

NEW COMBINATIONS IN THE ECONOMY AND CORRECTION PRINCIPLE OF "CREATIVE DESTRUCTION"

The paper investigates and develops J. Schumpeter's approach to economic development. The author proposes the model of a new combination appearance and those possible consequences, which this introduction causes in economic system. The presented model shows that the emergence of a new combination (sector) is not based only on the resource withdrawing from the former combination, but it requires the creation of a new resource. Thereby, the principle of "creative destruction" is modified and the principle of "combinatorial augmentation" is suggested. Fundamentally the important condition for economic evolution is to create a new resource for the new combination, not just borrowing resources from the old combinations to the new ones. It has received basic conditions for financing of new combinations in the growth phase and depression of the economy. It has demonstrated the necessary condition for creation a new resource for the new combination by the numerical solution of optimization models, not just borrowing resource.

Key words: new combination, theoretical model, principle of "creative destruction", "combinatory augmentation", growth and crisis.

1. Introduction

The theory of economic development of J. Schumpeter in general developed by the Austrian economist in 1934 in the work named "The Theory of economic development"¹, assumed as the main motive power of development – the businessman and the enterprise activity connected with creation of the new combinations in economy.

The Occurrence of new combinations is connected with activity of the businessman-innovator which borrows a resource from the old combinations which

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¹ Schumpeter J.: *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and Business Cycle*, Oxford University Press, New York, 1969

realization is connected with activity of “conservative”. As a new combination – Schumpeter understands five cases²:

- a manufacturing of the new, unknown blessing for consumers, or creation of a new quality;
- introduction of a new, unknown before, a way of manufacture in which basically lays unessential not only a new discovery but also a new way of commercial using of the goods;
- a discovery of a new commodity market where the given industry of the country hasn't been presented, in dependently there was this market till this time or not.
- the reception of a new source of raw materials or semifinished products irrespective of, there was this source before, or simply it was not taken into consideration, or was considered inaccessible, or it should be created.
- the reorganization – creation of a monopoly position or liquidation of that.

And really, a new combination, whether it would be a product or technology, is developed on the basis of already existing means of production, as the creation of the new means of production is already itself the new combination, capable to have the most fundamental consequences for economics development. At the same time as it is available there are a five types of new combinations, so for some of them new mean of production can be necessary, but it is enough for others – old and others don't need an additional resource at all³.

An Idea, according to which new combinations borrow a resource, that is district it, from old combinations, has been designated as “creative destruction”. By means of this concept the competition mechanism between old and new combinations and in the enterprise environment was explained. Further, the given logic has taken a born of concepts of a technical and economic paradigm, it's version – technological way and – obvious – taxonomical character of this concepts didn't cause any doubts. Technological possibilities of a society passed a certain stages which were allocated in the form of a paradigm or way in its development. And the subsequent stage was based on the previous resources and used these resources for itself.

2. Model of Emergence of New Combinations

Now, let's look at the emergence of new combinations from the point of view of economy structure. Let us admit, that there are $i=1, \dots, n_i, \dots, N$ sectors or scopes of activity in the economy. Each of them provides income y_i and at a

² Schumpeter J., *ibid.*

³ Perez C.: *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages*, Edward Elgar, Cheltenham, UK, 2002

certain point of time is characterized by profitability (return) - r_i . The risk of losses in each sector or activity is represented by income loss x_i and probability p_i . Thus, the risk will be $x_i p_i$. And this amount is the reflection of both internal inefficiency of the given sector or activity, and institutional inefficiency, that is, interactions with other sectors inside and outside the economic system⁴. The probability of losses may increase due to technological success of competitors in other countries. Then, the amount of total revenue for equal periods of time created by the system will be:

$$Y = \sum_{i=1}^N (y_i - x_i p_i) \quad ,$$

To create income Y for sectors or scopes of activity the amount of necessary resources (R) (natural resources, physical capital, human resources, etc., that is, material resources) will totally be:

$$R = \sum_{i=1}^N R_i$$

Financial resources are also distributed between sectors and activities, so that their total volume can be defined⁵:

$$F = \sum_{i=1}^N f_i \quad , \text{ where } f_i \text{ is finance used on the given period of time by } i -$$

sector. Money supply in the country can be designated as $M = \alpha F$. If the price of i - resource is s_i , then the necessary volume of financing for this sector is $f_i = R_i s_i$.

$$M = \alpha \sum_{i=1}^N f_i = \alpha \sum_{i=1}^N R_i s_i \quad \text{The consumed resource is processed into the product which provides income (in our terms, it is created income), the correlation being as follows:}$$

$$y_i = f_i r_i . \text{Then:}$$

$$Y = \sum_{i=1}^N (f_i r_i - x_i p_i) = \sum_{i=1}^N (R_i s_i r_i - x_i p_i) \quad ,$$

The sector share (b_i) or activity in economy showing the value of the sector and its dominating role, can be defined as a share of created income (y_i) in the country's total gain (Y), as the quantity of employed in the sector (L_i) in the gen-

⁴ Sukharev O.S.: *Theory of Economic Changes. Problems and Decisions*, KRASAND, Moscow (eng), 2013

⁵ Perez C.: "Finance and technical change: a long-term view". In: Hanush H. and Pyka A. (eds.) *Elgar companion to Neo-Schumpeterian Economics*, Ch. 49, 775-799, Elgar, Cheltenham, 2007. Sukharev O.S., *ibid*, fn 2.

eral number of economically active population (L) or as added value in its total volume in the economy.

$$b_i = \frac{y_i}{Y} = \frac{R_i s_i r_i - x_i p_i}{\sum_{i=1}^N (R_i s_i r_i - x_i p_i)}, \quad \sum_{i=1}^N b_i = 1$$

The share of each sector:

We have three formulas for economic growth, decline and recession representing these three functioning modes:

$$\frac{y_{t+1}}{y_t} - 1 > 0 - \text{growth}$$

$$\frac{y_{t+1}}{y_t} - 1 < 0 - \text{decline}$$

$$\frac{y_{t+1}}{y_t} - 1 = 0 - \text{recession}$$

Let's write down national income for the initial and future period of time:

$$y_{t+1} = \sum_{i=1}^N (R_{i+1} s_{i+1} r_{i+1} - x_{i+1} p_{i+1})$$

$$y_t = \sum_{i=1}^N (R_i s_i r_i - x_i p_i) \quad , \quad \text{and}$$

$$\frac{y_{t+1}}{y_t} = \frac{\sum_{i=1}^N (R_{i+1} s_{i+1} r_{i+1} - x_{i+1} p_{i+1})}{\sum_{i=1}^N (R_i s_i r_i - x_i p_i)} \quad ,$$

$$\text{and} \quad \sum_{i=1}^N f_i r_i \neq \sum_{i=1}^N x_i p_i$$

$$\frac{y_{t+1}}{y_t} = \frac{\sum_{i=1}^N (R_{i+1} s_{i+1} r_{i+1} - x_{i+1} p_{i+1})}{\sum_{i=1}^N (R_i s_i r_i - x_i p_i)} > 1 - \text{growth}$$

$$\frac{y_{t+1}}{y_t} = \frac{\sum_{i=1}^N (R_{i+1} s_{i+1} r_{i+1} - x_{i+1} p_{i+1})}{\sum_{i=1}^N (R_i s_i r_i - x_i p_i)} < 1 - \text{depression}$$

From the analysis of the presented correlations it follows, that the economy tendency to extension is expressed in the increase of resources, their price, profitability, reduction of losses and probability of their occurrence. The depression arises, when used resources decrease on the economy sectors, financial flow is depleted, profitability goes down, and losses probability increases sharply.

Let's present economic growth on the basis of correlations introduced above:

- 1) Losses should decrease. Initially income is more than losses and income should increase in the system:

$$\sum_{i=1}^N (f_{i+1}r_{i+1} - f_i r_i) > 0,$$

$$\sum_{i=1}^N f_{i+1}r_{i+1} > \sum_{i=1}^N f_i r_i$$

$$\sum_{i=1}^N x_i p_i > \sum_{i=1}^N x_{i+1} p_{i+1}$$

$$\sum_{i=1}^N f_i r_i > \sum_{i=1}^N x_i p_i$$

If financing of economic system is equal to losses, it is necessary for growth that profitability surpasses probability of these losses, that is, at $f_{it} = x_{it}$ it is necessary, that $r_{it} > p_{it}$.

- 2) In the initial state of the system income is more than losses, however, increase of losses is observed in the following time interval. Then growth is possible if income gain compensates this increase.

$$\sum_{i=1}^N f_i r_i > \sum_{i=1}^N x_i p_i$$

$$\sum_{i=1}^N x_{i+1} p_{i+1} > \sum_{i=1}^N x_i p_i$$

$$\sum_{i=1}^N f_{i+1}r_{i+1} > \sum_{i=1}^N f_i r_i$$

$$\left| \sum_{i=1}^N (f_{i+1}r_{i+1} - f_i r_i) \right| > \left| \sum_{i=1}^N (x_i p_i - x_{i+1} p_{i+1}) \right|$$

- 3) This is a situation when in the initial position losses exceed income, and they rise in such a way, that they surpass the losses of the previous period. Thus income increase of the system is such, that it cannot cover the negative losses, or the same situation provides a negative disparity on income increase. The relation of two negative values will give positive value, as it is required according to the criterion confirming economic

growth. However, such situation is possible only theoretically, because losses cannot exceed national income in the initial condition.

Infringement of the introduced correlations will correspond to depression (recession).

Now, let us suppose, that economy consists of two sectors, in which losses are equal to zero in the starting point and profitability is not the function of finances $r \neq \chi(f)$. We will accept, that profitability on the time interval $[t, t+1]$ on each sector does not vary. These are conventional assumptions, but the time interval can quite be such that this parametre does not change so quickly, especially as it also reflects with what efficiency the productive activity is carried out and how the work is organized, etc. It is necessary for simplification of calculations⁶. Then economic growth rate (g) can be written down as follows:

$$g = \frac{\sum_{i=1}^N (f_{i+1}r_{i+1} - f_i r_i) - \sum_{i=1}^N x_{i+1} p_{i+1}}{\sum_{i=1}^N f_i r_i} , \text{ then for two sectors (and at once for the third one which will appear immediately after), considering, that:}$$

$$r_{1t+1} = r_{1t} = r_1$$

$$r_{2t+1} = r_{2t} = r_2$$

$$x_{1t+1} p_{1t+1} = z_1$$

$$x_{2t+1} p_{2t+1} = z_2$$

$$z = z_1 + z_2 + z_3$$

$$f_{1t+1} - f_{1t} = f^1$$

$$f_{2t+1} - f_{2t} = f^2$$

$$f_{3t+1} - f_{3t} = f^3$$

$$f^3 = \alpha_1 f^1 + \alpha_2 f^2 + f^s$$

where: f^s – created financial resource for the development of a new combination: a new sector or an activity or technology (technological possibilities), α_1, α_2 – shares of the borrowed resources from the first and second sectors accordingly.

Using the agreed notations (designating $\beta = z/f_2$ – the total losses in the system per unit of finances in the second sector), we'll have the following expressions for growth of economy ($g > 0$) consisting of two and three sectors, with the appearance of the third one in the form of a new combination:

$$\frac{f^1}{f_2} > \frac{\beta - r_2}{r_1} \text{ – condition of system's economic growth with introduced assumptions for profitability change per sectors in the course}$$

⁶ Certainly, other conditions are accepted as equal, there are no changes, otherwise it generates a number of factors, for example, organizational or institutional which will, certainly, affect economic growth rate and even on its presence.

of time and losses absence for sectors in the initial point. For the growth to be observed, the incremental ratio of finance (income) in two sectors, which the economy consists of, should be more than the relation of total losses excess in the economy per unit of finances in the second sector over profitability in this sector to profitability in the first sector of economy. If losses at the moment of time $t+1$ are recognized as zero, then the correlation is:

$$\frac{f1}{f2} > -\frac{r2}{r1}$$

In other words, incremental ratio of finances (income) in economy sectors should be more than the inverse ratio of profitability in these sectors. Minus sign takes into account the fact, that, at growth of total gain of the system, change of finances (income) increment in one of the sectors can be negative, that is, financing (income) of the sector decreases then.

Let's suppose that there appears a third sector as a new combination in the economy. Then, assuming the situation that this new combination distracts a part of finances (national income or resource) from the first and the second sectors, we must admit that it also creates a separate resource for itself. And the last circumstance can essentially outweigh the effect of resource loan. The development of world economic system confirms this fact. Consumption of resources increases with technological progress, the factor of population growth being significant, but not the only one in this dynamics. If the development assumed destruction of old resource with the equivalent use of the resource, and the resource was not lost, the scheme of the development expressed in general dynamics of resources would look differently, and the problem of economy, including the one appeared for the account of technological progress and waste-free technologies, would not be voiced by the governmental economists, politicians, and in the reports of large research teams in the forefront.

So, accomplishing some analytical calculations, it is possible to come to the following expressions and modes of the third sector appearance. At system growth, the volume of created resource and, respectively, finances for the third sector should be:

$$f^S > \frac{1}{r3} \{z - f1(r1(1 - \alpha1) + r3\alpha1) - f2(r2(1 - \alpha2) + r3\alpha2)\}$$

If the resource is created entirely with the appearance of the third sector, then $\alpha1 = \alpha2 = 0$ and the value of needful resource will be:

$$f^S > \frac{1}{r3} \{z - f1r1 - f2r2\}$$

Provided that the first sector gives the resource entirely, and the second one does not give anything, the value of created resource for the system's third sector,

for the growth to be observed (otherwise, recession can be observed), will make - $\alpha_1=1$; $\alpha_2=0$:

$$f^S > \frac{1}{r_3} \{z - f_1 r_3 - f_2 r_2\}$$

If both sectors give the resource for the third sector formation, it will still be necessary to create its own resource ($\alpha_1=1$; $\alpha_2=1$):

$$f^S > \frac{z}{r_3} - f_1 - f_2$$

$$f^S > \frac{z}{r_3} + f_{1t} + f_{2t} = \frac{x_{3t} p_{3t}}{r_3} + f_{1t} + f_{2t}$$

The resource for the third sector should surpass total resource of the first and the second ones in the initial point of time t on the value of expected losses in this sector balanced on the value inverse to profitability of this sector. In practice, many reasons interfere, so that these correlations are not carried out. However, analytically obtained correlations are useful guideline for further reasoning and modeling, and for diagnosis of crises and evolution of economic system.

Using elementary optimization models, which allow seeing resources distribution between the elements of the system (sectors), it is possible to designate proposition qualitatively important for understanding the development (growth) of economic system on a numerical illustration.

Mathematical formulation of maximization model of national income of economic system in the elementary form is as follows:

$$Z = \sum_{j=1}^N \mu_j x_j \rightarrow \max, \quad \sum_{j=1}^N x_j \leq C, \quad x_j \geq 0$$

At restrictions:

where Z - national income,

x_j - capital invested in j^{th} sector or activity,

$\mu_j = \frac{1}{T} \sum_{t=1}^T r_j(t)$ - average expected income on j^{th} sector or activity,

r_j - income in the period of time t on j^{th} sector or activity per a unit of input (resource or capital investments);

T - the whole period of system's development described by the models,

C - total resources (capital) invested,

N - number of sectors or activities in economic system. Mathematical formulation of minimization model of total risk is as follows:

$$R = x^T K x \rightarrow \min,$$

at restrictions: $\sum_{j=1}^N x_j \leq C, x_j \geq 0, \mu^T x \geq D$ where $K = [\sigma_{ij}^2]$ variations matrix⁷

for N kinds of activity, sectors. D - minimum expected average income, R – system's total risk.

It is necessary to note, that the drawback of the presented models is that they do not consider the dynamics of risks change within the limits of the given structure of economy, additional capital investments, and change of return depending on the change of a consumed resource. However, they can be used to show, a new sector appears and how the structure of the system aspiring to the greatest national income reacts to it. The fact that modern economy is this very system does not cause doubts as maintenance of economic growth at reasonable risks is a kind of ideological fetish of all actions, decisions and politicians. As a rule, the logic of the second model operates extremely restrictedly, that is, the total risk for the system is not estimated due to the complexity. And more than that, it is not minimized. More likely, we speak about reasonable income growth at acceptable expected risk. Crisis occurrence in the course of growth proves that risks were not considered, and macroeconomic management cannot preventively stand the crisis due to institutional reasons.

3. Results of the model

Let there be a volume of a resource equal to 100 units and five sectors or activities. Each of them is characterized by the return and by qualitative tendency of its development (see Table 1). According to the first model, economic growth corresponds to modern situation in the world economic system in greater degree ("irrational" or absolute growth). If the events were closer to the second model and problems of ecology, wars, regulations, including the financial sphere, leveled the risks, obviously, there would be a model of "rational" or "reasoned" growth. The sixth sector or activity corresponds to the appearance of a new combination, technological possibilities.

And it is interesting to look at the economy structure when this appearance occurs at the same initial resource and at resource expansion (creation of the resource for a new combination simultaneously with its appearance). It is interesting to note, that appearance of a new combination (innovation) at the first stage hardly earns essential profit. Usually, the return is less than the investments. In this connection financing of a new combination appearance, that is, financial resource provision, is impossible without certain adjustment of financial institutions which are allocated in the sphere which, at the first interval of time, will obviously be unprofitable. Sometimes, the subsequent prospects are also illusive and are not clear for financiers and creditors.

⁷ Co-variation is defined by formula: $\sigma_{ij}^2 = \frac{1}{T} \sum_{t=1}^T (r_i(t) - \mu_i)(r_j(t) - \mu_j)$

Therefore, financial system and banks should risk and advance capital to a new combination appearance. On the one hand, under conditions of crisis it is difficult enough to fulfill. On the other hand, the firms having difficulties with production and technologies change their plans, refuse some projects and manufactures, running risks, sometimes according to the principle “to have everything or nothing”, select new directions of actions, “try” new products and technologies.

Not for each economic system and not for each crisis, let them repeat periodically for certain economic systems with more or less regular frequency. In the period of rise, when profitability of present productions and the ones, started after crisis or at the stage of its overcoming, begins to grow, there are possibilities of redistribution of the resource between activities in the real sector, getting additional financial resource at the expense of its concentration. Financing of science and applied design improve.

Table 1: Initial Data of Sectors Developments in Economy Structure with Increasing, Decreasing, and Unstable Return ⁸

Economy Sector or Activity	Return (Change on Equal Periods of Time, rbl per rbl. of the Invested Resource)	The Qualitative Characteristic of Sector Development
1.	1,0 0,7 1,2	Old, moderately developing sector , but having development prospect
2.	-0,8 -1,5 -2,1	Unprofitable kind of activity, with worsening situation - degradation and liquidation
3.	0,0 0,7 1,4	Quickly opened, stagnant sector having no prospects of steady growth
4.	0,4 0,6 1,0	Stagnant sector , probably, an old one, having no big prospects
5.	1,2 1,7 1,3	Dynamically developing sector, (possibly, dependent on conjuncture), dominating in the economy
6.	0,4 1,1 2,1	New sector - new combination increasing its effectiveness according to the plan

Thus, the possibility of new combinations appearance essentially increases, as in the crisis point the majority of possibilities, especially those referring to the development of science and its applied researches is curtailed. These expenses get to the area of economizing at once, and stereotypic production, or those products, which do not require large expenses and risks for realization are delivered to the markets Thus, in case the crisis revives the new combinations, they are only the

⁸ Unstable return is understood as a situation when sector return on equal intervals of time first decreases, then increases or vice versa. Thus, return is a changing parameter, the change direction of which matters.

ones connected with realization of economizing problems, especially referring to energy-saving and resource-saving and corresponding technologies and techniques.

As we see from the table, economic system can quite be presented by its basic sectors and states. Now, it is important to define the starting point of distribution for realization of optimization process (the solution of optimization problem) for five sectors providing the income flows up to 110 and 120 units, defining this point as {20; 20; 20; 20; 20}, and with the appearance of the sixth sector (a new combination), we will preserve the starting point the same, only proceeding from the conditions of optimization method and its algorithm. This point will be {20; 20; 20; 20; 18,2}, and at the resource expansion to 110 units there are two variants of the starting point accordingly. Though they do not change the total picture essentially: {25; 25; 20; 20; 18,2} and {20; 20; 20; 20; 23,7}⁹. (Sukharev, 2013) Then, the results of numerical calculation can be presented in Tables 2, 3, and 4¹⁰:

Table 2: According to the Model of Income Maximization for 5 Sectors at the Resource of 100 Units

Characteristic	The Expected Income	
	110	120
Distribution structure of a resource between five sectors, generating the expected income	26,61	27,58
	0,0	0,0
	13,7	6,93
	12,09	4,35
	47,58	61,12

Table 3: According to the Model of Income Maximization for 5 Sectors at the Resource of 100 Units

Characteristic	The Expected Income		
	100	110	117
Distribution structure of a resource between five sectors, generating the expected income	35,06	40,37	49,25
	2,53	1,2	0,4
	0,0	0,0	0,0
	23,54	12,29	0,0 5
	38,85	46,12	0,33
The risk is decreasing	11,5	8,49	6,1

⁹ The vector of distribution for the first starting condition will be {29,2 0,0, 13,4, 12,05, 39,71, 15,6} and for the second starting condition (the second starting point) - {23,35, 0,0, 14,71, 13,63, 40,38, 17,9}. As we see, the starting point predetermines optimization result, that is, the structure of distribution is a bit different than for other starting point, but for the given conditions a divergence is obviously insignificant and not the basic one.

¹⁰ Sukharev O.S., *ibid*, fn 3.

Table 4: According to the Model of Income Maximization for 6 sectors at the Resource of 100 units and 110 Units (New Combination Appearance)

Characteristic	The Expected Income		
	Resource - 100	Resource - 110	
	110	120	120
Distribution structure of a resource between five sectors, generating the expected income	23,2	22,7	29,19
	0,0	0,0	0,0
	12,57	5,43	13,4
	11,24	3,27	12,05
	38,47	48,7	39,71
	14,5	19,82	15,6

As we see from the data models:

- 1) Growth dynamics is provided by the sector dominating in the economy or activity, and the structure of return from activities on the sectors influences both the character of resource distribution, and the possibility of achieving the expected (desirable) income.
- 2) Unprofitable sectors receive less and less resource and, finally, disappear, or receive very insignificant resource on the model of risk minimization (basically spent for the support of labor resource, that is, solution of social problems).
- 3) Stagnant sectors have no key role of maintenance of both types of growth, at getting the maximum income and at minimum risks of development. As for dominating sectors and the old ones, steadily developing, they present steady prospect of economic growth and achievement of the greatest income and minimum risks.
- 4) With the appearance of a new combination (the sixth sector) with the same resource, the role of dominating and stable sectors remains the same for the growth of national income, but the resource is redistributed in favour of a new combination as well. At the resource expansion the new combination with the given profitability receives even smaller amount than at the initial resource, as the resource is distributed in favour of stagnant sectors, dominating sector and old steadily developing sector.
- 5) At resource expansion, it is not a new combination that borrows the resource of 15,6 units, but this resource is redistributed between other sectors. And this result is entirely defined by profitability of this new combination and not so much by its value, but by its change (growth). Distribution structures, of course, differ for the income of 110 units, provided by different models (income maximization, risk minimization and a new combination appearance at the same resource of 100 units),

but with the data of our problem this difference is not so great to speak about the loan of the resource in favour of a new combination as the primary factor of the development.

Thus, the development factor of the modern economy providing its development (growth), but, then, its crisis, is resource expansion for a new combination which, in turn, also changes the structure of resources-incomes distribution in economic system. On the subsequent period of time it also changes the profitability correlation of these sectors and activities, that affects further change of the structure and appearance of new combinations.

4. Principle of "combinatory augmentation"

The named examples make a numerous field in behavior of agents "high tech". Certainly, the analysis shows a deviation from the principle of "creative destruction". Development of techniques and high innovations assumes the other logic than the linear loan of the resource from the old combinations. Most likely, it's a logic of the haute couture, interspecific resource (the term entered by O. Williamson¹¹) confidential workings. Invention, the scientific work, carried out also in the conditions of "old" means of production, never the less, can give new combinations. The question concerning how much in general it is possible, using "old" resources to create new combinations and whether "new" resources will be necessary for this purpose, has the answer in frameworks of logic of perfection and techniques development. The answer is defined by problem statement, level of design statement. If it is said about outer space exploration also new combinations of intelligence and even administrative decisions were necessary. In a index point of this project the science has given the exact answer that is enough resources for the decision of such problem.

If at the level of separate technologies, productions, enterprises and sectors no effect of "creative destruction" is observed, but the effect of "combinatory augmentation" is present, then why in a long-term interval, at macroeconomic level the process on units has ostensibly other content (the principles explaining technological development are presented in the Table 5).

¹¹ Williamson O.: *The Economic Institutions of Capitalism*, The Free Press A Division of MacMillan Inc., N.Y., 1985

Table 5: Basic Principles of Modern Technological Development of the Economy

Principle Combination	'Creative Destruction'	"Combinatorial Augmentation" (Correction of the "Creative Destruction" Principle)
New	Borrows the resource from the old combination	Creates a new resource, or improves the old one
Old	Gives the resource in favor of the new combination. It is reduced up to degradation and destruction, or the proportion is stabilized	Gets new qualities or properties, can also use the updated resource, stabilizes its state or improves it, optimizing its possibilities at the expense of productivity growth of capital and labor

Certainly, the resource for general purpose should be borrowed. And that is what happens. However, the resource is also created under the new possibilities and new combinations having the basic importance for the development of economy and technologies. They are aimed at creation of such resource, and distraction of the resource from the previous directions does not solve the problem of their development, deep down. Defense workings out and technologies which are financed from the budget including the experiment and duplicating, which are a part of the income already created in the economy (or the deferred revenue in the form of public debt at deficit-ridden budget) distract the resource through consumption restraint in the worst case and at steadily developing system and effective finance they distract nothing. If the problem with the personnel is more or less clear, that is, for a new combination it is necessary to teach and train personnel. (It is extremely difficult to retrain and distract the agent at the age of 55 or 60. For some kinds of technological work it is impossible.) But as far as the capital is concerned it is not absolutely clear, whether the means of production from the old technological possibilities are suitable for new technologies or not. Most likely, there is no loan or replacements of the means of production. If such things happen, it happens in insignificant volume, or in the volume that does not determine the process, because new technology always grows from the previous technical possibilities, proceeding from the necessity of their perfection or replacement with more productive devices. The principle of "permanent improvement" is built into technology evolution. Therefore the development of engineering sciences is based on this principle or on the principle of "combinatorial augmentation"¹².

In the conditions of depression and economy crisis (financial crisis of 2008-2009) when the effect of "disappearance" of the finance was observed, there was a curling of orders in the industry and other sectors. As a result, firms,

¹² Sukharev O.S.: "Elementary model of Institutional Change and Economic Welfare", *Montenegrin Journal of Economics*, 55-64, Vol. 7(2), 2011.

curtailing one technical directions of work, started to “try” development of the other technical directions. Thus, no transfer of resources occurred – one work and orders simply stopped, the personnel was reduced, but appeared some new orders, in the new markets, at reduction occupied and release volumes. These cases break a principle of “creative destruction”.

Conclusion

New combinations provide dynamism to macroeconomic system. Fundamental and technological innovations have the property to set the level of imitating and product innovations. In other words, there is a partial transfer of knowledge, achievements and possibilities of obtaining innovations for lower levels of hierarchy together with the corresponding resource and possible profitability. It is evident, that if the financial system cannot provide industrial sectors with medium-term and long-term credit, then with the lapse of time possibilities for product, imitating and updating innovations are exhausted. Raw orientation of economy will automatically mean orientation on updating, imitating and, in part, product innovations, the share of the imitating innovations increasing and the product ones decreasing.

The problem of obtaining “micro-basis” for macroeconomics remains so far unsettled. The analysis and study of technological changes can be the tool which can be used as an original micro-basis for new macroeconomics together with the tools of financial regulation. However, the research of technological determinism problems in economic science leads to the necessity of certain positions correction, the doctrines of “creative destruction”, in particular, on the basis of which such ideas as the change of technical and economic paradigms by C. Perez are developed¹³.

Then influence on the distribution structure of resources/incomes and/or risk profile of economic activities and activities profitability becomes the central problem. It should make the basis of macroeconomic management and macroeconomic policy, and the trust or distrust will be measured by the indexes not only with reference to financial markets, but also to other sectors as it will certainly be connected with risk in the transactions. Negative selection of solutions and tools in macroeconomics can arise due to institutionalization (stabilization) of negative quality (system’s dysfunction). Thus, the change of agents’ trust can result in no shifts of the demand curve in principle. In other words, the susceptibility degree of demand to the given factor is important. Thus, it is necessary to take into account the susceptibility of supply to the same change of trust, because the general macroeconomic result will be defined by such gross change.

¹³ Perez C.: “Technological revolutions and techno-economic paradigms”. *Cambridge Journal of Economics*, Vol. 34(1), 185-202, 2009. Perez C., *ibid*, fn 2.

It seems important to me to notice, that macroeconomic theory should proceed from the necessity of influence on economic system structural parameters, providing necessary proportions of economic development on the intervals of time considered to ensure the product growth at achieving necessary efficiency parameters: agents' stimulus, institutional infrastructure maturity, total change estimation of players' behavior models and the most significant individual markets.

Literature

- Perez C. (2009): "Technological revolutions and techno-economic paradigms", *Cambridge Journal of Economics*, Vol.34(1), 185-202
- Perez C. (2007): "Finance and technical change: a long-term view". In: Hanush H. and Pyka A. (eds.) *Elgar companion to Neo-Schumpeterian Economics*, 49, 775-799, Elgar, Ch., Cheltenham
- Perez C. (2004): "Technological revolutions, paradigm shifts and socio-institutional change". In E. Reinert (eds). *Globalization, Economic Development and Inequality: An alternative Perspective*, 217-242, Edward Elgar, Cheltenham
- Perez C. (2002): *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages*, Edward Elgar, Cheltenham, UK
- Schumpeter J. (1969): *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and Business Cycle*, Tr. By R. Opie, Oxford University Press, New York
- Schumpeter J. (1950): *Capitalism, Socialism, and Democracy, Third Edition*, Harper & Brothers Publishers, New York
- Sukharev O.S. (2013): *Theory of Economic Changes. Problems and Decisions*, KRASAND, Moscow (eng)
- Sukharev O.S. (2011): "Elementary model of Institutional Change and Economic Welfare", *Montenegrin Journal of Economics*, Vol.7, (2), 55-64.
- Williamson O. (1985): *The Economic Institutions of Capitalism*, The Free Press A Division of MacMillan Inc., N.Y.

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NOVE KOMBINACIJE U EKONOMIJI I PRINCIP IZMENE U „KREATIVNOM RAZARANJU“

S a ž e t a k

Unutar tri grupe agenata gore navedenih postoji takva interakcija, koja stvara ekonomsku dinamiku i nije opisana u Šumpeterovom (Schumpeter) modelu. Šumpeterova ideja o „konstruktivnoj distrakciji“ sadrži linijsku orijentaciju koja dolazi do stvari koju «inovatori», kad se pojave, uzimaju sredstva od „konzervativaca“ i iste obezvređuju. U informativnim i visoko tehnološkim ekonomijama ovaj efekat nije moguć i „inovatori“ će se pojaviti na uštrb proširenja mogućnosti nekih sredstava (jer sredstvo postaje virtuelno), bez nanošenja veće štete „konzervativcima“. Važna okolnost je da endogena fluktuacija u samom modelu „inovator-konzervativac“ je od ogromne važnosti na ekonomski razvoj i hipoteza da ova fluktuacija zavisi od vrednosti monetarnog ranga u aktivnosti „inovatora“ i „konzervativaca“ je ponuđena. Otuda, u ekonomskoj dinamici postaje važno imati strategiju kada se model kao „inovator“ zameni za „konzervativni“ ili „neaktivan agent“ model.

Međutim, postoje priznanja o neprimenjivanju principa „kreativnog razaranja“ ne samo na nivou modela dobijenog na bazi Šumpeterove ideje o razvitku i formalizaciji, već i na nivou činjenica ekonomskog života. Sasvim sigurno, princip „kreativnog razaranja“ nije strogo dokazan od strane autora. To je još jedan podsticaj da se razmišlja o njegovoj ispravnosti i adekvatnosti.

Ključne reči: nova kombinacija, teorijski model, princip „kreativne destrukcije“, kombina-
cijskio povećanje rasta i krize

