007). Capital consumption allowance in this context is deemed to be the most important element of tax policy as it represents a share of corporate tax-exempt profit. Therefore in a short-term period an increase of allowance leads to tax revenues reduction in the budget (Mal'tseva 2012). At the same time in the context of development prospects this strategy proves to be effective.

The choice in favor of the “state as a regulator” model over the “state as an investor” model is described by the investment companies program for small business aimed to support venture capital financing in the US. If at first the US considered venture capital investment support as direct participation in the capital of companies formed then later restricted itself to providing state guarantee for bonds issued by venture capital companies. As the researchers note that “the US abandoned venture investment support with participation in the equity capital of the venture capital companies due to heavy losses” (Spitsyn 2010, p. 9) in favor of indirect supportive actions.

The advantages of the “state as a regulator” model are high investment activity of market entities and in this respect a higher rate of technological progress. It is the decentralization in some experts' opinion that provides permanent innovation flow for market economies (Kornai 2012). The problems of this model are cyclicity and ‘financial bubbles’ risks (Perez 2002), that emerge in the stock markets as a result of profit pursuit by isolated market entities. The institutional model “state as a regulator” risk reduction is achieved by its improvement as well as by incorporation of the alternative “state as an investor” model complementing the general practice of real sector financing in the countries with market based economy.

#### **4. INSTITUTIONAL MATRICES THEORY (IMT), OR X- AND Y-THEORY**

We shall try to explain the reason for the domination of the “state as regulator” model with real sector financing in some countries and the domination of the “state as an investor” model in the other countries based on the institutional matrices theory (Kirdina 2001; 2010).

This theory represents human society as a social system structured in three spheres: *economy, politics and ideology*:

- economic sphere with interrelations that involve resources used for the production and reproduction of work and business-related activities;
- political sphere with interrelations for regular and organized public and civil society actions that aim to achieve defined local, regional or national objectives; and
- ideological sphere with interrelations that embody important social and cultural ideas and values of a nation's people.

These main spheres are strongly interrelated morphologically as parts, sides or components of an indivisible whole. Each sphere is regulated by a corresponding set of basic institutions. Institutions permanently reproduce the staples of social relations in different civilizations and historical periods. Basic institutions integrate a society into one whole that develops sometimes with conflicts and at other times with harmony, sometimes with competition and at other times with cooperation.

Institutions have a dual character: they are objectively determined and also at the same time ‘human-made,’ which involves subjective and teleological features. On the one hand, institutions manifest self-organizational principles in a society as a co-extensive political-economic-ideological system. On the other hand, institutions are the result of purposeful human reflection with regard to relevant laws and rules; they emerge, extend and are shaped as human-made entities.

As Thorstein Veblen wrote, “Social institutions are not only the result of selection and adaptation processes, shaping the prevailing and dominant types of relationships and spiritual position, at the same time they are special modes of the existence of a society, forming a special system of social relations and, hence, in turn, are an effective selective factor” (Veblen 1899, p. 188). Aggregations of interrelated basic economic, political and ideological institutions are defined by IMT as *institutional matrices*. Historical observations and empirical research as well as mathematical modelling and a broad philosophical approach constitute the ground for our hypothesis about two particular interdependent types of institutional matrices existing around the world. Namely, we call the two types X-matrices and Y-matrices and compare the unique identities of each one in relation to the other. These matrices differ in function according to the set of basic institutions forming them.

The X-matrix is characterized by the following basic institutions:

- in the economic sphere: *institutions of a redistributive economy* (a term introduced by Karl Polanyi (Polanyi 1977). Redistribution-oriented economies are characterized by a situation where the center (at the top) regulates the movement of goods and services, as well as the rights to their production, reproduction and use;
- in the political sphere: *institutions of a unitary (centralized) political order*;
- in the ideological sphere: *institutions of communitarian ideology*, the essence of which is expressed by the idea of collective, shared, public values and rights governing over individual, sovereign, private values and rights, i.e. the priority of We over I.

The Y-matrix is characterized by the following basic institutions:

- in the economic sphere: *institutions of a market economy. Market-oriented economies are characterized by a situation where horizontal exchange relations between economic agents exist*;
- in the political sphere: *institutions of a federative (federative-subsidiary) political order*;
- in the ideological sphere: *institutions of an individualistic ideology*, which proclaims the dominance of individual values and rights over the values and rights of larger communities, where groups are subordinate to personalities, i.e. the priority of I over We.

In real-life societies and nations, X- and Y-matrices interact, with one of them permanently prevailing and governing. Nevertheless, the matrices are not and cannot be entirely exclusive of each other, even that both X- and Y-matrices co-exist concurrently in any given case. This is what distinguishes IMT as an approach based not on conflict, but rather on cooperation and collaboration.

In other words, the social structure of any society can be singled out as a dynamic binary-conjugate structure of these two dialectically interacting, yet alternative complementary institutional complexes. The governance of one of the matrices over the other is usually constant in the course of history. The dominant institutions of the prevailing matrix therefore serve as a performance framework for harmonizing complementary institutions from the other matrix.

We contend that X-matrix institutions predominate in Russia, China, and India, along with most Asian and Latin American countries. In these cases Y-matrix institutions are also “a must,” but they have a complementary and additional character instead of a governing voice in society. And conversely, Y-matrix institutions prevail in most European countries and in North America as well as Australia and New Zealand, whereas X-matrix institutions also exist but at a smaller ratio.

All economic, political and ideological X- and Y-institutions coexist in different combinations and are embodied in many institutional forms. Thus, though we are outlining the general features of X- and Y-matrix institutions, in real-life situations the extreme cases are never fully demonstrated. The most efficient and effective functioning of X- and Y-matrices in each society requires an appropriate institutional balance with all morphologically interconnected institutions.

Why do X- or Y-institutions following historically determined institutional forms dominate in the structures of societies? The material and technological environment is seen as a key

historical determinant of whether either an X-matrix or a Y-matrix prevails, along with culture and social actions<sup>4</sup>. The national environment can stress an indivisible *communal* system, wherein removal of some elements can lead to disintegration of the whole system or it can amplify a *non-communal* system with possibilities of functional and technological division (Bessonova et al. 1996, p.17-18). The institutional content of a nation developing within a communally-oriented environment is achieved by the tasks of coordinating joint efforts towards efficient and effective usage. In this way, X-matrices are formed under communal conditions.

A non-communal environment, on the other hand, is divisible into separate, disconnected elements; it is more easily able to disperse and can exist as an aggregate of dissociated, independent technological objects. In this case, an individual or group of people (e.g. families) can participate using parts of the non-communal environment in their economy, can maintain their effectiveness, and use the obtained results themselves, without cooperating with other members of the society. When this is the case, the main function of the surrounding social institutional structures is to assure interaction between the atomized economic, political and social agents. Y-matrix institutions are shaped in such a non-communal environment.

To make a summary, in communal environments X-matrix institutions are dominant and Y-matrix institutions are complementary, while in non-communal environments the institutional balance is reversed.

The ratio of dominant and complementary institutions is defined by the changing conditions of political-economic-ideological development. At one extreme, there is an outright dominance of one type of institutional matrices, yet without conscious implementation of complementary 'other matrix' institutions. This tends to result in a general systematic collapse (e.g. USSR's breakdown in the 1980s and '90s) or in a social and economic crisis (e.g. the US's recent 2007-'09 recession).

The opposite extreme implies an attempt to replace historically dominant institutions with complementary ones. This move leads to revolutions through reconstructing dominant institutions into new forms (e.g. the French Revolution as a reaction to economic and political centralization and, alternatively, the Russian October Revolution (1917) as the outcome of an attempt at "building capitalism") or unsustainable socio-economic development (e.g. some Latin American countries). The main task of social and economic policy making in each country is thus to support the optimal combination (cf. proportional balance) of predominant and complementary institutions. For example, economic policy aims to find the best proportion between market and planned redistributive institutions as well as means to their modernization (Kirdina 2001). People and authorities can actively help to achieve this balance faster and more efficiently with concentrated "teleological" efforts, rather than just letting "unguided" evolutionary history (cf. "the invisible hand") take its course.

The institutional model described as "state as an investor" is typical for countries where X-matrix with the redistributive economy, the unitary (centralized) political order and the communitarian ideology prevails. The institutional model "state as a regulator" is characteristic for countries where Y-matrix with the market-oriented economy, the federative (federative-subsidiary) political order and individualistic ideology dominates.

## 5. CONCLUSION

Comparative statistical data and analytical surveys show that it is possible to distinguish two basic institutional models – "state as an investor" and "state as a regulator" in real sector and R&D financing. Even though they do not exist separately but rather coexist, one of the models strongly dominates over the other one. The dominating position of any of the models is related to social, economic and political processes and the type of a predominant institutional matrix. It is

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<sup>4</sup> The role of cultural factors for economic development is investigated in work of the so-called civilization approach (see e.g. Rosefielde, 2008). In IMT these factors are not investigated.

reasonable to keep in mind the mentioned differences during the institutional overview of economic growth problems and mechanisms. We hope to continue a comparative institutional analysis to test the hypothesis about the relationship and interaction between two abovementioned models in a context of other nation-states.

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## EXTREMAL QUANTILES OF MAXIMUMS FOR STATIONARY SEQUENCES WITH PSEUDO-STATIONARY TREND WITH APPLICATIONS IN ELECTRICITY CONSUMPTION

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### ABSTRACT

We propose a method for estimation of the distribution function of the maximums for time series with pseudo-stationary trend on the basis of the earlier proved by the author theorems. The results are applied for estimation of the distribution function for the extremal values of electrical energy consumption.

**KEY WORDS:** Stationary sequences with periodic trend, estimation of the distribution function, forecasting, energy consumption.

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JEL Classification: C61, C62, C63, C72

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### 1. INTRODUCTION

The problem of estimation the distribution function for the maxima of time series with pseudo-trend plays an important role when calculating reserves, forecasting consumption peaks (e.g., energy consumption), predicting extremes in weather events (e.g., temperatures), forecasting extremal price-levels. These challenges can be approached from the perspective of the classical results from Extreme Values Theory (EVT) (see Suveges 2008), and from a position of the results which, to some extent, are extensions of the classical EVT, seasonally adjusted data. We study the behaviour of maximums of electrical energy consumption in Russia from the point of both methods. But it should be stresses that the second extended method allow us to use more data and get robust results. For empirical illustrations we use hourly electricity consumption in Russia from the period from 1-th of July till 10-th of September 2005, taken from the site of the System Operator of the Unified Energy System of Russia (see 1).

The rest of the paper proceeds as follows. Section 1 provides formulations of the theorems for approximation the distribution function of maximum for time series with pseudo-stationary trend. In theoretical background section, we presented Fisher, Tippett and Gnedenko theorem together with the extended limit theorem for normalized maxima for stationary sequences with pseudo-stationary trend. Section 2 consists of empirical illustrations where is presented the procedures for high quantiles approximation. Section 3 concludes.

### 2. THEORETICAL BACKGROUND

The classical Extreme Value Theory studies asymptotic distribution of maxima of independent and identically distributed random variables with the function with distribution function  $F(x)$ . The basis of this theory is Fisher-Tippett-Gnedenko theorem (Theorem on extremal types, see (De Haan and Ferreira 2006), (Fisher and Tippett 1928), (Gnedenko 1943), (Leadbetter and Lingren et al. 1983). Theorem Fisher-Tippett-Gnedenko, states:

#### **Theorem 1.n (Gnedenkon 1943); Fisher and Tippett 1928)**

If for the distribution functions  $F(x)$  and  $H(x)$  there are such  $a_n > 0$  and  $b_n$ , that

$$\lim_{n \rightarrow \infty} F^n(a_n x + b_n) = H(x),$$

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at any continuity point of  $H(x)$ , then  $H(x)$  must coincide up to linear transformation of the argument  $x$  (with a positive coefficient of scale) with one of the three distribution functions,  $H_1(x) := \exp\{-e^{-x}\}$  (Gumbel distribution),  $H_2(x) := \exp\{-x^\beta\}, x > 0$ , (Fréchet distribution with  $\beta < 0$ ) and  $H_3(x) := \exp\{-(-x)^\beta\}, x \leq 0$  (Weibull distribution with  $\beta > 0$ ).

Note, that  $F^n(a_n x + b_n)$  represents the distribution function of the normalized maximum for  $n$  identically independently random variables with distribution function  $F$ .

Denote  $D_\nu, \nu = 1, 2, 3$ , as the disjoint domains of attraction, that is  $F \in D_\nu$  if and only if the limit of the sequence  $F^n(a_n x + b_n)$  belongs to type  $H_\nu, \nu = 1, 2, 3$ , respectively. Details and proofs can be found in the monograph (Leadbetter M. R. et al. 1983). It turns out, that this approximation is suitable in the case of weak dependence for the large values of the  $X_i$  far away from each other, see (Leadbetter et al. 1983, Leadbetter 1974) Relevant mixing conditions are known as Leadbetter's mixing conditions.

In this paper we consider the extended problem of approximation for distribution of the maximum values of the time series:

$$Y_i = X_i + c m_i, \quad i = 1, 2, \dots, \quad (1)$$

where  $\{X_i, i = 1, 2, \dots\}$  – strictly stationary random sequence,  $\{m_i, i = 1, 2, \dots\}$  – trend, which behaves in the below defined stationary manner (for example, seasonal component),  $c$  – small parameter. It is assumed, that the distribution function  $F(x)$  of the random variable  $X_1$  belongs to the maximum-domain of attraction. It means, that there are some positive sequence  $a_n$ , some  $b_n$  and nondegenerate distribution function  $H(x)$  such that at any continuity point  $x$  of the function  $H$  the sequence  $F^n(a_n x + b_n)$  converges to  $H(x)$  when  $n \rightarrow \infty$ .

We introduce some initial conditions which are needed for our main result.

**Condition 1.** The sequence  $\{m_i, i = 1, 2, \dots\}$  is above-bounded:  $m := \sup_{i=1,2,\dots} m_i < \infty$ .

Onwards the small parameter  $c$  is taken equal to  $a_n$ , where  $a_n$  – normalizing sequence from Fisher-Tippet-Gnedenko theorem, which corresponds to the distribution function  $F$ , that is,  $c = c(n) \equiv a_n$ . In the next section, we recall a specific type of normalization  $(a_n, b_n)$ , depending on the attraction domains,  $D_1, D_2$  or  $D_3$  for distribution function  $F$ . More details see, for example, in (7).

Denote  $u_n = a_n x + b_n$ . Introduce Leadbetter's type mixing condition for large values of the (1).

**Condition 2.** (Condition  $D^2(u_n, a_n, \{m_k\}_{k=1,\dots,n})$ ) There exists a family of numbers  $\{\alpha_{n,l}\}, n, l = 1, 2, \dots$  and sequence of positive integer numbers  $\{l_n\}$  such that  $l_n = o(n), \alpha_{n,l_n} \rightarrow 0$ , and for any  $x, y$  and arbitrary sets of positive integer numbers  $I = \{i_1, \dots, i_p\}, J = \{j_1, \dots, j_q\}$  such that

$$1 \leq i_1 < i_2 < \dots < i_p < j_1 < \dots < j_q \leq n, \quad j_1 - i_p \geq l_n,$$

holds the following inequality:

$$|P(\bigcap_{j \in I \cup J} \{X_j \leq u_n - a_n m_j\}) - P(\bigcap_{j \in I} \{X_j \leq u_n - a_n m_j\})P(\bigcap_{j \in J} \{X_j \leq u_n - a_n m_j\})| \leq \alpha_{l_n, n}.$$

Condition 2 ensures the mixing (weak dependence) far away separated large values of the time series (1).

**Condition 3.** (Condition  $D'(u_n - ma_n)$ ) The following equality holds:

$$\lim_{k \rightarrow \infty} \limsup_{n \rightarrow \infty} \sum_{2 \leq j \leq n/k} P\{X_1 > u_n - ma_n; X_j > u_n - ma_n\} = 0.$$

We introduce "empirical distribution functions" of the trend values for  $Y_i$ :

$$G_n(x) = \frac{\#\{i: m_i \leq x, 1 \leq i \leq n\}}{n},$$

where the sign # denotes the number of elements of the set.

Let  $G$  - nondecreasing nonnegative left-continuous bounded function, denote  $a_+ := \max(a, 0)$ , and define the functions:

$$\begin{aligned} L_1(z, G) &= e^{-z} \int_{-\infty}^{+\infty} e^t dG(t); \\ L_2(z, G) &= \int_{-\infty}^{+\infty} (z - t)_+^\beta dG(t), \quad \beta < 0; \\ L_3(z, G) &= \int_{-\infty}^{+\infty} (t - z)_+^\beta dG(t), \quad \beta > 0. \end{aligned}$$

Now we formulate the pseudostationarity condition for the sequence  $\{m_k, k = 1, 2, \dots\}$ .

**Condition 4.** There exists  $G(x)$  such that the convergence in probability holds:

$$\lim_{n \rightarrow \infty} G_n(x) = G(x) \quad (2)$$

at any continuity points  $x$  of the function  $G(x)$ . Besides, for any  $\nu = 1, 2, 3$ , if  $F \in D_\nu$ , then for any  $x$  and  $\eta = 0, 1$  there exists finite limits:

$$\lim_{n \rightarrow \infty} L_\nu(x, G_n) = L_\nu(x, G) < \infty.$$

Functions  $L_\nu(x, G)$  are involved in formulas for limit distribution of the maxima. Note, that if (2) is satisfied, then  $L_2(x, G)$  isn't necessarily finite.

The main result of the article concerns the limiting joint distribution of the random variables:

$$M_n = \max\{X_i + m_i a_n; i = 1, \dots, n\}$$

with infinitely growing  $n$ .

**Theorem 2.** Let in model (1)  $F \in D_\nu$ , where  $\nu = 1, 2$  or  $3$ . Assume, that conditions 1 – 4 are satisfied. Then, if  $\nu = 1$  or  $\nu = 3$ , then for any  $x, y$ ,

$$\lim_{n \rightarrow \infty} P\{M_n \leq u_n\} = e^{-L_\nu(x, G)}, \quad (3)$$

if  $\nu = 2$ , then for any  $x, y > m$ ,

$$\lim_{n \rightarrow \infty} P(M_n \leq u_n) = e^{-L_2(x, G)}. \quad (4)$$

**Proof of Theorem 2:** Proof of this theorem is similar to (Kudrov 2008).

### 3. EXTREMAL BEHAVIOUR OF ELECTRICAL ENERGY CONSUMPTION

In this section we apply our theoretical results for the study of hourly consumption of electrical energy in Russia for the period from 1-th of July till 10-th of September 2005 year. Visual analysis of changes in electrical energy consumption leads to conclusion about its periodicity per day.

Moreover, we can see that there is a periodicity associated with days within a week, and yearly-periodicity (seasonal homogeneity), so that it is common, that changing in electrical energy consumption during the year follows the seasonal regularity, and, for example, we can distinguish the months with the highest electrical energy consumption and the months with the lowest electrical energy consumption. For the full study of extremal electrical energy consumption we must also consider yearly-trend.

We take the data from subperiod, 7-th of June till 22-th of July 2005, as an example of seasonal homogeneity. We will consider only the data from Tuesday to Thursday in every week since consumption peaks during a week is reached only in these days and for these days there is a similar structure of consumption.

We denote by  $\hat{C}_k$  consumption for the  $k$ -th hour of the considered time-interval. Let  $(\hat{C}_k)$  is a sample from stochastic sequence  $(C_k)$ . Assume that the elements of this random sequence  $(C_k)$  is represented as the sum of deterministic periodic component  $(p_k)$  and a stationary time series  $(X_k)$  with zero mean, otherwise it can be subtracted from stationary stochastic component and added to the deterministic component:

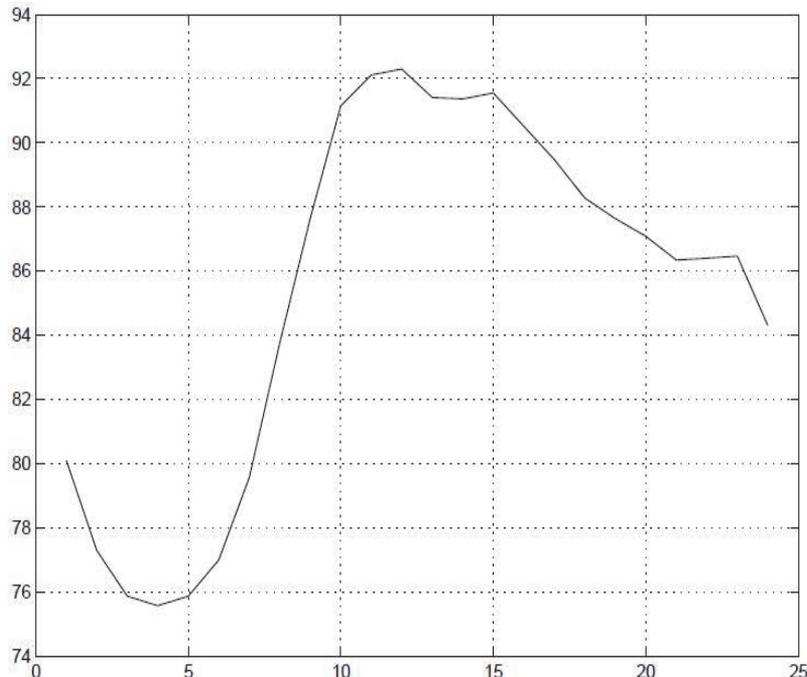
$$C_k = X_k + p_k.$$

Next, we suppose that a deterministic periodic component has a period, which equals to 24 which corresponds to the number of hours per day. The estimator for  $(p_k)$  is calculated as follows:

$$\hat{p}_i = \frac{\hat{C}_i + \hat{C}_{i+24} + \dots + \hat{C}_{i+24(K-1)}}{K}, \quad (12)$$

where  $1 \leq i \leq 24, i \in N$  and  $K$  – number of days covered by the sample (in this case,  $K = 28$ ). Figure 1 shows graphically the values  $(p_i; 1 \leq i \leq 24)$ .

Figure 1: Estimator for periodic component (energy consumption)



Denote

$$\hat{X}_i = \hat{C}_i - \hat{p}_i, 1 \leq i \leq 24K.$$

Since consumption peaks during a day occur in the time interval between 8:00 and 18:00, it makes sense to consider only the values which correspond to this period of time, namely:

$$(\hat{C}_{i+24(m-1)}, i \in [8,18] \cap \mathbb{N}, m = 1, \dots, K),$$

$$(\hat{X}_{i+24(m-1)}, i \in [8,18] \cap \mathbb{N}, m = 1, \dots, K),$$

$$(\hat{p}_i, i \in [8,18] \cap \mathbb{N}).$$

Denote  $j$ -th element of the first two sequences from the above mentioned as  $\hat{C}_j^*$ ,  $\hat{X}_j^*$ , respectively, where  $1 \leq j \leq 11K$ , and  $j$ -th element of the third sequence as  $\hat{p}_j^*$ , where  $1 \leq j \leq 11$ .

We take the maximal element in each interval of indices  $[1 + 11(m - 1), 11m]$ , where  $m = 1, \dots, K$  for the sequences  $(\hat{C}_j^*)$  and  $(\hat{X}_j^*)$ , which we denote as:

$$\hat{M}_1, \dots, \hat{M}_K$$

and

$$\hat{M}'_1, \dots, \hat{M}'_K,$$

respectively.

Let  $(\hat{X}_j^*)$  - sample from  $(X_j^*)$ , then  $(\hat{C}_j^*)$  - sample from  $(X_j^* + \hat{p}_j^*)$ . Assume, that  $(X_j^*)$  is stationary and satisfies asymptotic independence property. Then, applying the results of Theorem 4 (the case, when periodical component equals zero), we get the limit distribution function for the lineraly normalized maximum of  $(X_j^*)$  (distribution function of extremal types). We estimate the parameters of this limit theoretical distributional function. For that we need to estimate an extremal index for the distribution function of extremal types. We use Pickands estimator for the extremal index.

Let

$$\hat{X}_{11K,11K}^* \leq \hat{X}_{11K-1,11K}^* \leq \dots \leq \hat{X}_{1,11K}^*,$$

- order statistics for  $(\hat{X}_j^*)$ .

Then Pickand's estimator is defined as follows:

$$\hat{\xi}_{i,n} = \frac{1}{\ln 2} \ln \frac{\hat{X}_{i,11K}^* - \hat{X}_{2i,11K}^*}{\hat{X}_{2i,11K}^* - \hat{X}_{4i,11K}^*}$$

This estimator has the following properties (see DeHaan 2005):

- 1) If  $i(n)/n \rightarrow 0$  when  $n \rightarrow \infty$ , then  $\hat{\xi}_{i,n}$  converges in probability to  $\xi$  (consistent estimator).
- 2) Under some additional conditions  $\sqrt{i}(\hat{\xi}_{i,n} - \xi)$  has asymptotically normal distribution with zero mean and variance:

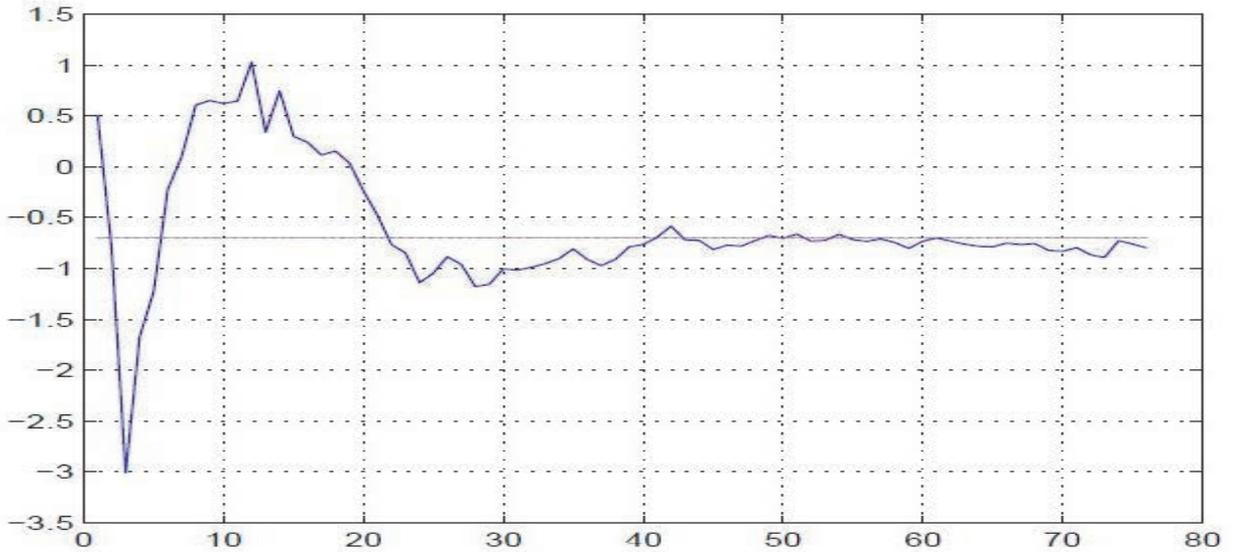
$$v(\xi) = \frac{\xi^2(2^{2\xi+1}+1)}{(2(2^\xi-1)\ln 2)^2}.$$

For the choice of optimal Pickand's estimator  $\hat{\xi}_{i,n}$ , we use visual method, for that we depict the graph for

$$\{(i, \hat{\xi}_{i,n}): i = 1, \dots, 101K/4\},$$

see Figure 2.

Figure 2: The graph for Pickands estimator for data with subtracted periodic component



and choosing the largest area where the graph is nearly horizontal (see [Embrechts, Kluppelberg, Mikosch (1999)]). Thus, we take:

$$\tilde{\xi} = -0.7009,$$

in accordance with the above-mentioned properties, 95% asymptotic confidence interval for this value is:

$$[-1.5776; -0.5967].$$

Denote the empirical distribution function  $\hat{M}_1, \dots, \hat{M}_K$  as  $U(x)$ , and the empirical function distribution of  $\hat{M}'_1, \dots, \hat{M}'_K$  as  $G(x)$ .

Let us now compare the empirical distribution function  $G(x)$  and the theoretical distribution function with extreme type index  $\tilde{\xi}$ . For this we use the  $QQ$ -plot to depict graphically the set (see Fig. 3):

$$A = \left\{ \left( G^{-1}(i/(K+1)); - \left( -\ln \left( \frac{i}{K+1} \right)^{-\tilde{\xi}} \right) \right) : i = 0, \dots, K \right\}.$$

As we can see the elements of set  $A$  are very close to the line constructed using the method of weighted least squares. Transform linearly  $y$ -axis on the coordinate plane replacing it by  $(y' = (y - b)/a)$  so that the points set  $A$  are located along the line  $y' = x$  (see Fig. 4).

Figure 3: Quantile-quantile plot for A, where on x-axis are pointed the quantiles of empirical distribution function for normalized maximums of data with subtracted periodic trend and on y-axis are pointed the quantiles of standard distribution function of extreme types with the estimated extremal index  $\tilde{\xi}$

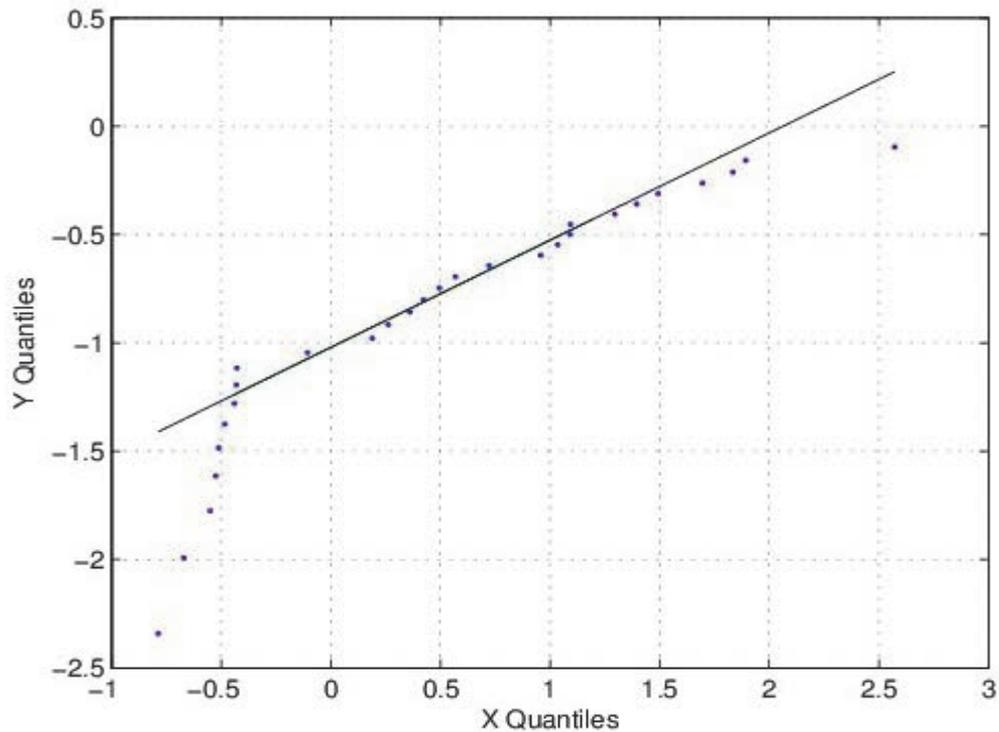
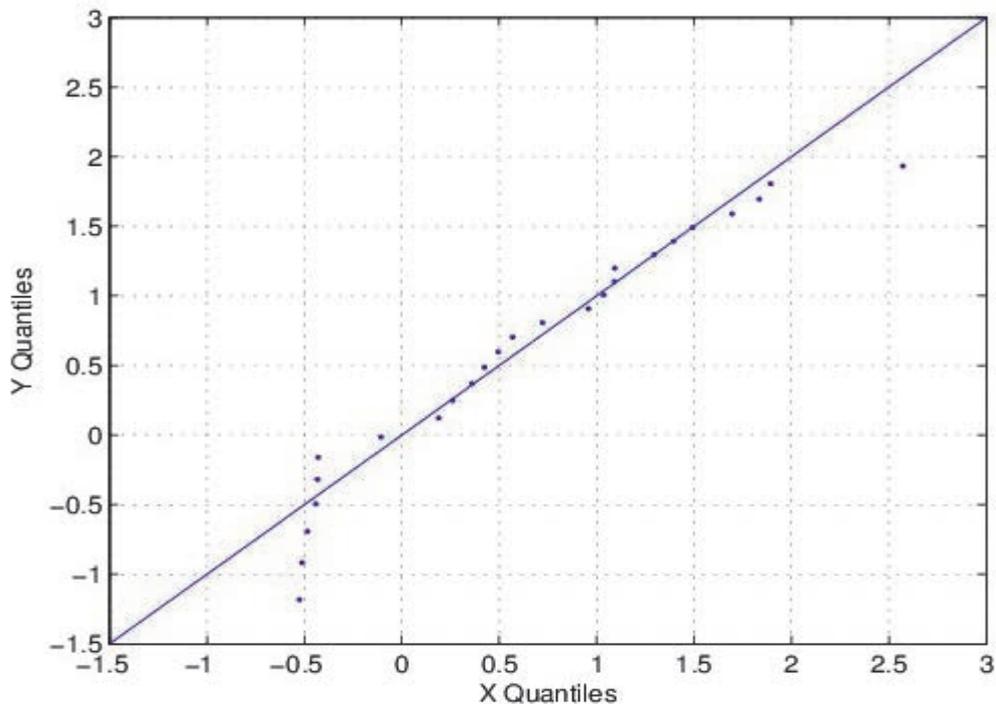


Figure 4: The graph obtained after a linear transformation of the second coordinate for elements of A, where on x-axis are pointed the quantiles of empirical distribution function for normalized maximums of data with subtracted periodic trend, and on y-axis are pointed the linearly transformed quantiles of standard distribution function of extremal types with extremal index  $\tilde{\xi}$



This linear transformation defines normalization for maximums by which we normalize maximums:

$$(\widehat{M}_1 - b)/a, \dots, (\widehat{M}_K - b)/a.$$

Next, we use Theorem 2, wherein is presented limiting distribution function for normalized maxima for corresponding sequences (including periodic component) and get that the distribution function

$$P(x) = \exp \left\{ -\frac{1}{11} \sum_{i: \frac{\widehat{p}_i^*}{b} > x} \left( \frac{\widehat{p}_i^*}{b} - x \right)^{-\xi} \right\}$$

should approximate the empirical distribution function of the sample:

$$(\widehat{M}_1 - b)/a, \dots, (\widehat{M}_K - b)/a.$$

In order to see how well one distribution function approximates another distribution function, refer to the set:

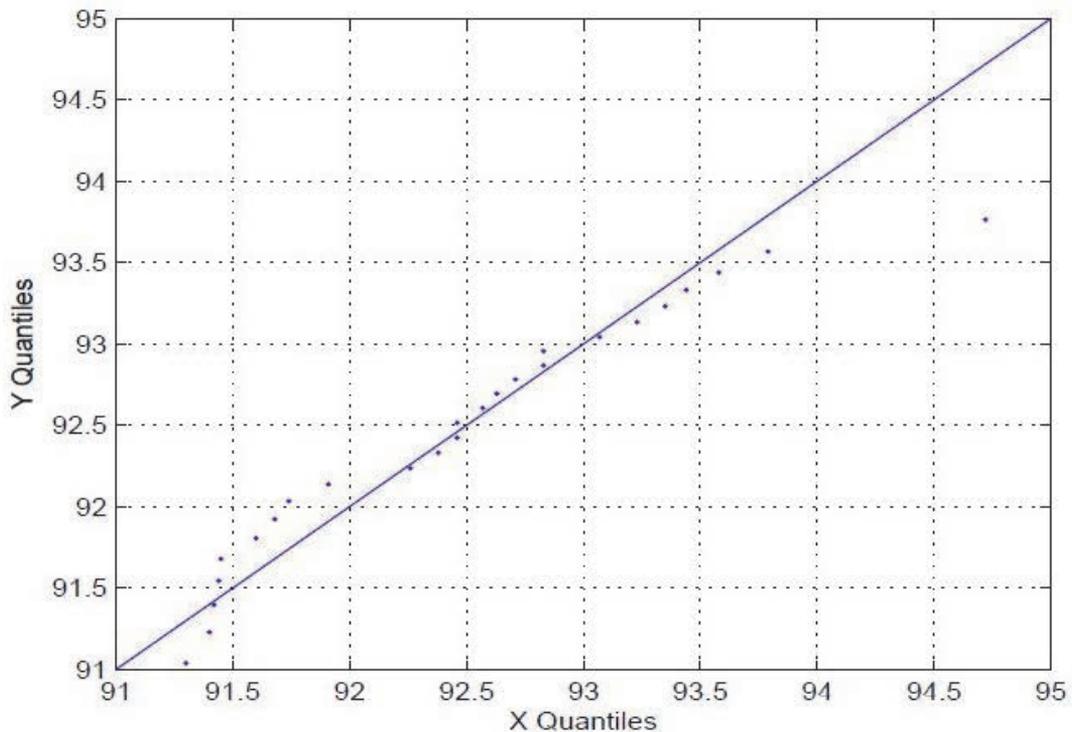
$$B = \{(U^{-1}(i/(K+1))); at(i/(K+1)) + b\}: i = 0, \dots, K\},$$

where  $t(i/(K+1))$  - solution of the equation:

$$\exp \left\{ -\frac{1}{11} \sum_{i: \frac{\widehat{p}_i^*}{b} > t(i/(K+1))} \left( \frac{\widehat{p}_i^*}{b} - t(i/(K+1)) \right)^{-\xi} \right\} = \frac{i}{K+1}.$$

Note that this equation always has a solution, as a function on the left-hand side is monotone in  $t(i/(K+1))$ . Let point on  $(x, y)$ -plane the graph for  $B$  (see Fig. 5).

**Figure 5:** Quantile-quantile plot for  $B$ , where on  $x$ -axis are pointed the quantiles of empirical distribution function of the normalized maximums and on  $y$ -axis are pointed the quantiles of theoretical distribution function from Theorem 2, taking into account the periodic component



As we can see from the figure, the points of  $B$  are located sufficiently close to the line  $y = x$ , which means that the distribution of  $P(ax + b)$  quite accurately approximates the empirical distribution function  $U(x)$  in the region of high quantiles.

Since the periodic component in the considered time interval (from 8:00 to 18:00) is sufficiently flat, it seems reasonable to consider the application of the classical extreme value theory, excluding the impact of the trend, and compare that results with the results obtained above.

In order to construct an estimate of extreme index we use Pickands estimator again using observations:

$$\hat{C}_1^*, \dots, \hat{C}_{11K}^*$$

Take an order statistics for the sequence  $(\hat{M}_i)_{i=1}^K$ :

$$\hat{C}_{11K,11K}^* \leq \hat{C}_{11K-1,11K}^* \leq \dots \leq \hat{C}_{1,11K}^*$$

then Pickands estimator for extremal index is:

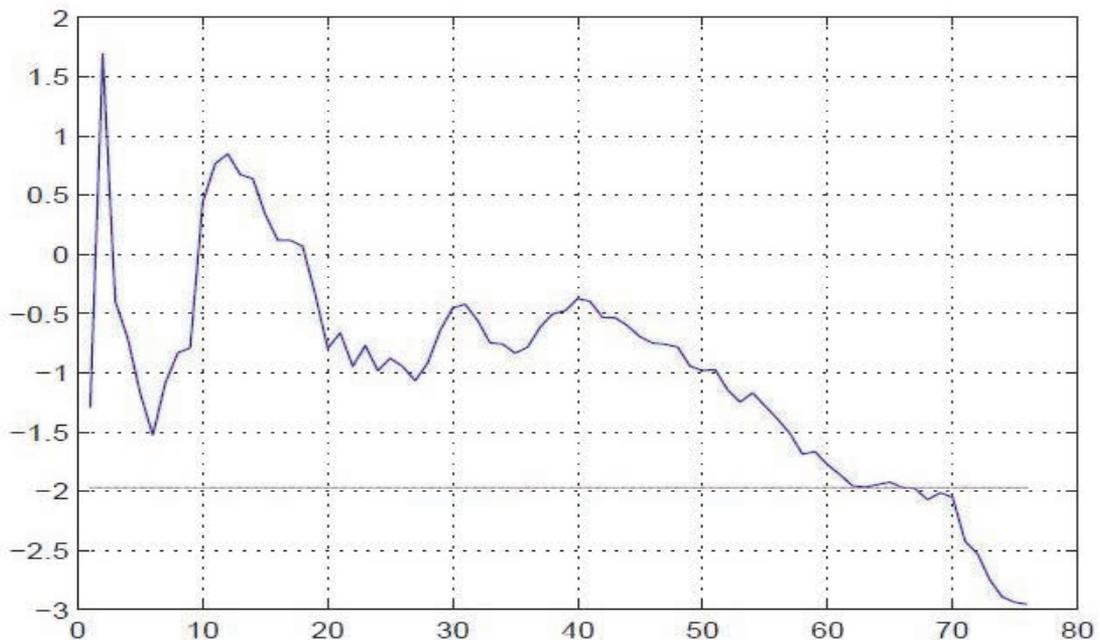
$$\hat{\eta}_{i,n} = \frac{1}{\ln 2} \ln \frac{\hat{C}_{i,11K}^* - \hat{C}_{2i,11K}^*}{\hat{C}_{2i,11K}^* - \hat{C}_{4i,11K}^*},$$

where  $1 \leq i \leq 11K/4$ .

On Figure 6 it is shown a graph of the set:

$$\{(i, \hat{\eta}_{i,n}) : i \in \overline{1; 11K/4}\}.$$

Figure 6: The graph for Pickands estimator for daily maximums



In accordance with the above mentioned procedure, we select Pickands estimator for extremal index:

$$\tilde{\eta} = -1.9690,$$

And 95% asymptotic confidence interval for that value:

$$[-2.2592; -1.6788].$$

Note that this estimate of extremal index differs significantly from the extremal index which we got for the data with subtracted periodic component.

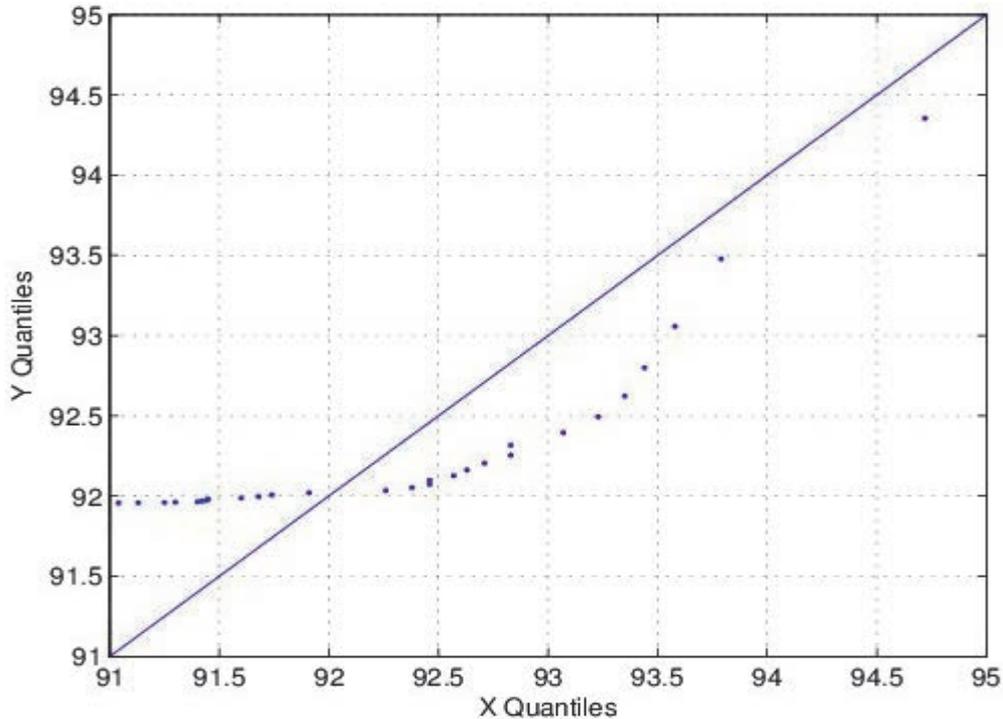
Define a linear normalization ( $y = ax + b$ ) using method of weighted least squares for the following 2-dimensional data:

$$C = \left\{ \left( -\left( -\ln \left( \frac{i}{K+1} \right)^{-\tilde{\eta}} \right); G^{-1}(i/(K+1)) \right) : i = \overline{0, K} \right\}$$

On Figure 7 we point the graph for the set:

$$D = \left\{ \left( G^{-1}(i/(K+1)); -a \left( -\ln \left( \frac{i}{K+1} \right)^{-\tilde{\eta}} \right) + b \right) : i = \overline{0, K} \right\}.$$

Figure 7: Quantile-quantile plot for D, where on x-axis are pointed the quantiles of empirical distribution function of the normalized maximums and on y-axis are pointed the quantiles of theoretical distribution function from Theorem 2, without taking into account the periodic component on the basis of daily maximums



Comparing graphs for the sets B and D, we conclude that the inclusion of a periodic trend provides a better estimators for description the empirical distribution function of maximums as compared with estimates constructed on the basis of a sample of daily maxima.

#### 4. CONCLUSIONS

To the problem of estimating the distribution function for maxima of stationary sequence with periodic trend can be approached using two approaches. The first approach is based on the results of classical extreme value theory, the second approach is based on the result proved by the author which concerns limit theorem for normalized maximums of stationary sequence with periodic trend.

Significant limitation of the first approach is small number of data (maximums) to be processed. The second approach allows us to overcome this limitation, because it takes into account the presence of a periodic trend. The second approach allows us to consider more data, and therefore using it possible to obtain a more robust estimates.

For data with a periodic trend accounting for periodic component allows to obtain more accurate estimates for distribution function of maxima. In this paper it is shown as an example electricity consumption in Russia.

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## FRAMEWORK FOR RESEARCHING THE MODELLING POSSIBILITIES OF INSTITUTIONAL BEHAVIOR

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### ABSTRACT

*This paper will try to conceptualise the primary structural elements of the exemplary model of institutional behavior as a framework for bounded economic rationality, based on the sublimation of the key recommendations from the extensive scientific literature and heterogeneous indicators of institutional development. Its hypothesis states that this model should be based on a) homogeneous framework of interaction between domestic political, economic and other social institutions, and b) the role of external institutions, which, in their totality determine the economic choices and the corresponding effects, and c) application of the principles, conclusions and explanations that offer institutional economic theory.*

**KEY WORDS:** *Institutions, institutional changes, economic development.*

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### 1. INTRODUCTION

One of the most important, the most complex and the most controversial issues of transition in post-socialist countries is selection and combination of various forms and mechanisms of social and economic regulation. It results from the problems of wider social regulations (political, institutional, social, moral, etc..). Most economists (apart from neo-liberals<sup>3</sup>) agree that pluralism of economic institutions is essential for economic growth and sustainable economic development, especially in various combinations. At the theoretical level there are disputes regarding the boundaries and fields of economic institution's effects, their social orientation and engagement, defining the institutional balance and the like. In most transition countries, the situation is approaching institutional dysfunction in almost all social and economic areas. Thus, the issue of modelling institutional behavior is a top priority for a consistent development strategy.

After years of "divorcing" the economic and political science, their interaction has been modelling again in the recent decades. In addition to that, political processes are viewed as endogenous in terms of structure models, and economic models are applied to analyze the political process (the theory of social choice, etc..). That is an attempt of effective synergy of economists and political scientists, based on rational choice theory as a common methodological basis.

There is broad agreement in academic circles that institutions play a key role in economic development. K. Polanyi (1992) has correctly observed that economic history is a chronology of institutionalized elections and exchange. Despite the large number of papers about institutions in economic literature, it seems that there are no consistent and systematic explanation, based on which we could accurately model the institutional behavior as an alternative form of limited economic rationality. That would include different types of institutions, a level of their construction and influence indicators. Exclusively the broadest notion of social institutions as a major structural parts of society (Macdonis 1991, p. 11) and „relatively stable sets of ideas and actions,

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<sup>3</sup> Alibi-neoliberal economists constantly refer to F. Hayek, who has distinctly written that it is necessary to act accordingly to the rules, because without them the market coordination would not be achievable.

aimed at carrying out important social tasks“ (Coleman & Cressey 1984, p. 9) branches in various types: economic, political, ideological, legal, cultural and other.

Despite all the theoretical propositions, definitions and empirical evidence, seems that a strong conclusion as to why the institutions are important for economic growth still does not exist. One of the reasons is the lack of operational framework and possibility of accurate institution measurement. In this regard, Acemoglu (2009) points out that the term „institution“ is very broadly used and defined in literature, a wide variety of institutional forms that can be relevant to economic outcomes. Baron and Hannan (1994, pp. 1141-1142) suggest the ways through which historical, cultural, political, social, and psychological and other factors of influence can make some equilibrium (a state of balance) more sustainable than others, and indicate the need for learning and introducing the source of resistance to changes in the societal systems. In this way, they suggest the need for analyzing the distance traveled (*path-dependent*) of development that is very important for the prediction of events and various comparative assessment of institutional levels.

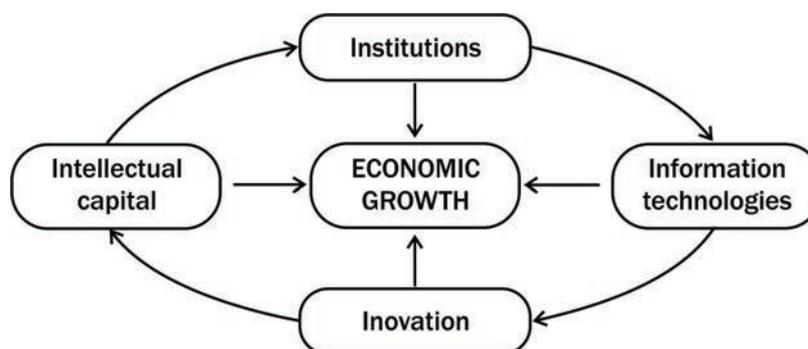
## 2. THEORETICAL APPROACH

Institutional changes and economic growth are probably the most important components and assumptions for economic development. High and sustainable growth rates are often the major drive for improving the general well-being. Representatives of neo-institutional economic theory (D.North and others) proved that long term economic growth could not be achieved without a progressive, pluralistic, politically desirable and legally protected institutional environment. In other words, high and sustained rates of economic growth are clearly not the cause but the consequence.

Rapid changes in economic reality of the past 20 years, caused by exponential technological and related organizational changes, as well as global processes, have resulted in paradigmatic modifications of economic growth model. Neoclassical growth model by R.Solow (1956) has emphasized the key role of technical progress in relation to the previous emphasis on the role of physical capital accumulation and the growth of a labor force. Solow has calculated that four fifths of U.S. growth per employee comes from technical progress. Lucas (1988) has pointed out the role of human capital, Barro and Sala-i-Martin (1997) have underlined the role of technological diffusion, Barro (1990) has emphasized the role of public infrastructure, Romer (1990) the incentive for innovation, and so on.

Modern theories of economic growth as the main cause consider: institutions, innovation, information (and other) technologies and intellectual (human) capital. Conditionally, it is possible that "model 4i" explains the causes of economic growth (Figure 1).

Figure 1: Conditional model of "4i" sample of economic growth



Source: Author's creation.

One of the major global problems is a wide gap between rich and poor countries, and certain layers of society, and individuals within them<sup>4</sup>. This raises interest for researching the role of national institutions, which are believed to represent the main cause of this "big gap". In addition to the many well-known economist, IMF (2005) has advised the necessity for economic development to improve and constantly strengthen the quality of national institutional framework. The main reason is that bad institutions inevitably distort rational use of production inputs such as labor and capital, degenerate the adoption and the use of ideas by leadership states, and demotivate their own population. This means that understanding a consistent institutional system, institutional arrangements and channels, necessary for real and well functioning of the institutions, are essential for creating the appropriate policies that would facilitate achieving the economic growth and sustainable development.

For better understanding of this discussion, one must understand the meaning of institutions. D. North (1981) defines them as „*rules of the game in a society or, more formally, the restrictions that are human, made by humans to shape their own interactions.*“ As a result, institutions structure incentives are in human exchange, whether it is political, social, economic or other (North 1990). In other words, the choice of individuals is defined and limited by institutions. Social (political, traditional, moral, cultural, etc.), and economic institutions directly and indirectly affect the structure of economic motives in society. North (Ibid., pp. 36-37.) points out that institutions can be interpreted as an informal constraints and formal rules. Informal institutions are "codes of conduct, norms of behavior and conventions, derived from socially transmitted information and are part of the heritage that is called culture."

Inherited culture in different societies shows why formal institutions lead to different results in different circumstances. Formal institutions include political (and judicial) rules, economic rules and contracts. Their hierarchy, according to North (1990, p. 47), from the constitution, through statute, common law, to specific bylaws, and individual contracts, defines limitations, from general rules to their particular specifications. Acemoglu, Johnson and Robinson (2004) have proved that the company will prosper from the economic institutions that facilitate the accumulation of factors of innovation and the efficient allocation of resources, and vice versa.

IMF (2005) has broadened the North's definition of institutions, emphasizing the relationship between economic and political institutions. The term „political institutions“ refers to the institutions that shape the incentives of political executives and distribution of political power, including the ability to create economic institutions and to distribute resources in society. By determining relative abundance of different social groups, economic institution can have a feedback effect on the formation of political institutions. Quality economic institutions are most likely to thrive in the "rent-free" environment, where small groups have not been able to seize a monopoly in a particular "industry" (meaning service industries) or economic activities, ie. they will not be able to gain privileged access to natural and other resources. Also, there is a great possibility that good economic institutions will be accompanied by good political institutions. Further, if political power is generally accepted, subject to review and recallable, and when used in terms of refraining from monopolizing and balancing the interests of society, it is much less likely that those who have the political power will use their position to acquire their personal profit.

### 3. CONDITIONAL INSTITUTIONAL MODELLING

To explain the questions above, it is necessary to model institutions as socio-economic technologies and their relation to politics and economics, freedom and violence (as basic forms and manifestations of certain framework), reforms, and crisis. In this regard, it is useful to accept the views of Acemoglu et al. (2004) on the role of institutions in society and economy, which we understand as follows: reduction, relativization and control over political domination over economy re-

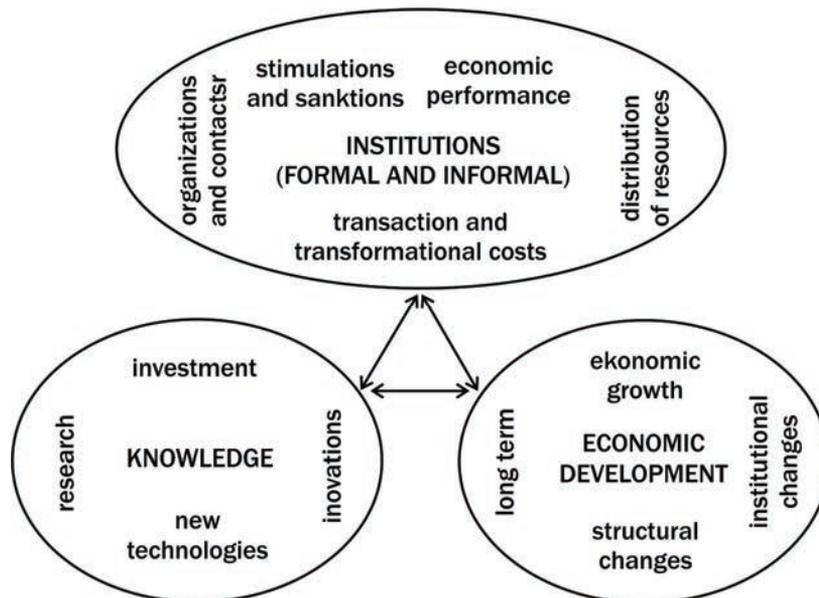
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<sup>2</sup> While most of the population barely survives, the "Bloomberg" agency has announced that 300 world richest people in 2013. increased their assets by a total of 524 billion. U.S. dollars.

quires dominance of institutions over politics and economics. Thereby, *homo politicus* appears to be a missing link between *homo institutus* and *homo economicus*.

Since many theoretical and empirical studies have established a direct connection between institutional development and economic development (D. North et al.), as well as the level of knowledge and economic development, these authors (Ibid.) have presented the logical assumption that mentioned causal relations can be joined in a relationship knowledge– institutions– economic development, with a mandatory category of investing in knowledge (Figure 2).

Figure 2: Conditional modelling of sustainable development



A. Stulhofer (1995, p. 954) rightfully claims that without answered questions on creating the norms and institutions, and methods of their maintenance, it is not possible to successfully explain the dynamics of social relations. That is the main reason why economists have decided to overcome neoclassical abstractions<sup>5</sup> and reject the dogma of cultural variables exogeneity. We should mention Olson's evidence of inconsistency between individual rational interests and group activities, indirectly accepted by North, pointing to the issues of collective action and the opportunism of the dominant groups. Stulhofer cites five key characteristics of institutions, which may be important for modelling institutional behavior:

- a) institutions are permanent and organized social practice, a set of interactive activities,
- b) institutions include norms<sup>6</sup>, which direct, regulate and restrict given activities,
- c) institutions imply a system of sanctions that ensures the effectiveness of norms,
- d) institutions include a role system, strictly defined tasks, responsibilities and interpretative framework,
- e) institutions have important influence on the social structure because they act cohesively.

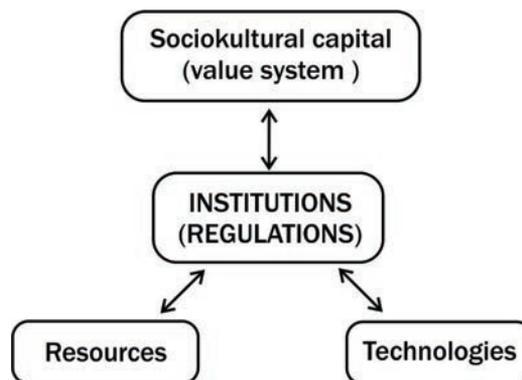
<sup>5</sup> Neoclassical orthodoxy is burdened with forced study of balance issues, which is closely connected with the rational behavior of economic agents. One of the main methodological differences between neoclassical and neo-institutional analysis is the basic "unit" of analysis: in neoclassical that is an individual, and in neo-institutional that is an institution (Dugger 1979, p. 905).

<sup>6</sup> The norms are interpreted as a socially constructed system of expectations, which directs individual actions, and is based on external mechanism (formal and/or informal) of sanctions, and internal mechanism of socialization (the process of identification). For clear classification of social norms see Elster (1991, pp. 112-113). Stulhofer (Ibid., p. 957) points out that norms are building material of institutions, and that institutions are guarantee of sustainable norms.

For our research, an interpretation of the social capital concept is very important. Stulhofer (p. 956) argues that relationship actors/institutions can be characterized by autonomy, coercion, authority and historical continuity of institutional change, and that behavior of actors is determined by the strength of institutional influence. Institutions affect the individual rationality through external constraints (laws, regulations, etc..) and internal constraints (socialization). According to Stulhofer, rationality is rooted in the value system, called the *socio-cultural capital*<sup>7</sup>, which represents the "fabric of informal institutions," and consists of the adopted norms, ideological beliefs, values, beliefs and other social structures. The relationship between social capital and formal institutions is a very complex, especially in terms of the strong relationship (*path dependency* – interpreted by North 1990, p. 112) between past and present institutional structure.

In accordance with Stulhofer's reasoning and scheme (Ibid., p. 961) and schematic system that is essential for Nureev's economic growth (2007, p. 350), we have constructed a customized, simplified scheme (Figure 3), which can serve as a starting point for modelling institutional behavior.

Figure 3: Socio-cultural capital as an element of institutional behavior



#### 4. INSTITUTIONAL FUNCTIONS AND RATIONAL ECONOMIC BEHAVIOR

In all areas of society should be active and continuous operation of unique (constitutive) rules, which apply equally to all and make indiscriminate and unprivileged regulation, coordination, organization and limitation of the human behavior. These institutions are the best manifested by its functions. The role of institutions in society and economy is a necessity and a priority, as a kind of meta-foundation and meta-mechanism. All "development" models that had ignored the institutions have proven to be unsustainable. The rules are to be followed. This is the basic objective function of effective institutions, which in their totality constitute the infrastructure of rules in the society and economy. Contrary to the effective, the infrastructure quasi-rules have emerged in some transition countries ("foisted nonsense" - T. Veblen), which tolerate imitation-interest and dysfunctional (vertical) institutional order, metaphorically called "institutional nihilism" by V. Drašković and M. Drašković (2013, pp. 11-24), Rodrik et al. (2004) "institutional fundamentalism."

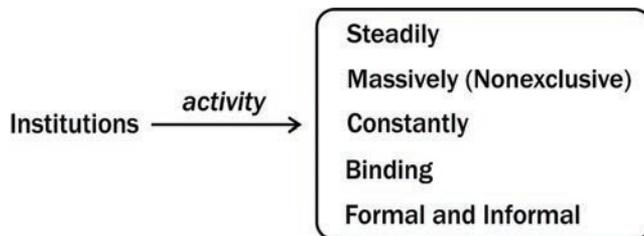
Institutions perform several basic tasks<sup>8</sup>:

<sup>7</sup> We do not agree with the author's theory that the socio-cultural capital is the broader concept than the social capital, which he has explained by appropriate images (Ibid., p. 958). The issue has a discussion character, but in any context, in our view, the social system is a broader concept than socio-cultural, because in addition to intangible (including institutionalized: power, influence, etc.) it contains a material resources.

<sup>8</sup> It is difficult to classify all theoretical modification tasks, performed by institutions. Thus, for example A. Greif (2006) argues that institutions create behaviors (actions of individuals and organizations), which in practice must harmonize with beliefs; W. Neale (1987, p. 1183) states that institutions determine relationships as rules, in a way that regulate

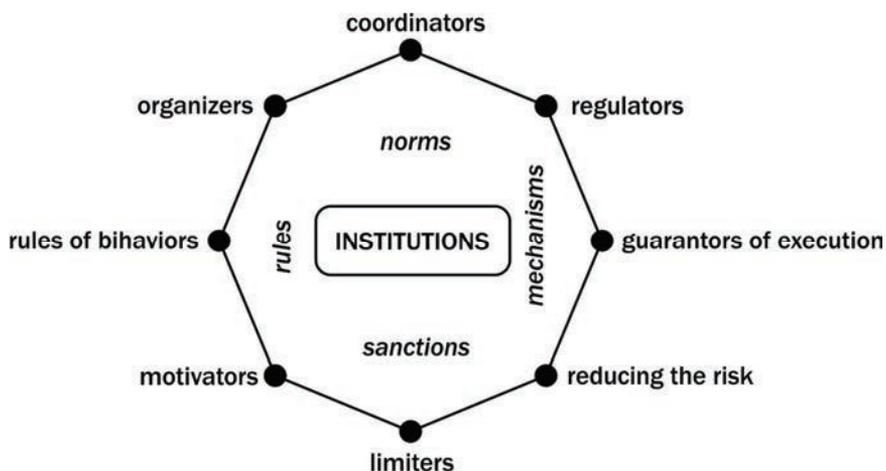
- a) increase of the transaction efficiency and thus reduce transaction costs (Williamson, 1981) through the coordination of economic activity, ensured by harmonization of interests between economic entities (horizontal) or on the property rights basis (vertical),
- b) enable the realization, networking and coordination of economic relations, resources, subjects and activities; increase the communication efficiency between community entities (trade, etc.); economize time and efforts in making decisions; contribute adapting the changes, minimizing the uncertainty and entropy; provide reliable protection of opportunistic behavior,
- c) limit the choice possibility (behavior) of economic entities and reduce the likelihood of collectively irrational outcome of individual irrationality, and
- d) maintain the hierarchical structure of authority (which in principle allows the imposition of asymmetric conditions of trade and access to resources ie, the possibility to abuse through organizational), monopolization of decision making (Michels 1967). This means that institutions, in their quasi-manifestations, may represent particularism as the promotion of political, economic and other interests of privileged social classes.

Figure 4: Characteristics of institutional action



Source: V. Drašković, M. Drašković 2013, p. 41.

Figure 5: The role of institutions as continuous intermediaries between collective pattern and individual behavior



Source: Ibid., p. 42

Depending on the orientation of institutions towards the above mentioned tasks, according to research by North (1990, p. 9), Putnam (1993, 1994) and other authors, institutions can be (according to Stulhofer Ibid., p. 977):

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what can and can not be done, as a public view they provide information necessary for meaningful participation in social life, and the sanctions are applicable in the case of non-compliance with given code of conduct;

- *horizontal* (universally oriented towards objectives a, b, and c), characterized by universal reciprocity, limited solidarity and developed forms of trust, numerosity and connectivity of informal and formal associations and their members (propulsive and affirmative institutional environment that Putnam calls *civil society*), and

- *vertical*, aimed at fourth objective (d) and dedicated to the issues of power and redistribution, characterized by closeness, nepotism, opportunism, suspicion, familial cooperation, the priority of loyalty and the lack of organizational forms (demotivation, civil uncooperative and discriminatory institutional environment with major or minor elements of violence, that E. Banfield calls "amoral familism"). It is the inefficient and irrational monistic institutional order, formed by reduced system of management, collapse, amorphousness and ambivalence of economic system, inadequacy of the rule of law, creating a large gap between reality of crisis and rhetoric of "reform" and forcing privileged interests.

Stulhofer (Ibid., p.p. 972-976) lists three basic steps in creating a rational or irrational institutional behavior (such as limited framework for economic rationality):

- *first step* is a rational response of actors ("rooted rationality") on the internal and external constraints of a specific social context, which is historically given,

- *second step*, which can be channeled into two diametrically opposite evolutionary direction, namely: a) positive structuring and improvement of social capital towards the continuous and offensive development of informal institutions (through the building and rebuilding of the internal and external constraints), which favor the formation of a broad cooperative horizontal institutional order and dynamic reform of institutions and their adaptation to the developmental needs of society, and b) negative structuring of social capital towards discontinuous, defensive, narrowly cooperative, imitative and vertical institutional order, with existing discrimination, monopolization and the rigidity of institutions, causing distrust, opportunistic behavior, erosion of social values, obstructing institutional changes, having elements of coercion, instability, clan and authoritarian monopolizing of institutional power, all of which consequently leads to a lack of socio-economic development, and

- *third step*, which involves parallel, multilevel and relatively stable existence of horizontal and vertical evolutive institutional order, where the first is characterized by the reproduction efficiency, and other is reproductively inefficient.

The above elaboration suggests that modelling of institutional dynamics a) must take into account the creation, evolution and maintenance of two different types of institutional structures (horizontal and vertical), b) that it is largely compatible with North's (1990) modelling, which considers the change of institutional framework (as a set of informal institutions) as a consequence of the organization impact (as formal institutions), where existing configuration (positive or negative) of institutional framework (as a set of values and rules) causes certain transaction costs of functioning the political and economic markets (Ibid, pp. 8-9, 135-40), which restrictively influence the institutional change, and c) that elimination of the forced (repressive) institutional order can be achieved only through discontinuous change, which implies a radical normative and institutional reforms, applying the consistent and fair sanctions, establishing the critical mass of civil society values (Tullock 1995).

## 5. QUASI-NEOLIBERAL MODEL OF "INSTITUTIONAL" BEHAVIOR IN TRANSITION

A successful transition in post-socialist countries assumes radical changes in the attitude and forms of business, ownership, mechanism regulations, and political and legislative regimes. Actual and radical institutional changes are the general framework and precondition for all other changes. They enable and enhance economic stability, growth and development. Economic inefficiency in transition is defined, among other things, by institutional vacuum and increased transaction costs of adaptation on the market conditions of economy and creating new institutions.

In theory and practice, there have been great doubts and different interpretations of objectives, methods, time, results and the costs of transition. They are the result of uncoordinated desires and interests with actual possibilities, one-sided ideological formation of prejudice from civilization needs, relationship issues and limits of state and market institutional regulation and dissenting opinions of the gradualism supporters and shock therapy. Causes of the aforementioned dilemmas are more visible than the consequences. In a way, they discredit the idea and practice of transition and indicate the reality – that they could be implemented only to the extent enabled by existing social, economic, political and institutional conditions and constraints.

Ignoring the essence of neo-institutional economic theories and institutionalization as a practical process and specific socio-economic development "technology", using its potential weaknesses of a systemic nature (possibilities for manipulation), quasi-reformers have imposed the individual "efficiency" on the social efficiency. Using various non-market methods and procedures<sup>9</sup>, they have transferred a significant part of the social (state) property into private property. In this 25 years long process, many social institutions have failed, primarily management, control and property origin. Consequently, economic institutions have failed too.

Neither the practice nor references of neo-institutional economic theory, nor many other theoretical studies were not sufficient enough to accepting orderly social (state) action "from the top" towards the massive delusion about transition process through dominantly profitable, privileged methodology of thievery. "Shock therapy" and strategies of alleged institutional "transplantation" of western role models have failed in most cases. Even if there were good intentions (and there were not, only profitable), the realization of any rules of conduct can be multivariate, depending on institutional and cultural environmental factors, but primarily on interests of the dominant political party (or coalition) in power. Strategy of "growing institution" (Stiglitz) and "transplanting the institutions" (Polterovich) does not fit in here. The causes are always the same - social, political and interest, but also methodology of reproducing institutional dysfunctionality (paternalism, nepotism, passivity, tradition of violating the legal norms, possibilities for unpunished manipulations, abuse and compensation, log rolling, lobbying, annuity-oriented behavior, etc.).

L. Polishchuk (2008, p. 28) explains that institutions does not get the desired results in various environments, and that is usually explained as "inadequate" local conditions. Good institutions should reflect the local specifics and have the character of a social good, because institutions reduce transaction costs and support the production and exchange. According to Polishchuk, the reason for this "incongruity" is that institutions may be used in aimless fashion, when the motives and character of its applications are in contradiction with their essence. Untargeted ways of implementing the institutions are: their unpunished abuse and exploitation, asymmetric information, institutional manipulation, institutional submission by some interest groups and their use for covering up certain operations.

D. Rodrik (2005) has proposed a conceptual framework of "good institutions", providing a primary economic principles: protection of property rights, contract enforcement, market competition, appropriate incentives, reliable money, debt sustainability and economic efficiency. Mutual influence of political and economic institutions must establish "*the right balance between disorder and dictatorship*", and therefore they should be together considered. Starting from here, Rodrik has proposed the classification of "market viable institutions" (Table 1). It is a synergy of economic and political institutions. His taxonomy can be understood in four dimensions, namely "market-creating", "market-regulating", "market-stabilizing" and "market-legitimising" institutions. Rodrik believes that the market requires extensive regulations to minimize abuse of market power, internalization of externalities, information asymmetry, and to establish standardization and safety products etc.

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<sup>9</sup> Getting favorable inflation and other loans, quotas, licenses, using trade and natural monopolies, inflationary profits, creating quick and big lobbying, earning on annuity and social security, with low risk and avoiding commitments, as well as making money on some of the speculative ways (financial pyramids, money "laundering", currency smuggling, gray economy and war profiteering)

Table 1: Rodrik's taxonomy of "good Institutions"

<p><i>Market-creating institutions</i></p> <p>Property rights, and Contract enforcement</p>	<p><i>Market-regulating institutions</i></p> <p>Regulatory bodies, and Other mechanisms for correcting market failures</p>
<p><i>Market-stabilizing institutions</i></p> <p>Monetary and fiscal institutions, and Institutions of prudential regulation and supervision</p>	<p><i>Market-legitimizing institutions</i></p> <p>Democracy, and Social protection and social insurance</p>

A warning that inadequate institutions can have a destructive effect on the valorization of economic resources has not been respected. Strengthening and concentration of privileges and consequent enrichment of individuals, criminalization of the economy and society, social stratification, impoverishment and apathy of mass population, the promise of a better life and costly improvisation of economic "reformers" have been unstoppable trend. They have led to the conversion of the former vices into ideals. Transition has been paradoxically substituted by rhetoric of reform, the market – by monopolies and black markets, the private sector – by privileged rich, entrepreneurship – annuity-oriented and grey economy behavior, democracy – by party lobbying and nepotistic log rolling, political pluralism – by totalitarian monism of the ruling party and/or coalitions, institutions – by system vacuum (institutional, organizational and normative).

Establishing an efficient economic institutions has been blocked by various barriers (V. Drašković 2001, p. 73):

a) slow and inadequate implementation of institutional changes, with socio-pathological and pragmatic signs of interest, which contributed to the disorganization, demotivation and apathy of most economic agents and the monopoly-lobbying enrichment of minority in frequent suspicious activities,

b) time<sup>10</sup>, structural, qualitative, quantitative and functional delay of institutional changes on other transitional changes, instead of being their support, stimulus and guarantee,

c) large gap between formally established economic institutions and essential economic behavior, which was far from regular norms,

d) hasty<sup>11</sup> formation of economic institutions,

e) wrong implementation of institutionalization, with no real strategy; Simply, it was not possible to implement a parallel transition and institutionalization with huge appetite of "reformers", in unfavorable economic environment.

The aforementioned obstacles have prevented institutional and any other competition, especially in the key areas of access to resources. In many cases of establishing institutionalization, violence has been imposed instead. The nature and extent of the business, the wealth of nouveau riche businessmen and characteristics of the "market" under their control, often had been dependant on the nomenclature level between certain quasi-entrepreneurs and/or on the degree of circumventing the legislation, rather than on their entrepreneurial skills.

<sup>10</sup> North (1994, p 79) has insisted on a time line of institutional change, because this has increasee the propulsive power of other changes, many of which were out of control or were just rhetorical in character.

<sup>11</sup> Apart from the speed of institutionalization (which inevitably bears the stamp of formalism) much more important is its quality, adaptability, safety and efficacy of action (regulation).

The application of quasi-neoliberal model of institutionalization in transition countries has led to a large polarization: freedom and enrichment of minorities, and the consequently reduction of economic choice and impoverishment of the majority. Rather than enabling the development and institutional innovation, it has led to the imitation of crisis and improvisations, which has generated a long list of the obstructing mechanisms. State dictate was replaced by dictate of a "new entrepreneurs" (nouveau riche rich). A retrograde request of time was in power – enrichment at any cost. From the previous times were taken slogans, promises, political parties' dominance, reproduction of crisis, reform apologetics and palliate, negative selection of personnel, etc. This led to further social disintegration and collapse of the middle class, years of reproduction crisis, boom of speculative trade, the development of social pathology, neglect of production, employment and investment, degradation of science, education and morality. A system of alternative institutions was created. There were a variety of socio-pathological phenomena, gray economy, long-term application of wrong monistic recipes of neoliberal "shock therapy", compensating strictness of formal rules by their violation, corruption, violation (deprivation) of property rights, establishing various stereotypes of behavior, influence of informal norms of behavior (escalating institutional conflicts), etc.

## 6. CONCLUSION

Institutional pluralism as a development principle is an organic and integral feature of developed societies and economies. It has proved to be a form of motion and solving many contradictions between public and private interests. It is based on a dynamic equality and mutual harmonization between variety of rival institutional forms of regulation and coordination of human activities (social and economic). Aforementioned suggests that institutional pluralism is an elementary principle which must be assumed in modelling process of institutionalized behavior.

Defining and analyzing the problems of mutual relation and interdependence of the social environment and economy, especially the perennial problem of political influence on the economy, is not possible without institutional analysis. Pluralistic modelling of institutional behavior and its selective and flexible application in practice can help understanding the transition from totalitarianism to democracy, from crisis to progress, from monopolistic dictates to the cooperation of interests and freedom of private initiative in the mass proportions, from non-economic subordination to economic motivation, from privileged economy to the knowledge economy, and from quasi-neoliberal monism to the horizontal institutional pluralism.

The practice of developed and developing societies and economies shows that the most important condition for ensuring economic freedom and property forms – a strong and pluralistic institutional constraints of executive power in the field of property relations, ie. material and status value, as well as the political power.

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## INSTITUTIONALIZATION OF PLACE MARKETING (CASE OF REPRESENTATIVE RUSSIAN REGION)<sup>1</sup>

DANIIL FROLOV<sup>2</sup>

### ABSTRACT

*In recent years the special attention is paid to territorial marketing, it is defined by one of instruments of social and economic development and increase in capacity of the territory, and the marketing paradigm gains more and more wide circulation. However there aren't many examples of the strategic oriented and complete approach in this area, the special programs and marketing strategies. The experience of any subject which generalization promotes an increment of knowledge and promotes search of new perspective ways of development is of great importance for researchers and practitioners. The Volgograd region is rather developed and, at the same time, quite representative region from the point of view of the marketing strategy which analysis of experience allows to allocate the typical mistakes and widespread problems of integration of the principles of territorial marketing to the system of regional strategic management. Developing the marketing strategy of the Volgograd region and its implementation it is necessary to consider the existing experience of other territories. The analysis and reconsideration of the work done in recent years, in the field of territorial marketing in the Volgograd region, will allow to avoid the mistakes and to adapt the positive experience. For this purpose, was organized and analyzed the experience of the implementation of territorial marketing, highlighted stages and forms of this process, detailed the typical for Russian regions problems of strategic marketing planning. Besides, the practical based on off-site experience recommendation about development of regional marketing strategy are offered.*

**KEY WORDS:** Place marketing, Marketing strategy, Rebranding, Stakeholders, Identity.

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Prospects of regions of Russia are caused basic natural and geographical and the socio-economic factors defining advantages or barriers of spatial development. Set of territories possess limited resources, thus they are involved in essentially new dynamic political, social and economic situation which features are defined by global processes, changes at the level of the region and the country as a whole. Besides, recently negative tendencies considerably became aggravated: moving of the population to the large regional centers, compression of manned economic space, depopulation of peripheral territories, backwardness of infrastructure, shortage of investments and budgetary financing. At this conjuncture search of the internal reserves which are based on concrete advantages of their territories is necessary for municipalities for further social and economic development. Thus the increasing attention is paid to the new concepts, one of which is territorial marketing. This concept is based on interpretation of territories (regions and the cities) as the corporations socially responsible the multi-stakeholders, developing on the principles of customer-oriented management. The marketing paradigm gains more and more wide circulation and is in the long term capable to become dominating approach to management of development of territories, bringing to qualitatively new level the concept of "new public management".

Place marketing's institutionalization - difficult, multi-stage process of integration of marketing vision of identity of city or region and the concept of a brand of the territory in system of interests and shared beliefs of key territorial actors.

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Marketing of territories can't have unambiguous, universal interpretation as its specifics are defined by "depth" of integration of a marketing paradigm in a control system of territorial development:

1. Marketing of territories in narrow sense – separate function of system of the strategic territorial management, connected with formation of a brand of the city or the region and creation of positive image for activation of advance of local production on foreign markets, involvement of tourists and investors and achievement of other strategic objectives. In essence marketing of territories is identified thus with territorial branding (Anholt, 2005; Kavartzis, 2009).

2. Marketing of territories in expanded sense – the integrating through mechanism of market orientation of system of the strategic territorial management, including special methods, tools, forms and influence channels. Marketing is regarded thus "as of paramount importance", it "penetrates" and "sews" all management of territory development, focusing administrations on perception of the population, local business and nonresidents as peculiar consumers of services provided by the territory. Actually marketing of territories acts as customer-oriented territorial management (Mant, 2008).

3. Marketing of territories in a broad sense – the corporate ideology which was formed on the basis of territorial identity of interaction of the power, business and the civil society which reference point is wide popularity and recognition of a brand, a priority – requirements, interests and values of stakeholders, an imperative – loyalty degree to a brand and the saved-up reputation capital. In an ideal marketing of territories is a market mentality of residents of the territory as coauthors of changes (Go, 2009).

We will allocate key ideas of territorial marketing:

- territories (the cities, regions, the countries, etc.) make specific goods (including services) which consumers are the population of these jurisdictions, local and extra-regional business, external investors, tourists and potential new inhabitants who form sales markets of "place goods" (Kotler, Rein, Haider, 1993; Dinnie, 2008);
- the main task of territorial marketing is identification and satisfaction of requirements of the target markets and their segments that demands continuous feedback with consumers and a clear understanding of identity of the territory (Anholt, 2007);
- specifics of marketing of territories consist in its orientation not only on target groups of consumers, but also on a wide range of stakeholders (Maheshwari, Vandewalle, Bamber, 2011);
- advance of territories includes at least four directions connected with development of their image, investment, tourist and social appeal;
- management of appeal of territories demands purposeful information and advertizing actions, forming of long-term communications and the relations, diplomacy and lobbying of interests;
- "kernel" of territorial marketing is place branding (Kavartzis, 2004; Zenker, 2011);
- marketing has to be "through" ideology of work of all divisions of administration of this or that territory, but specialized divisions (departments, teams, the working groups, etc.) on marketing policy and competitive identity are necessary at the leaders of the countries, regions and the cities.

The marketing paradigm is becoming more widespread and in the future it will be able to become the dominant approach to the management of territorial development, bringing the concept of new public management to the new level. The Volgograd region is a rather developed and, at the same time, quite representative region from the point of view of the marketing strategy development, analysis of which allows to allocate typical errors and widespread problems of integration of the marketing principles of territories in system of regional strategic government.

The implementation process of place marketing in the Volgograd region has passed through three stages:

1. 2010: the development of the marketing strategy of the territories' development of the urban district of Volgograd city-hero till 2020.
2. 2010-2011: the attempt to rebrand the Volgograd region based on the creation of mega-project of the federal center of patriotic education (National center "Victory") in the region.
3. 2012-2013: reduced marketing of the region within modernization of Strategy of social and economic development of the Volgograd region till 2020.

Volgograd's marketing development strategy was written in 2010 by the group of scientists from the Volgograd State University. The research work had been done during a year in the close cooperation with the city administration. The key factors of competitiveness and sustainable positive reputation of Volgograd were determined by analysis: logistically advantageous location in a zone of the international transport corridors; agglomerative composition of moving; multi-functional structure of the industry; unique natural potential; rich cultural and historical heritage (primarily War Memorial complex associated with the Stalingrad battle); strong domestic market; powerful scientific and educational complex; stable crime situation.

Along with it is revealed the ambiguity (asymmetry) of the city's image. The very negative ecological image (Volgograd is consistently ranks among 35 most polluted cities in the world and in the top ten environmentally unfriendly cities of Russia) combined with high sports (first of all, due to the outstanding Olympic achievements of Volgograd's athletes), positive economic image, leading positions in Russia for the development of territorial self-government. The analysis of Volgograd's marketing potential in image aspect led to draw the conclusion about the need to focus on the marketing city's strategy on advantages for business and social activity, unique potential of sports and outdoor activities whereas the ecological image needs a radical improvement.

The main aim of the Marketing strategy of Volgograd till 2020 was determined by the promotion of unique city's advantages taking into account all available and potential resources and sustained growth of its competitiveness in the territorial division of labor through quality improvement business, investment, innovation, cultural, scientific, sport and recreation image of Volgograd at municipal, regional, national and international levels. The realization of this system goal requires achieving the following fundamental objectives:

1. In the short term (1-2 years) – positive change and formation of new image of Volgograd, increasing the frequency of positive mentions in the media and Internet.
2. In the medium term (3-5 years) – creation and active promotion of Volgograd's brand, formation of stable positive associations with city activity at all segments of target consumers, support of loyal community of a city brand.
3. In the long term (6-10 years) – radical positive change of the city's investment climate, strengthening the reputation of the municipal authorities, the improvement of internal social climate, the creation of a competitive framework for sustainable development.

In functional-structural aspect the Marketing strategy of Volgograd is the system of special marketing strategies (on key areas of activity), integrated strategy of the city's image. The Strategy has three levels of formation and promotion of umbrella brand and the complex of sub-brands of Volgograd: municipal (local), national, global. For each level of strategic marketing were developed perspective brands, focused on specific target groups of stakeholders, were identified the areas of marketing actions, grounded the tools in each direction and necessary resources; revealed the composition and the time range of positive effects, develop the indicators and calculated their predicted values.

For a large city with a complex territorial and social and economic structure such as Volgograd, focusing on separate, let and large-scale thematic idea or the project is pernicious in long-term prospect. The main advantage of the Marketing Strategy of Volgograd's development is a lack of obsession with a single period in the history of the city or of any historical person. However, at the initial stage of the work was revealed the specific of understanding of the place mar-

keting functions by the city administration: as evident from the terms of reference, marketing strategy was seen as a way to improve implementation of the Strategic plan for sustainable development of Volgograd till 2025, i.e. it hadn't independent significance and occupied a subordinate position in the system of territorial management. In this strategy involves focusing on promoting the existing strengths and achievements, while the weaknesses and problems from the framework of its competence.

The idea of the responsible entities of the Strategy was different: the scientists believe that the marketing approach has been implemented by all departments of the city administration for the associated functions and with the active participation of civil society; the authorities believe that special structural unit in structure of the city's administration should deal with formation and maintenance issues of the city's image, the main task of the unit is the development of recommendations for local government and for the private companies. Moreover, the requirements specification doesn't provide for the development of the concept and identity of the city's brand that violated the integrity of the strategic marketing.

The additional problem was created by the political instability caused by the protracted conflict of the regional and city administrations. As a result, marketing strategy development of Volgograd only formally based on the provisions of Strategy of social and economic development of the Volgograd region till 2025. In reality, the degree of coherence of marketing activity was extremely low that certainly, negatively affected both the content of Strategy and the potential of its realization.

Attempts to fix the marketing strategy of the territory in the format of the strategic document, despite their usefulness and importance, causing three negative trends that complicate the transition to the paradigm of territorial marketing:

- responsibility for the strategy's implementation is shifted to official structures of the regional and municipal authorities, with insignificant participation of civil society;
- promotion of a range of facilities has steadily increased as no division of the administration is not ready to recognize them Supervised activity minor or de minimis;
- formalization involves the preparation of the document and its adoption in final form, which does not meet the basic principle of strategic marketing - openness to change, fast adaptation to the new trends and operational testing of creative ideas.

Almost parallel to the development of a marketing strategy of Volgograd was announced about the initiative of governor of Volgograd region Alexander Brovko to create the region's National Center "Victory" - the federal center of patriotic education, preservation of the spiritual and cultural heritage. The main idea of the project was to create an umbrella brand of the region on the basis of "heritage resources" and the idea of "progressive patriotism". It was supposed that the region does not need a lot of investment and time to create a bright and recognizable brand; its main socio-cultural resource is the Battle for Stalingrad, which should be used as a "locomotive" for the "acceleration" of sub-brands.

NC "Victory" as "innovative multicenter" was founded to provide "mirror" change of the region's perception giving its image such accents as "dynamic", "various", "creative", "electronic", "modern". In the main building of the National Center, that planned to create by reconstruction of the Central department store, should accommodate the Museum of Russian successes and victories, archive of the Second World War, Congress and exhibition center, Institute of Regional Studies, Children's educational and cultural center and other structures forming a multi-function scientific and educational, cultural and museum complex of modern type. The list of key projects of NC "Victory" oriented to multi-channel promotion of the ideology "progressive patriotism", included a gallery of modern art, Institute of memory Victory Train, interactive museums (including the one at the entrance to the city on the road "Moscow - Volgograd" and at the borders of Tsaritsyn watch line), ethnic village, new historical and ethnographic tourist routes on the territory of Zavolzhye, etc.

The basis of the planned rebranding of the Volgograd region was the idea of the global positioning of the region as a cultural capital of the new Russian patriotism, international center of multiculturalism and tolerance. With the apparent superficiality of the main strategic idea, this project should recognize innovative for the region and quite complex, combining history of Tsaritsyn-Stalingrad-Volgograd and focused on the future. The main marketing problem of the project of creation of NC "Victory" became the vulnerability for criticism the ideology of "progressive patriotism". The Great Patriotic War is one of the most highly taboo topics for the Russian society. Its history needs of demythologizing, but it could be a very painful process. Revealed also a lack of readiness of the local expert community and the public, especially veterans organizations, even the terminology used - commercialization memory and national values, post-industrial business on the military heritage, conversion of the history into a competitive advantage, etc. After the sensational presentation of NC "Victory" during the investment forum in Sochi with the sculpture "Motherland" dressed up with a floral sundress (September 2010) the project was criticized by the national media and trolling in the Internet. The attempts to position the regions as the centers of any particular activity gives insufficient effect due to excessive narrowing of regional identity. NC "Victory" got a stable association with the corruption. The numerous scandals in the administration of the region contributed to it. The attempts "to restart" the project were interrupted with resignation of the governor Brovko at the beginning 2012.

Let's single out specific challenges and risks of the marketing promotion of the Volgograd region:

- the absence of a clear positioning and the blurring the umbrella brand: desire to focus all the advantages and benefits of the region regardless of their coherence among themselves and their significance for consumers;

- the uncertainty of the target audiences: the aspiration to capture all categories of potential consumers of "product areas" leads to defocusing of marketing and cardinally reduces its efficiency;

- "cannibalism" of regional and capital brands: almost all well-known and recognizable objects are concentrated in Volgograd and have the military-patriotic character that increases the cost of an expanded definition identity of the region as a whole;

- underdeveloped of subterritory's brands: Urjupinsk designed the registration of the trademark "The capital of the Russian province" only at the end 2012, positioning of Volzhsky suffers from high abstraction ("the city where you want to live"), other municipal districts in the region even haven't started branding.

- absence (due to mergers and acquisitions) rallied local big business as the initiator of the development of marketing strategy and rebranding.

Crowdsourcing project of development of Strategy of social and economic development of the Volgograd region till 2020 was implemented at the end of 2012 in the Volgograd region. It is possible to say, that the governor Сыкпун Bozhenov and the regional government take into account the negative experience of place marketing (as an attempt to develop a comprehensive and essentially unrealizable in full marketing strategy, and attempt drastic, radical re-branding in the absence of a loyal social base), therefore the marketing techniques were relegated to the background and are considered as an auxiliary tool of territorial management. In Strategy the following directions which can be carried to the sphere of competences of the place marketing were offered: the development of the Volgograd region's brand was in the list of the priority projects (top-15); realization of actions of investment marketing at the all-Russian and international levels; carrying out market researches of a situation in the tourism; implementation of PR-projects, aimed at promoting of tourism product of the region; the formation of harmonious modern tourism brand of Volgograd region and its popularization through information technology and advertising campaign; developing proposals for regional clusters and networks in the field of marketing and relationships between buyers and suppliers.

Despite its importance these strategic directions actually reduce marketing of the Volgograd region to the region's branding and marketing of tourism. Perhaps it is the best solution in this situation, but it should not acquire a sustained inefficient equilibrium. At the same time, we must admit non-standard format of using of crowdsourcing for the formation of the social base of the strategy, as well as for the definition of "anchors" of the region's identity in the public mind.

It is planned that in the medium term the strategic management of development of the Volgograd region should accept system character that assumes development on the basis the updated Strategy of social and economic development of the Volgograd regional marketing strategy for the same period, the modernization of the Strategic Plan for Sustainable Development of Volgograd and Marketing strategy of the city's development till 2020. The marketing strategy of the Volgograd region's development is a key missing link in the logical chain of strategic place management.

We will present the practical recommendations for the development of the regional marketing strategies that are relevant for the modernization of the city's marketing strategy:

1. The development of the strategy should be carried out by the working group at the governor of the Volgograd region, consisting of experts of local marketing, branding experts and identity, a wide range of scientists and representatives of the main stakeholder categories. It is possible the establishment of expanded Public council with advisory functions. For example, the Public Council for the strategic development of Lublin (Poland) includes about 1000 members (leaders in various fields) with a population less than 360 thousand people. It is important to provide prestigiousness of membership in Council, to attract active and motivated participants.

As a "managing director" the authority of the territory should be able to analyze the situation, set goals and develop strategies, optimal use of resources taking into account the specific features of the region, constantly look for and adapt new tools and models. There are the examples of "administrative model" of the city's marketing, when the initiator and the main contractor is the administration in Russia. One of them is, public office "Urals' capital" created in Yekaterinburg, aimed to act as a marketing agency. The main tasks of PO are research, analytical work with arrays of information, development of concept programs aimed at developing an objective image of the city, development of strategies and methodical recommendations and organization of interaction of divisions, interested parties.

In the Vologda region a subject performing the monitoring, collection and updating of information, area advance at the Russian and international level, consolidation of promotional and performs the specially organized in 2008 state-financed organization "Regional center of tourism marketing and promotion programs of the Vologda region". The most significant achievements of PO has in the tourism sector (approved the strategy of tourism development till 2020) however, experience and technology can extend the work of the center in all directions of place marketing.

2. The period of strategies' development should match the level of complexity of the tasks and assume adequate funding for analytical and design work, as well as the possibility of outside consultants.

The question of financing of such projects always generates a lot of disagreements. Thus, the ambiguous attitude has caused the adoption of the "Marketing promotion Novosibirsk Region in 2013-2015". Within its framework, the government announced that within 3 years (2012-2015) it will spend for these purposes 600 ml n rub (considering that all budget of Novosibirsk's development is some billion rubles). However, these funds will hold a large-scale communications campaign at the federal and international level using the integrated approach, involving highly skilled professionals. Another issue is that the funds must be used correctly. Moreover such costs are fully justified if expected increase in investment would happen.

3. The terms of reference should not impose undue restrictions on the imagination of policy-makers. Thus, the company Pentagram Design, developing the concept of re-branding of south art of Pittsburgh found that on their way home people had to go through the underpass disgusting. As a result, terms of reference was ignored and developed a plan for the reconstruction of the transition with the purpose to make it pleasant space with installations which implementation led to growth the loyalty of inhabitants.

4. The presentation and discussion of the strategic ideas and concepts of strategy should have the widest character, detailed coverage of regional media, and the implemented in the online broadcast.

The adoption of the city's strategy development till 2022 "Cherepovets - a city of opportunities" accompanied by a series of strategy sessions, conference "Cherepovets – territory of development", which attended more than 250 guests from Moscow, St. Petersburg, Russian regions and foreign cities; 5 round tables took place within the conference, known experts were involved.

5. Indispensable condition is testing of loyalty of the population to a new brand and a concept of marketing strategy. During the analysis of public opinion it is advisable to use crowdsourcing and online surveys with moderation in addition to sociological researches.

Yaroslavl is the example of high research activity in the field of branding and positioning on the stage of development of the brand. Yaroslavl State Pedagogical University organized and hosted a thematic cycle, consisting of web sessions and conferences, revealing the idea of "Yaroslavl – the third capital of Russia" and developing it in an integrated theme of "capital and the provinces" that test its viability. On the other hand, the lack of coordination brand Perm, inability to deliver its benefits, value and substance to the city's residents caused a considerable response to the public that generated hearings about the city's rejection of the offered concept and lack of internal marketing.

6. The list of strategic activities must be fundamentally open. Many regions are actively trying to attract the public at all stages from design to implementation of policies, programs, concepts and brand identity. The authorities have reached a new level of openness and transparency in their activities, including the use of social control mechanisms, through interaction with experts.

7. Development of brand identity should be implemented in the format of an open competition, suggesting Internet voting and examination by specialists of marketing and branding.

Development of the visual component of a brand of the city "Cherepovets - a city of opportunities" started in June 2012 as an open competition for the urban development of a logo, a slogan and audio logo of the city. The vote on the different communication platforms for the proposed options was organized. For the legitimacy of the process of visual component's selecting of a brand were collected about 300 creative works. The brand-book will be developed on the basis of the work - the winner of working group on creation of system of visual communications.

8. The special emphasis is needed to stimulate the initiative, including non-profit projects that require mainly information support, but are able to give immediate effect as the PR-cause. For example, to create the interactive book of records of the Volgograd region is much easier and cheaper than "to promote" the former capital of the Golden Horde Sarai-Berke. Thus, in the Ulyanovsk region in the framework of the concept of identity formation are realized the starting projects: "The name of Simbirsk-Ulyanovsk region" allowed to reveal the most famous countrymen, the contest "Seven Wonders of the Ulyanovsk region", defined the most interesting man-made and natural sites in the region; the project "Ulyanovsk region - the birthplace of Kolobok" in the nationwide project "Fairytale map of Russia", caused a wide resonance in Russia and Ukraine.

9. The policy documents should be very compact and reflect the specific findings and recommendations of the research.

10. The number of priorities of the Strategy should be limited: ideally three "anchor" for example, District Friendship (historical "intersection", multinational people, tolerance, multiculturalism, Sarmatians and Sauromates, Cossacks, etc.), Homeland of Victory (veterans, tourism, architectural monuments, etc.), the portal of the Future (neoindustrialization, youth, workers, entrepreneurs, and creative class, modern forms of business, etc.).

11. The Undeveloped of subterritory's brands forming the submission about the Volgograd region as a whole must be eliminated. Targeted programs should address city neighborhoods, defining a logical continuation of the development and promotion of the area.

For example, the program "Cultural Capital" in Ulyanovsk is aimed at the Ulyanovsk region as a whole, including the town of Dimitrovgrad, which is a "city - the partner of the Capital of Culture". One of the aims was to increase the visibility and attractiveness to investors, the city's competitiveness in priority sectors. As a result Dimitrovgrad was chosen as the site for the im-

plementation of a major federal project - the creation of nuclear-innovation cluster and providing a number of measures to revive the production of automotive components. The target Program "Formation and control of image of the city of Dimitrovgrad, Ulyanovsk region in 2012-2014" was developed.

12. The absolutization of a role of image and branding techniques is not permitted. In particular, the development of tourism in the region primarily involves active work with extra-regional operators, creating preferences for them in exchange for the active promotion of Volgograd tourism product, and the next step is already the formation of attractive image and presentation of attractions. The preliminary step of creating of Uglich's image and the promotion of the brand "soul of Russian province" was the restoration of monuments and landscaping (the first phase was carried out on the money from the local and regional budget). There will be enough work on the creation and promotion of the brand, but the city became attractive for many tourists and strategically important big business.

13. The system of the priorities and actions has to have the echeloned character depending on the investment capacity of projects, terms of their realization, the importance for a regional brand, etc.

14. It is necessary to maximize the opportunities of inter-regional cooperation in the field of marketing: for example, in a format of advance of the joint tourist brands ("Gates of Russia to the Great Steppe" etc.).

The consolidations of the local community, the revitalization of small and medium-sized businesses become the most significant, a burst of activity and the revival of Uglich, due to the development of tourism. The city's example was a lesson for many, and in 2007 was based the Association of small tourist towns of Russia, united Uglich, Suzdal, Dmitrov, Yelabuga, Myshkin, Tobolsk, Valdai, Ples. One of the priorities of the association is the development of the federal program "Tourism as a way to revive the Russian provinces", attracting investment and economic recovery.

15. System introduction of a paradigm of marketing of territories in all municipalities of the region seems essentially important. Certainly, creation of the information field is necessary for investors for decision-making, in particular, formation of investment passports of municipalities, etc. can become the first step. But are necessary more original, creative steps to attract the attention of investors and nonresidents to the region subterritories.

For example, in Vologda took place the presentation of the project "Guest Card". The card offers the opportunity to use the public transport without any limit. To visit museums and galleries without pay and queues. Tourist with a guest card can take a free tour of the city. Other tours of this card will cost less. The tourist will have special discounts in hotels, restaurants, cafes, beauty salons, theaters and shops, entertainment and sports complexes. St. Petersburg offers its guests such guest card. A joint project of business and public authorities – "Angel Eyes" also finalized. During preparation is developed a unique search engine providing possibility of fast arrival of groups of reaction to a person who find themselves in an emergency situation. The city mobile tourist and information service "Service of Angels" is unique. "Angels" speak foreign languages, work in pairs and are competent, concise, professional and absolutely free of charge for guests of the city to provide a wide range of information about St. Petersburg.

16. The formation of interactive content created by the user, especially the residents and visitors to the area is crucial to the success of the marketing strategy of the region. Possible options include multilingual regional information and entertainment portal (including official news, a poster of events, news from users, forum, local blogs etc.); ratings of the best places in Google Maps and social networks, social media (networks, blogs and forums); mobile sites and applications, high-quality multimedia content (3D-maps, transport schemes, hiking trails, videos, photo galleries etc.); accumulation of reviews and recommendations.

If recognize that the logo is the first step on the path to a new territory's identity, the major problems in the area of identity for the Volgograd region are the powerful brake for its branding.

The creation of brand book "Ulyanovsk. Ready for takeoff" became the starting project of identity formation of the Ulyanovsk region. One of the primary tasks of Smolensk in the preparation for its 1150th anniversary was also the development of brand-book. The main element of the visual identity of the brand was chosen the image of the heart. The feature of a sign is that it is possible to find outlines of territorial borders of the Smolensk region in it. More or less recognizable have the brands of St. Petersburg, Kaluga, Omsk, Magnitogorsk, Perm, Yaroslavl, Cherdyn, Dobryanka, Nizhny Novgorod, Molebka and other cities.

The discussions about the emblem and the symbol of our region are clearly delayed, although the territorial heraldry has a very indirect relationship with the brand. The problems connected with the identity development for the large cities and regions always appear and they mainly related: a) the high costs of coordinating projects with the ideas and beliefs of many stakeholders, b) with problematic narrowing all the measurements of the image area. It is important to recognize that official symbols and brand of the region - a fundamentally different phenomena. Therefore, maintaining the Motherland and Mamaev Kurgan as the images and symbols of the heroic past, as the basis of Volgograd patriotism, should refuse to overfish in identity of a regional brand and sub-brands, as well as the use of explicit connotations of the Battle of Stalingrad. This is indicated by the results of the poll by the Levada Center of the relation to the return of Volgograd its old name "Stalingrad": in October 2012 for only 18% of respondents spoke that they agree with it, against were 60%, undecided - 23%. Nevertheless, the deputies of the Volgograd City Duma in January 2013 took the decision to use the name "hero city Stalingrad" six times a year, in anniversaries of the Great Patriotic War. Volgograd and the Volgograd region could not have the one brand: it is necessary the division of official and informal brands with different tasks and target audiences. Attempts of their combination are initially doomed to public criticism and rejection. Probably, it will be better to combine in identity of the region not simply last, real and future, and the remote past, the near past and the expected future. In particular, it is possible to use the symbolism of the Golden Horde, ornaments of Uryupinsk down products, the images of high-tech industries (chemical formula, model nanotubes and fullerene molecules, etc.), and elements of the military-patriotic theme. It is necessary to provide systemacity of identity as visual identity of a brand of the region: it should reflected in the design of business documents, the style of outdoor advertising (billboards, banners, etc.), the design of the urban environment (street steles, sculptures, etc.) and transport (tram, trolley-buses, taxis, airport, river port, bus and train station, public transport), as well as souvenirs demanded by the inhabitants of the region.

Perm is a striking example of the Russian city-branding. There are sculptures of bears and unusual monuments, men on the roof, a special place has a red letter "P", Pasternak looking thoughtfully with posters at the bus stops. Although these accents are scattered and controversial they have the rational as the city got fame and federal attention. A good example of the use of its "abnormal" location is the village of Molebka, the most part of its budget is the souvenirs with symbols of UFOs and the income from "expeditions" and UFO conferences.

Volgograd is the only million-plus city in Russia that has marketing strategy as separate, scientifically reasonable document. All more or less large Russian cities include block of marketing activities into the overall strategy of social and economic development or private strategies. The important the condition of the realization of Strategy of social and economic development of the Novosibirsk region till 2025 is the creation, the strengthening and promotion of a competitive brand of the Novosibirsk region at the inter-regional and international level as the region of innovative development providing a high quality of the citizens' life. The long-term target program "Marketing promotion of the Novosibirsk region in 2013-2015" and the program "Formation of image of Novosibirsk till 2020" have been taken to achieve this goal.

The place marketing of St. Petersburg is focused on the development of the tourism industry. That is why the main positions are in the Development programme of St. Petersburg as the tourist center in 2011-2016: the formation of a positive image, launch events, placement of image information, attraction of investments, infrastructure's reconstruction and economic recovery. The sections devoted to the image of the city, its promotion and its communication strategy are

in the City development strategy till 2022 “Cherepovets - a city of opportunities”. The block of marketing activities included in the target program “Development of domestic and inbound tourism” in the Volgograd region, developed for the period from 2009 till 2012 and Strategy for tourism development in the region till 2020. And later in the Strategy of development of tourism in the municipality “City of Vologda” till 2020 “Vologda - the cultural capital of the Russian North” the marketing focuses on the development of unique historical and cultural resources of the region. The presentation of Vologda as one of the biggest cultural center of North - West of Russia is possible by the creation of conditions for the development of cultural and historical heritage, secondary and higher education institutions, the organization of public events, concerts - exhibition, festival events, tourist gatherings, celebrations giving the reasons for the coverage in the media the recreational opportunities of the city. The cultural heritage could help the development of the city and its infrastructure thanks to a good advertising and attracting of media.

It is important to overcome the widespread notion that the marketing strategy is a specialized subsystem of social and economic development of the area and the higher jurisdictions (macro-region, the country, the international association), its parameters (orientation, the imperatives and priorities) are mainly given “from above”, it is a special way of their realization, and its conceptual framework and horizons are also formed by higher-level strategies. The marketing strategy of the region - not a subsystem, and meta-strategy for social and economic development, it should not only contribute to the achievement of the main objectives of the strategy, but also to define them, and to provide the integration of all areas of the strategic regulation from industrial policy to the development of science, culture and sports.

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## THE INSTITUTIONAL STRUCTURE OF SOCIAL ENTREPRENEURSHIP IN THE USA, UK AND GERMANY WITHIN A CONTEXT OF MARKET-BASED VS. BANK-BASED SYSTEMS

RUSLAN PAVLOV<sup>1</sup>

### ABSTRACT

*Since the beginning of the world economic crisis the level of unemployment across different countries increased significantly and so did social and welfare polarization of people. Under these conditions the emergence of social entrepreneurship could be viewed as an additional opportunity for the disadvantaged people to enhance their welfare and improve their living quality. As all the phenomena of such kind its activity should be coordinated by some special institutions in order to develop successfully, thus enhancing its aggregate performance. The paper reviews different kinds of economic systems inherent to certain types of integration between financial and industrial resources. So, the system of industrial development of the USA relies in most part on the stock market, while that of several European countries, such as the United Kingdom and Germany prefer to use credit resources, or the loan capital. The main purpose of the paper is to find out whether such trends hold true for the institutional structures of social entrepreneurship in these countries and whether that is the case for Russia as a country with a transitional economy. The paper contains some implications for such countries suggesting them to consider some opportunities of evolving their market-based institutions and bank sector to create a more suitable institutional system to support the development of social entrepreneurship.*

**KEY WORDS:** social entrepreneurship, institutions, market-based systems, ethical markets.

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### 1. INTRODUCTION

Social entrepreneurship has become a very popular phenomenon among different scholars nowadays. It presents a great interest not only because of its extraordinary nature, but also due to the paradigm crisis of the neo-liberal economic model, whose features are becoming increasingly evident for the recent times. The events which happened on 17 September 2011, when the protest movement 'Occupy Wall Street' began in Zuccotti Park, were impressionable by their scale and impact. The wave of protest movements all over the world that followed this action showed that the social discontent with economic inequality of people has been growing. According to the U.S. Census Bureau data, the proportion of overall wealth—a measure that includes home equity, stocks and bonds and the value of jewelry, furniture and other possessions—held by the top 10% of the population increased from 49% in 2005 to 56% in 2009 (Morin, 2012). At the same time the share of economically excluded people is growing steadily, which is evidenced by the recent data on the high rates of unemployment in Portugal and Spain.

As A. Badulescu points out, “social entrepreneurship aims at being an effective approach, even if it does not follow the personal profit of the entrepreneur but the fulfillment of social objectives with broader community impact; maximizing money invested for the good of the community or for solving social problems remains a priority”. Some examples of social entrepreneurship emerged in the first half of the 19<sup>th</sup> century, though they were unique and not a mass phenomenon. For the recent decades, this sector has flourished greatly penetrating to the developed as well as developing countries.

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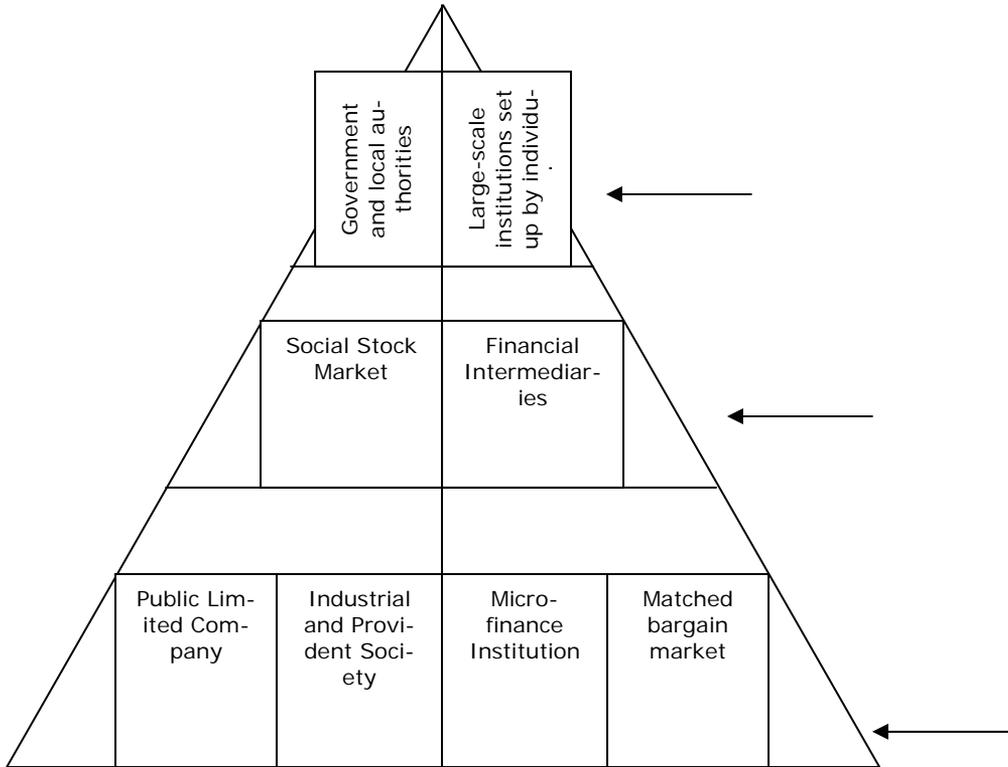
It's interesting to note that the left movement ideology has attracted lots of new followers which reflects, in particular, in the Marxism revival. 'Why Marx was right?' by T. Eagleton proved to be a bestseller since lots of problems, connected with the system peculiarities of the paradigm being criticized by the contemporary scholars, were efficiently elaborated in the Marxist' terms and some disturbances in the social and economic system resulted from the current trends of the mainstream policy were emphasized against the same disturbances the world economy faced more than a century ago (Eagleton, 2011). Such analogies have become of a great importance allowing for the crisis of methodological tools in the modern economics. Besides, the legitimacy of the left political movement in Europe is increasing, which is evidenced by the victory of the social-democrats at the last parliamentary elections in Italy and the presidential in France. These are, in turn, the signs of poverty growth, labor migration, social exclusion and the failure to solve such problems by means of traditional ways of applying market mechanisms. Such challenge suggests to think about social entrepreneurship as a possible way to mitigate the distortions stated above. It can be viewed not only as an economic or social phenomenon, but also as a political movement, as it challenges the dominating paradigm at all the levels of its pervasion, forcing the governments to introduce some important radical measures aimed at supporting its development.

## 2. HIERARCHY OF SOCIAL ENTREPRENEURSHIP INSTITUTIONS

The available literature on social entrepreneurship allows us to argue that there were several attempts to classify this phenomenon, though they were based upon a certain criterion, regardless of the fact that it might have different scales of development. In this context the classification provided by A.Nicholls (2007) seems to be successful, as it challenges the dominant paradigm at different dimensions. According to it, social enterprises challenge the dominant paradigm at three levels, micro (the enterprises), meso (new markets; intermediaries) and macro (socio-economic impact; policy implications). These refer to social enterprises that (1) respond to market failure and/or "institutional void" by developing new products and services, (2) contribute to the reconfiguration of markets to generate new or increased social value and (3) challenge institutional arrangements through political action. From Nicholls' point of view, the third level of institutions should be presented by social enterprises. Though it is rather an excessive assumption, as in addition to social enterprises they should also involve the ways of mitigating social problems at the micro-level, which become embedded into an original institutional form. Thus, in order to enable an adequate reflection at micro-level, different ways of eliminating social cataclysms within a given micro-environment should be included into this concept, which don't necessarily have the form of social enterprises.

So, if we imagine the hierarchy of social entrepreneurship institutions, we'll get the picture as that presented in Figure 1. It's an improved version of Nicholls' classification as a pyramid with three levels, the first of which should present the macro-level institutions, the second deals with the activities of intermediaries and markets, e.g. social capital markets, and the third one presents the myriad of the local country- and region-specific institutions which are inherent to the particular place shaping its origins and nature, while contributing in some way to forming the relative institutions at the meso-level. The intermediaries presenting a nexus of some financial institutions designed to support social enterprises can be viewed as meso-level structures coordinating the activities of those from the bottom level. So, Community Development Financial Institutions (CDFIs) in the United States can exemplify this kind of institutions, as they present a network of special innovative financial mechanisms embedded in the current institutional structure surrounding communities. The macro-level institutions are those which influence much the dynamics of social entrepreneurship as a socio-economic phenomenon in the given country or worldwide. They can be embedded in certain regulations, laws, policies or some original institutions, which are capable to change the existing status quo at the level of a given country, not within certain communities or districts.

Figure 1: Three levels of social entrepreneurship institutions



Notes: The concept is a modified version of that presented by Nicholls (2007).

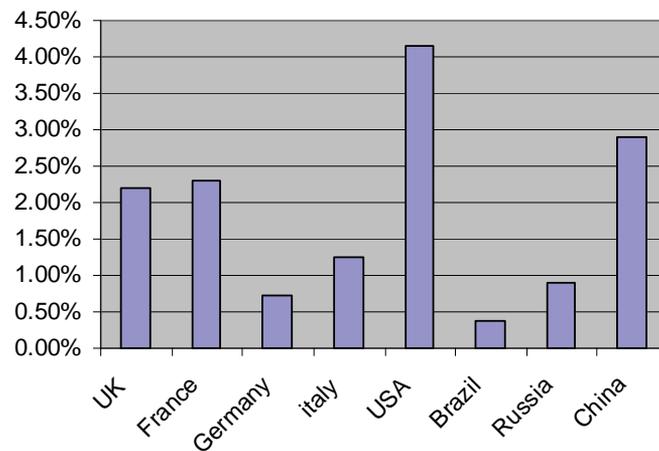
### 2.1 Social reforms as macro-level institutions

The macro-level institutions are hard to specify, as the impact executed by a politician or a public figure, can be formalized into the system of certain institutions, as well as be realized within a certain political strategy. The first case can be exemplified by a famous public figure Elena Panaritis, who initiated the property rights reform in Peru, which improved significantly the life quality not only of the residents, but of the immigrants as well. Allowing for that the system of regulating property rights was rather disorderly and hazardous in this country, as the houses of people were not secured properly against any fraud, she undertook a special reform designed to improve the situation in this area and to fill the institutional gap with a special agency called “Registro Predial”. It was a special registry designed to refine the system of securing and enforcing the property rights. In 1996 Peru’s government agreed to extend the property rights reform nationwide, with funding from the World Bank. The government created a new commission, Copri, which would work in tandem with “Registro Predial”, sharing the process of transforming Peru’s property market, which Panaritis called transforming the “Unreal” to Real. The reform did more than change perceptions, however. The security created by the new property rights system generated tangible social and economic benefits for formal property owners that were not available to informal owners and the formal property rights led to the increasing of entrepreneurial activity in those communities as the formal documentation enabled significant increasing in private-sector loans (Panaritis, 2007). It is not surprisingly that due to such action Panaritis is called “a social entrepreneur”.

Another case of social entrepreneurship, implying the adherence to a specific strategy that modifies greatly the position of certain local communities, but at the same time has a nationwide

effect, is connected with some political measures introduced by the former US president Bill Clinton. As Figure 2 shows, the rank of early stage social entrepreneurial activity (SEA) in the United States is the highest, as compared with those of other countries, according to the data provided by the Global Entrepreneurship Monitor (2009). SEA is the social equivalent of the total early-stage entrepreneurial activity index (TEA) which is measured as the percentage of a country's working-age population who are actively trying to start a new business (nascent entrepreneurs) and those who at least partially own and manage a business less than 3.5 years old (a baby business). Its highest rate in most part can be explained by the longevity of charity traditions in the United States which would be of the same force as the entrepreneurship ones. Numerous examples mentioned by Clinton (2009) in his book "Giving/How Each of Us Can Change the World" suggest that. Besides, he is known as a person launching several charity initiatives, but that is not why he should be called "a social entrepreneur". He managed to force the financial institutions to provide loans for the low-income communities, while most of them refused to do that before. According to the amendment of 1995 to the Community Reinvestment Act of 1933, they might be closed in the case of refusal. Such measure can be treated not only as social, but also as entrepreneurial, as it had the same effect as that implemented by Panaritis. The highest rate of early stage entrepreneurial development can be explained in part by the environment encouraging people to engage in business of such kind, that was formed under the period of Clinton's presidency. We can't help but mention emergence of the Community Development Financial Institutions which shaped greatly the institutional structure to support social entrepreneurship at that time.

Figure 2: Early-stage social entrepreneurial activity (SEA) rate in different countries, 2009



Source: GEM (2009) "United Kingdom 2009 Monitoring Report", [online] Global Entrepreneurship Monitor, [http://strath.ac.uk/media/departments/huntercentre/research/gem/GEM\\_UK\\_2009.pdf](http://strath.ac.uk/media/departments/huntercentre/research/gem/GEM_UK_2009.pdf).

## 2.2 Social stock market and loan stock institutions at the meso-level

The meso-level institutions present the intermediary level in this structure. Marking this group of institutions as a specific category is of great importance because it is not only a superstructure over that beneath, but is also a factor which shapes and determines the behavior and performance of the micro-level institutions. So, for instance, the social capital market which is coordinated by a network of international financial organizations, such as the International Association of Investors in the Social Economy which was thoroughly investigated by Mendell and Nogales (2009), can be viewed as a cluster which originated from the bottom of this pyramid, but it can influence significantly the subsequent trends of development of micro-institutions worldwide. In this context the emergence of a social stock market should be mentioned.

For the recent decade there were several attempts in the world aimed at constructing some mechanisms to enable social enterprises to act as conventional business enterprises – that is to provide them with the opportunity to issue shares, but allowing for the high-level risk connected with their trading at an ordinary stock exchange, it should be advisable to let them trade at a special stock exchange designed for that. So, the United Kingdom and Germany can play a pivotal role in installation and deployment of such mechanisms. Whereas the former belongs to the market-based countries range, the latter belongs to another group, consisting of bank-based countries, but it didn't miss the chance of adopting such mechanisms which seem to be effective. A special meso-institution, such as the Social Stock Exchange Association (SSEA), has been operating in Germany for the recent 5 years. It is designed not only to ensure forming the social stock market within this country, but also expands its influence abroad to help other countries which are engaging in such difficult and controversial process.

Though this institution is implementing a pilot project in Germany, it is also engaged in similar activities in Portugal, where the processes of launching a social stock exchange are well underway. Moreover, it organizes different events for similar initiatives to get involved, collaborate and learn from each other's experience (SSEA, 2013). The initiators of such project are deemed to be aware of the financial risk connected with the assets of social enterprises, implying the low return rate on the capital invested. The main task of SSEA project in Germany is to create a platform that will offer investors some clear comparability on the social and technological impact on their investments, which will yield a slightly lower (single digit) financial return. Though this platform is not launched yet, it has a preliminary stage which expressed in the meeting which was held on 25 March 2011. At this meeting five social ventures were pitching to a dozen investors for a financing volume of roughly € 20 million (Kuhlemann, 2011). We should think that taken such event as the first indicator characterizing the activity of social stock market in Germany nowadays, we can make a conclusion that in any case Germany leaves behind the UK where the total sum raised from the ethical issue shares amounted £ 50.1 million by 2005 (Hartzell, 2007) that equals € 58.6 million which is about three times as many as this value.

Table 1: Number of Ethical Share Issues and Total Raised and the turnover at LSE in the UK in the period 1984-2005

Period	Number of issues	Total raised (£ million)	Total turnover at LSE (£ million)
1984-1990	6	3.35	1,899,136.4
1991-1995	8	4.17	2,610,621.9
1996-2000	13	10.55	6,097,414.2
2001-2005	16	32.03	7,931,012.52
Total	43	50.1	18,538,185.02

Sources: Hartzell J. (2007) "Creating an ethical stock exchange", [online] Skoll Centre for Social Entrepreneurship, [www.sbs.ox.ac.uk/Skoll/Ethical\\_Stock\\_Exchange.pdf](http://www.sbs.ox.ac.uk/Skoll/Ethical_Stock_Exchange.pdf). and the data derived from the website: <http://www.londonstockexchange.com> .

Though this table suggests that the link between these variables is evident, we should seek to find out it more accurately. So, if we try to calculate the link between the time series of all these variables for the period from 1984 to 2005, we'll get the values as those presented in table 2. These findings suggest that the strongest link exists between the total turnover at LSE and the number of issues. As for others, they are less, but it doesn't mean that we should neglect them.

The process of launching the social stock exchange in the United Kingdom is also still ongoing, as well as in Germany. Nevertheless there are several ways of executing such operations beyond such exchange. Such operations are possible due to a three-step system of ethical share investment in the UK which presents a way for social enterprises to adopt their abilities within a less stringent environment than that for the existing business enterprises. So, these steps are: the Off-Exchange (OFEX), the Alternative Investment Market (AIM) and the London Stock Exchange

(LSE). All of them can be considered as a hierarchical tree, in which companies graduate from one level to the next as they grow in size. Indeed, AIM was established by the LSE for companies being at their earlier stages of development. The markets which are higher up the tree offer greater liquidity, but are more expensive to list on and the listing requirements are more stringent in terms of disclosure of the price sensitive information.

**Table 2: Pearson correlation matrix of the variables featuring the linkages between the activity of the social stock market and that of the mainstream stock market in the UK**

	Total turnover at LSE (£ million)	Total raised (£ million)	Number of issues
Total turnover at LSE (£ million)	1.000		
Total raised (£ million)	0.899	1.000	
Number of issues	0.997	0.895	1.000

**Notes:** The correlation indices are calculated by the author using the figures stated above.

Thus a company might first choose to list on OFEX, where the cost of listing is only around £ 10,000 a year or less, but trading there can be deceptive, as some OFEX shares are not traded at all for long periods. The share price then remains static and may not reflect the value that a share might achieve in a more liquid market. The lack of competition and the absence of due confidence among investors cause the fall in the share price. Although many companies go straight to AIM, a listing on OFEX is often a first step towards an AIM listing. But AIM is a very important step for social enterprises, as it is a chance for them to attract some major institutional investors. However, fees for listing on AIM are likely to be between £ 300,000 and £ 500,000 even excluding marketing costs (Hartzell, 2007). For a social enterprises, where a high profit level is not to be expected, share issues therefore need to be in the range between £ 10 to £ 20 million to stand a chance of covering the costs of fees. Raising this level of investment is often unrealistic, allowing for the financial condition of social enterprises. The larger of the AIM companies move to the London Stock Exchange. Some of them have a balance sheet as small as £ 10 million, but most are much larger. However there is a threat of a hostile takeover for the enterprises seeking to attract large amounts from the institutional investors or venture capitalists. That is also the reason which prevents social businesses from being the actors on the mainstream market.

While the UK demonstrates an example of enhanced activity in the field of social stock operations, Germany appears to be one of the leaders on the development rate of microfinance institutions (see Table 2) and in this sense matches its position as a bank-based country absolutely. In most part Germany's successes in the development of microcredit system can be explained by the effective performance of such meso-institution as the German Microfinance Institute, as it provides a wide range of different services, in particular, counseling and training for MFIs (e.g. their loan officers), designing electronic loan processing tools and accrediting MFIs for the risk capital fund which is called "Microfinanzfonds Deutschland" (El-Zoghby, Gähwiler, Lauer, 2011).

**Table 3: Main microfinance indicators in selected European countries**

Country	Microfinance Indicators			
	Number of loans disbursed	Total value of loans disbursed (EUR M)	Average Loan Size (EUR)	Average Interest Rate (%)
Germany	4,625	52,276,375	11,303	6.92
Italy	3,223	22,451,418	6,966	5.80
Spain	8,773	97,800,000	9,943	5.00
UK	1,252	13,420,000	10,718	13.40
Romania	2,496	18,847,296	7,551	-
Bulgaria	68,348	432,890	6,334	-
Czech Republic	-	-	4,500	-
Slovakia	982	155,000,000	157,841	6.50

France	121,000	852,500,500	7,045	0.5
Poland	130,888	-	2,024	11.00
Netherlands	43,508	739,636,000	17,000	-
Hungary	104,754	371,876,700	3,550	-

Source: Kraemer-Eis H., Conforti A. (2009) Microfinance in Europe. A market overview, [online], European Investment Fund, [http://www.eif.org/news\\_centre/publications/EIF\\_WP\\_2009\\_001\\_Microfinance.pdf](http://www.eif.org/news_centre/publications/EIF_WP_2009_001_Microfinance.pdf).

As for the situation in the microfinance industry, let's investigate the positions of German microfinance sector to find out whether the environment of banking sector shapes the microfinance development in this country. As we can see, according to the data presented in table 4, the trends of development of both variables are not so parallel as those for the social stock market and London stock exchange in the UK, but the link is also positive: the correlation index is 0,725. It is weaker because of the relative stability of the microfinance industry in the beginning of its development, while the total banking sector experienced a short decline caused by the worsening of the macroeconomic situation in the country. Nevertheless we can conclude that the linkages between the financial mechanisms of social entrepreneurship and the environment they evolve in exist. So it would be advisable for different countries to consider the opportunities of developing those institutions which match the type of their financial systems. That means that path dependence is a very important thing for the development of financial mechanisms of social enterprises.

Table 4: The dynamics of profits of commercial banks and the average-weighted growth of assets of microfinance institutions in Germany in the period 2004-2009

Year	Profits of commercial banks (Billions of Euros)	Average-weighted growth of assets of MFIs (%)
2004	5	38
2005	20	31
2006	10	35
2007	18	45
2008	-5	15
2009	5	22

Sources: Germany. Banking Sector Structure. Technical Note, July 2011, International Monetary Fund / <http://www.imf.org/external/pubs/ft/scr/2011/cr11370.pdf>; Microfinance in evolution. An industry between crisis and advancement / Current Issues. Global financial markets. Deutsche Bank (DB Research), September 13, 2012 / [http://www.dbresearch.com/PROD/DBR\\_INTERNET\\_EN-PROD/PROD0000000000294314.pdf?kid=dbr.inter\\_ghpen.headline](http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD0000000000294314.pdf?kid=dbr.inter_ghpen.headline).

### 2.3 Matched bargain market in the UK as an example of micro-level institutions

As in the United States and Germany the social capital market is only at the stage of installation, while in the United Kingdom it is at the stage of deployment yet, we'll focus only on the English institutions as having settled fundamentally and providing a very valuable experience on this point. In this country a company not listed on the mainstream markets can usually only trade its shares through a matched bargain market. This is usually run by a broker or a recognized financial institution, and involves holding a list of buyers and sellers of the shares and matching them at the price they both wish to pay. So the matched bargain market for a certain enterprise can be viewed as a micro-level institution. Matched bargain markets usually operate for one company in isolation rather than for several companies. Moreover, the Financial Services and Markets Act limits the extent to which the investment can be marketed. Price-setting on a matched bargain market is usually a haphazard affair. Quite often it is left to buyer and seller to agree, but if any price at all is recommended, it is usually the broker running the market who would recommend a price, based on information provided by the company. Thus in a matched

bargain market, the company itself has much more control over the share price. This is usually regarded as an unsatisfactory situation open to abuse, as two conditions necessary for an efficient stock market are not met. The first one is that the market is sufficiently liquid for expectation of value to be quickly reflected in the current price. The second is that investors have all and equal information available to them surrounding the situation of a company. When these conditions are not met, anomalies occur and some individuals can benefit over others due to the drop in the share price as stated in the previous subsection.

Speaking about matched bargain markets, it's interesting to note that those companies which didn't list on OFEX and AIM have achieved wonderful results. To approve our suggestion derived in the previous section that the division of countries according to the criteria, whether it is a market- or a bank-based system, coincides with the development of the same kind institutions for social enterprises in these countries, we'll provide some data concerning the growth of capital amount raised as a result of share issues by three most successful social enterprises of the United Kingdom: Traidcraft, Shared Interest and Wind Fund.

Table 3: Three leading social enterprises in the amount of shares issued

Company	Year	Legal form	Type of investment	Amount raised (£M)
Traidcraft	1984	PLC	Share	0.3
	1986	PLC	Share	1
	1991	PLC	Share	0.4
	2002	PLC	Share	3.25
Shared Interest	1995	IPS	5 Year Loan stock	0.65
	1996	IPS	5 Year Loan stock	0.85
	1997	IPS	5 Year Loan stock	1.2
Wind Fund	1995	PLC	Share	1
	1998	PLC	Share	1.3
	2005	PLC	Share	4.75

Source: Hartzell J. (2007) "Creating an ethical stock exchange", [online] Skoll Centre for Social Entrepreneurship, [www.sbs.ox.ac.uk/Skoll/Ethical\\_Stock\\_Exchange.pdf](http://www.sbs.ox.ac.uk/Skoll/Ethical_Stock_Exchange.pdf).

Thus, according to these indicators, we can conclude that all the three companies achieved such great results, having issued their shares beyond the mainstream market, but whereas Traidcraft and Wind Fund are public limited companies (PLCs), Shared Interest is an industrial and provident society (IPS) which has a limited ability to attract funds. Moreover, the redemption period for the bonds issued by IPSs is rather short. So, the investors usually have less opportunities to buy and sell such bonds, as they would have dealing with bonds issued by a conventional business enterprise. Wind Fund happened to be the most successful among these companies, as it managed to raise its capital from £ 1 million in 1995 to £ 4.75 million в 2005, which is comparable with AIM in its scale. Though Traidcraft managed to have even 2,400 shareholders, while the average number of the AIM company' shareholders is around 800 (Hartzell, 2007). This fact suggests that a matched bargain system presents something like an economic miracle which is developing along with its immanent laws and has an ability to outachieve the existing formal markets.

### 3. THE SYSTEM OF MICROCREDIT INSTITUTIONS AND SOCIAL STOCK EXCHANGE IN THE USA, GERMANY AND THE UNITED KINGDOM

The model of institutions presented here is a sophisticated version of Nicholls' classification which enables us to make it clear what kind of financial institutions are best developed in a particular country at the particular level. So we can compare the respective institutions of social entrepreneurship in these countries with their profiles – whether it is a market-based or a bank-based system, according to the classification presented by Demirguc-Kunt and Levine (2003). In

bank-based financial systems such as Germany and Japan, banks play a leading role in mobilizing savings, allocating capital, overseeing the investment decisions of corporate managers, and in providing risk-management vehicles. In market-based financial systems such as England and the United States, securities markets share center stage with banks in terms of getting society's savings to firms, exerting corporate control, and easing risk-management. Table 3 presents three countries, two of which are market-based (the United States and the United Kingdom) and the third is bank-based (Germany). The distribution of the respective institutions for social entrepreneurship looks like that for the commercial sector in these countries.

Table 3: The loan capital and social stock institutions in the USA, Germany and the United Kingdom

	USA		Germany		United Kingdom	
	Loan Capital Institutions	Social Stock Institutions	Loan Capital Institutions	Social Stock Institutions	Loan Capital Institutions	Social Stock Institutions
Macro-institutions	Community Reinvestment Act of 1977 as amended further	The United States Securities Act of 1933	The Act amending the German Investment Act of 2003 (the Amendment Act, 2007)	The Stock Exchange Act of 1896 as amended further	Community Investment Tax Relief, Credit Unions Act	Financial Services and Markets Act; AIM Rules for Companies
Meso-institutions	Community Development Financial Institutions	Green Stock Exchange (launch in 2014)	The German Microfinance Institute (Deutsches Mikrofinanz Institut); The Microfinance Fund Germany (Mikrofinanzfonds Deutschland)	Social Stock Exchange (launch in 2013)	Community Development Loan Funds	OFEX, AIM, LSE, Social Stock Exchange (launch in 2013)
Micro-institutions	Web-resource 'www.kiva.org	New York Stock Exchange	GLS Bank	NExT SSE	FINCA UK	Triodos mated bargain market

Notes: The table is composed by the author using the data derived from: SSEA (2013), Kuhlemann, A.K. (2011), Clinton, W.J. (2007) and some other reference bases.

Different laws, regulations and standards coordinating the activity of the respective fields of social investment systems presented here are treated as macro-institutions. Community Reinvestment Act of 1977 with the amendment of 1995 which resulted in increasing the opportunity window for the low-income households is worth mentioning first. The Act amending the German Investment Act of 2003 (also known as the Amendment Act of 2007) played a major role in forming an environment for the development of microfinance institutions in Germany. It enabled the emergence of two meso-institutions in microfinance area: the German Microfinance Institute and the Microfinance Fund "Germany". As for the system of regulating social stock exchange, it should be stressed once more that the most successful pattern of it is represented by the UK financial system which is, in turn, a market-based country. Maybe that is the reason of its leadership among all the other European countries. In addition, the system of regulating transactions in AIM is simplified so that AIM companies are supervised by a nominated adviser (referred to as a "nomad") rather than by a securities regulator (in the UK, this is the Financial Services Authority (FSA)). All the transactions of AIM companies are subject to the AIM Rules for Companies (AIM Rules). AIM's simplified admission procedures generally result in savings in time and cost for an

AIM admission as compared to a main market or other listing. In most part the creation of such institution was predetermined by the increased activity of matched bargains, which was, in turn, caused by the traditions of using stock exchange as a leading mechanism to support industrial development in this country.

#### 4. IN CONCLUSION

The main result of the paper is a modified version of Nicholls' classification of challenges against the dominant neo-liberal paradigm. It is modified so that it might include the main institutions orienting the activities of social enterprises which proved to be effective. Such model would help us to assess the completeness of coverage of the relevant aspects in the system of institutional regulation of the subject in issue. Its application allowed us to answer the question, what institutions are more developed in the countries observed and whether it matches the widespread opinion on the separation of countries between market-based and bank-based. The result is that such trends hold rather true for the financial streams of social enterprises in the UK and Germany. Consequently, it should be advisable to recommend those countries having strong traditions of stock market development to put a special emphasis on the development of relative financial institutions to support social enterprises, whereas those relying upon a strong system of bank institutions would be reasonable to develop the microfinance sector to achieve the competitive advantage for their social enterprises. As E. Panaritis argues, to build an "enabling environment" seems better than to adopt paternalistic policies by the government, as it "would create the conditions for economic growth" (Panaritis, 2007, p. 91). So, it's difficult to disagree with such suggestion.

Besides, one should say some words about the way of attributing these implications to the analysis of the situation in developing countries. For instance, Russia might be subsumed under the group of bank-based, rather than market-based countries because of its path dependence connected with long traditions of bank monitoring system which originated in the Soviet Union and was performed by the State Bank. To speak about Russia as a market-based country presents a great difficulty, because it lacks the established class of social investors which is well represented in such countries as USA and UK thereby contributing to their image as market-based countries. Moreover, Russia has one of the lowest positions in the ranking of social responsibility of business across different countries, occupying the 37<sup>th</sup> place (Belova, 2011). Only Turkey has a worse position being at the bottom of the list. The implications derived in the paper could be valuable when planning the strategy of development for different countries. The link between the kind of economic system and the respective institutions of supporting social entrepreneurship should be taken into account when projecting the strategy of development of financial mechanisms for social enterprises in the respective countries. As the amount of the paper is rather limited we hadn't the opportunity to reinforce our implications by an empirical research. This task faces a problem of collecting data on the development rates of bank and market institutions in the respective countries, but it seems rather realistic to perform. So, maybe further it would be possible to construct a regression model showing the link between the level of development of market- and bank-based economies and the respective rates of social entrepreneurship' institutions in those countries.

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e.g. Picard, R. G. (2005), "Money, Media, and the Public Interest", in Overholster, G., Jamieson, K. H. (Ed.), *The Press*, Oxford University Press, Oxford, pp. 337-350.

□ *For journals* Surname, Initials (year), "Title of article", *Journal Name*, volume, number, pages.

e.g. Thacher, D. and Rein, M. (2004), „Managing Value Conflict in Public Policy”, *Governance Vol. 17 No 4*, pp. 457-486.

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e.g. Draskovic, V., Grego, Z., Draskovic, M. (2011), "Media Concentration, Neoliberal Paradoxes and Increase in Virtuality", in *Media Concentration proceedings of the international conference in Podgorica, Montenegro 2011*, Elit, Podgorica pp. 33-45.

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e.g. Miller, M. C. (1997), "The Crushing Power of Big Publishing", *The Nation*, 17 March, p. 10.

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e.g. *Vijesti* (2011), „The New Media“ 2 December, p. 5.

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e.g. Compaine, B. M. (2005), „The Media Monopoly Myth: How New Competition is Expanding our Sources of Information and Entertainment”, available at: [http://www.NewMillennium Research.org//archive/final\\_Compaine\\_Paper\\_050205.pdf](http://www.NewMillenniumResearch.org//archive/final_Compaine_Paper_050205.pdf) (accessed 10 december 2011).