Objective laws governing formation of general equilibrium and business cycle

By prof. Paata Leiashvily

Paata Leiashvily

Professor of Iv. Javakhishvili Tbilisi State University,

Department of Economics (last position).

Address: St. Kandelaki, 2. Apt. 22. Tbilisi, Georgia, 0160,

Tel.: +995 599 950341

e-mail: pleiashvili@mail.ru

Key words: *economic equilibrium, price, profit, saving, investment, optimization, business cycle.*

Abstract

The original model of general economic equilibrium is proposed. According to it a closed, decentralized economic system has many equilibrium states. Condition of equilibrium is equality of gross profit, saving, investment and consumption in debt, which are internally linked between each other. According to model "commodities are produced by commodities" and their prices are a mathematical group. The law of economic equilibrium, under which the cost of goods spent on production of some good should be equal to the cost of this good expended in production of other goods, is substantiated. New understanding of formation mechanism of business cycle is given.

1. Introduction

As a result of global economic crisis 2008 - 2010 all current models of economic equilibrium, based on the ideas of neoclassical theory in one or another way, have been discredited. Moreover, this crisis has detected not only an incompetence of existing models of equilibrium, but also the whole depth of crisis of neoclassical theory itself, the ideas of which serve as a basis for construction of these models. This circumstance suggests an idea that failures in creation of adequate models are caused not by an insufficient readiness of actually mathematical toolkit, but by the incorrect assumptions on which they are constructed. And it is quite possible that the model itself, based on right assumptions, can be constructed with the use of even comparatively simple mathematical apparatus and doesn't need "multi-storey mathematical constructions" at all, behind which the economic reality can hardly be looked through.

In spite of the fact that more than century efforts (since Walras) of theorist economists to create an adequate mathematical model of closed decentralized economic system have not yet been crowned by desirable results, the idea of general equilibrium is so attractive that economists will not refuse it in the nearest future. With the acknowledgement of this premise, in the present article there is one more attempt to clarify the understanding of objective laws for both the formation of general equilibrium and the deviations from it, being evident in business cycle fluctuations.

2. Preliminary concepts[1]

1. According to this model it is supposed that not production factors, but their services are primary resources. Accordingly, at the market of primary resources, as the goods, entrepreneurs buy from owners not production factors, but their services, more precisely, the rights of temporal use of these services, or the time, during which the entrepreneurs can use these services. The price of these rights of temporal use of services is the Wage, Interest and Rent[2].

2. The property right can't exist without a subject of law, without the legal owner. As primary resources are on sale in the form of property rights (the right of use of factors' services), the reproduction of primary resources as the goods is reduced then to reproduction of life of production factors' owners. But life of owners is reproduced as a result of consumption of final products. Thus, due to consumption of resources, products are produced and due to consumption of products – resources are reproduced.

[1] In more details these preconditions are argued in Leiashvily 2011a, 2011b, 1996, 1990.

[2] Already L.Walras, in his model, clearly distinguished production factors from their services. (See, Walras 2000, 154). Proper attention isn't given to this difference in modern models, which complicates creation of adequate model.

3. For production of final products not only objective production factors (Labor, Land and Capital) are necessary, but also the subjective factor - an Entrepreneurship. The entrepreneur renders services to a society by shouldering the enterprise risk. The risk implies that he buys primary resources from a society (owners), without being aware beforehand whether he can cover his spending by incomes from sale of produced products or not. With these resources he produces products and sells them back to a society at the price exceeding his costs. But to buy primary resources, he should be the owner either of financial resources or any other assets under the pledge of which he can take the credit. In either case he puts his property under the risk. For his services the entrepreneur demands from a society a payment in the form of profit, as premium over his expenses.

4. In terms of market economy not only producers face the risk of production and selling. If production does not meet the needs of customers, decrease of demand for products will cause decrease of demand for resources. Therefore, consumers (owners) also face the risk that demand for their resources can be reduced. Their future incomes and well-being are also under the risk. Consumers are induced to make saving and consequently they demand from entrepreneurs such payment for their resources that will allow them to make saving.

5. The purpose of producer, **as an entrepreneur**, is not maximization of quantity of produced production, but maximization of profit. Also, the consumer's purpose, as an **owner,** as well, is not maximization of quantity of consumed goods, but satisfaction of needs at minimum costs, i.e. minimization of costs on consumption and maximization of saving, which remain after satisfaction of needs[3]. To have saving – it itself is one of the needs in a system of needs.

6. Financial resources are supposed to be entrepreneurial resource. The entrepreneur allocates his financial resources in production and puts them under risk. To make decisions where to input these resources and to take risk on himself – just is the entrepreneurial services. As the price of these services the rate of profit is supposed, for the sake of which he runs risk of losing these resources. As the price of thrift the rate of saving is accepted, for the sake of which a saver abstains from consumption of a certain share of income.

7. It is supposed that depreciation charges are purely financial procedure, which has only remote relation to real loss of cost by the fixed assets. The choice of norms and methods of charging the amortization depends on state economic policy, and not on actual deterioration of

[3] I.e. it is meant that maximization of saving is carried out not at the expense of underconsumption, but at the expense of: 1) optimization of expenses on consumption, and 2) maximization of incomes from sale of resources.

real capital. So, according to the given model, the amortization is a part of profit, but not a part of the self-cost of product (which is gradually being included in final goods)[4].

8. All those goods, production and consumption of which needs the larger time than time interval under review, are referred to the capital goods. The physical and human capital is attributed to these goods[5]. Production of both of these capitals requires investments, the other side of which is consumption on credit. Production of physical capital goods is connected with investments of resources into production, which is consumption of resources on credit. But production of human capital is connected with investments of products into consumption, which on the other hand is consumption of products on credit.

9. Between the structure of social needs, size and distribution of income and relative prices of products and resources, there is a functional relationship, they mutually cause each other. But the structure of social needs (the matrix of consumption coefficients b_{ji}) in the model is taken as fixed with the aim to simplify the analysis.

10. This model of general equilibrium reflects the system of interrelations not between the subjects, but between the economic flows. Macroeconomic effects and a business cycle are presented not as the result of interaction of separate actors within the limits of existing institutes, but as the result of interaction of commodity and financial flows, generated by independent decisions of these actors, and being the aggregated results of their actions.

3. "Symmetric model" of general economic equilibrium

1. There is considered the model of a decentralized closed economic system, in which capital goods and m kinds of final products are produced by means of n kinds of primary resources. Intermediate products in the given model aren't considered. Sector 1 (see Tab.1) reflects a process of consumption of primary resources and production of final products. Sector 4 reflects consumption of final products and reproduction of primary resources. Sector 2 reflects the market of products and sector 3 – the market of resources at which the equilibrium prices balance supply and demand[6].

---

[4] In understanding of depreciation there always were disputes. There are two substantial characteristics of depreciation - 1) wear of assets and 2) formation of renovation fund. The allocation of the cost of assets by periods in which the assets are used (depreciation with the **matching principle**) doesn't correspond to real processes of wearing. To define adequacy of real wearing to the norms of depreciation is impossible. Besides, any norm of depreciation assumes possibility of using of object after its full normative wearing. Establishing the norm of depreciation, government regulates the rates and character of reproduction in sectors. Therefore it is supposed that depreciation is a part of profit, which isn't taxed and from which dividends aren't paid.

[5] To investments into the human capital (consumption investments or consumption on credit) is attributed consumption of entrepreneurs, consumption in the spheres of education, sciences, cultures, public health services etc., and also stocks of products of consumers (as insurance of the future consumption).

[6] Thus, sectors 1 and 4, reflecting production and consumption, are considered mutually opposite, the same as sectors 2 and 3, reflecting the market of products and market of resources.

2. According to a matrix, in a clockwise direction, there is a transformation of resources into products, which serve as resources for reception of other products, etc. Counter-clockwise there is a transformation of incomes into the expenses, which themselves are the incomes and are transformed again into expenses, etc.

3. The square block matrix of (m + n + 2) dimensions is presented. As cost of sold and bought goods is the same size, each element of a diagonal brings lines and columns in the whole model into accord with each other. In conditions of system' equilibrium, each element of a diagonal (sectors 2 and 3) is equal to the sum of elements of corresponding line and, simultaneously, to the sum of elements of corresponding column of sectors 1 and 4. Therefore, first, the sum of elements of each column or every line in table is equal to zero, which reflects the fact that the system is closed. Second, the sum of elements of each of m lines of production sector (1) and n lines of consumption sector (4) in the model is equal to the sum of elements of corresponding columns of opposite sector (sectors 4 and 1). That is, in a closed economic system in conditions of system' equilibrium there is produced only what is consumed and is consumed only what is produced. Such conformity between production and consumption means that supply and demand, purchase and sale of all goods (products and resources) completely correspond to each other.

4. The model description: Constants: a_{ij}, b_{ji}. Variables: x_i, y_j, p_i, v_j, α_i, β_j, γ_j, δ_i.

I.

$$(1+\alpha_i)\sum_{j=1}^{n} a_{ij}\, v_j = p_i\,, \qquad (i = 1,2\ldots.m); \tag{1}$$

$$(1+\delta_i)\sum_{j=1}^{n} b_{ij}\, y_j = x_i, \qquad (i = 1,2\ldots.m); \tag{2}$$

$$\sum_{i=1}^{m} a_{ij}\, x_i = y_j\big(1-\gamma_j\big), \qquad (j = 1,2\ldots.n); \tag{3}$$

$$\sum_{i=1}^{m} b_{ij}\, p_i = v_j\big(1-\beta_j\big), \qquad (j = 1,2\ldots.n); \tag{4}$$

$x_i \geq x_{min}$, $y_j \leq y_{max}$, $0 < \alpha_i, \beta_j, \gamma_j, \delta_i < 1$.

II.

$$\sum_{i=1}^{m} \alpha_i\, C_i\, x_i = \sum_{i=1}^{m} \delta_i\, Q_i\, p_i\,; \tag{5}$$

$$\sum_{j=1}^{n} \gamma_j \, y_j \, v_j = \sum_{j=1}^{n} \beta_j \, y_j \, v_j \, ; \qquad (6)$$

III.

$$\sum_{j=1}^{n} y_j \, v_j \; + \; \alpha_0 \sum_{j=1}^{n} y_j \, v_j = \sum_{i=1}^{m} x_i \, p_i + \beta_0 \sum_{j=1}^{n} y_j \, v_j \, ; \qquad (7)$$

5. The equations 1-4 are received by summing up of elements in (m + n) lines and in (n + m) columns of the matrix. According to conditions I a sum of costs for production and profit is equal to the product price, and the sum of consumer expenses and saving, being on unit of reproduced resource, is equal to resource price. Quantity of sold (bought) goods is equal to a sum of consumed and invested (consumed in credit) goods. At that the products can't be bought (sold) less than it is caused by the minimum acceptable consumption level. Also, resources can't be sold (bought) more than it is caused by physical limitation of production factors (accordingly, their services).

6. According to these formulas mutual transformations of resources y_j and products x_i as well as their prices (p_i and v_j) into each other occurs by the same matrixes A and B. But the directions of these transformations are the opposite. Therefore, changes of elements of matrixes will exactly in opposite way be reflected on the ratios between x_i and y_j, on the one hand, and on ratios between p_i and v_j – on the other. For example, reduction of technological coefficients a_{ij} simultaneously causes, on the one hand, increase of supply of products x_i^s and decrease of their supply prices p_i^s and, on the other – decrease of demand for resources y_j^d and increase of demand prices v_j^d on them. Similarly, the increase of consumer coefficients b_{ji} simultaneously will cause, on the one hand, increase of demand for products x_i^d and decrease of demand prices on products p_i^d and, on the other – decrease of supply of resources y_j^s and increase of supply prices on them v_j^s. All these processes completely correspond to real market processes. As considering that market prices are result of interaction of supply and demand prices, we receive the following. As a result of increase or decrease of goods' consumption norms it becomes, accordingly, shortage or surplus. An increase of shortage of the goods is accompanied by increase of their prices, and decrease – by decrease of prices[7].

[7] That is technological and consumption coefficients are coefficients of transformation of resources into products, and products - into resources, and the prices are coefficients of transformation of money into the goods and the goods into money and, accordingly, incomes into expenses, and expenses - into incomes. At that producers and consumers are two parties, which are in reflective relations. Therefore, coefficients of transformation of incomes into expenses for one party are coefficients of transformation of expenses into incomes - for another, because expenses of one are incomes of others. Coefficients of transformation of resources into products for one party are coefficients of transformation of products into resources for the other party, for products of one party are resources for another. But, behind the nominal prices there are real proportions of an exchange of goods. Therefore, if

According to these formulas the prices of products p_i and resources v_j have opposite signs, and second, all prices and rates of profit and saving[8] mutually cause each other.

7. Cost of the sold and bought goods is the same magnitude. Therefore considering that $C_i = \sum a_{ij} v_j$, and $Q_i = \sum b_{ji} y_j$, following equality takes place:

$$x_i\, p_i = (1 + \alpha_i) \sum_{j=1}^{n} a_{ij}\, v_j\, x_i = (1 + \delta_i) \sum_{j=1}^{n} b_{ij}\, y_j\, p_i\,, \qquad (i = 1,2 \ldots . m); \qquad (8)$$

From this equation follows, if $\alpha_i = \delta_i$, then:

$$\sum_{j=1}^{n} a_{ij}\, v_j\, x_i = \sum_{j=1}^{n} b_{ij}\, y_j\, p_i\,, \qquad (9)$$

Any deviations of equation's (9) parties from each other should be compensated by corresponding deviations of α_i and δ_i from each other.

Similarly in resource market:

$$y_j v_j = \sum_{i=1}^{m} a_{ij}\, x_i v_j + \gamma_j y_j v_j = \sum_{i=1}^{m} b_{ji}\, x_i\, y_j + \beta_j y_j v_j\,, \qquad (j = 1,2 \ldots . n); \quad (10)$$

If $\beta_j = \gamma_j$, then:

$$\sum_{i=1}^{m} a_{ij}\, x_i v_j = \sum_{j=1}^{n} b_{ji}\, y_j\, p_i \qquad (11)$$

The deviation of equation's (11) parties from each other should be compensated by corresponding deviations of β_j and γ_j from each other. It is clear that equality $\alpha_i = \delta_i$ (i = 1,2 ....m) means also that $P_n = D_g$, and equality $\beta_j = \gamma_j$ (j = 1,2....n) means that $S_n = I_g$. Though, on the other hand, equality $P_n = D_g$ is possible also in case if deviations of α_i and δ_i for one products are compensated by their deviations in opposite direction for other products. It is analogous at the market of resources. Equality of $S_n = I_g$ is possible, if deviations of β_j and γ_j from each other at the markets of some resources are compensated by their opposite deviations at the markets of other ones.

8. According to the given model P and D correspond to the same element of a diagonal. Therefore, according to conditions II, in conditions of equilibrium P = D. Similarly, in conditions of equilibrium I = S. Thus, by its economic meaning P_I is a profit from previous investments, received in a current interval of time. Therefore, PI is a part of P, but isn't a part of

---

technological and consumption coefficients are coefficients of production and consumption of goods, the prices are coefficients of their exchange.

[8] Despite the specific form of expression, profit rate and saving rate represent the prices – the price of enterprise risk and the thrift price (insurance of future incomes).

current I, and Rc, is a part of both I, and P[9]. Considering the above-mentioned, as we see from table 2, the basic ratios of flows are following (see Tab. 2):

$P = P_n + P_I + R_c = P_g + R_c$; $P_g = P_n + P_I$;

where P_g - gross profit.

$D = D_g + A + R_p$;

$S = S_g = S_n + A + R_p$;

where S_g - gross saving.

$I = I_g + R_c$.

It follows from this that for achieving the equilibrium in the system it is not enough to maintain the equalities $P_n = D_g$ and $S_n = I_g$. It is also necessary that $P_I = A$ and $Rc = Rp$. For simplification, we further accept conditionally that $P_I = A = 0$ and $Rc = Rp = 0$. As the given model is static, such assumption doesn't break the general logic of reasoning.

9. Gross profit:

$$P_g = P_n = \sum_{i=1}^{m} \alpha_i C_i x_i = \alpha_0 \sum_{j=1}^{n} y_j v_j \ ; \qquad (12)$$

where C_i - cost price of product i; α_0 - average rate of profit.

Consumption on credit:

$$D_g = P_g = \sum_{i=1}^{m} \delta_i Q_i p_i = \delta_0 \sum_{j=1}^{n} y_j v_j \ ; \qquad (13)$$

where Q_i - quantity of product i consumed for reproduction of primary resources;

δ_0 - average norm of consumption on credit (as percent from expenses on paid consumption);

Gross saving:

$$S_g = S_n = \sum_{j=1}^{n} \beta_j y_j v_j = \beta_0 \sum_{j=1}^{n} y_j v_j \ ; \qquad (14)$$

where β_0 - average rate of saving.

Gross investments into production:

[9] According to the given logic it turns out that, on the one hand, $I = I_g + R_c$ (1) and on the other, $I = S = S_n + A + R_p$ (2). But as in conditions of equilibrium $Rc = Rp$, a $I_g = S_n$, it turns out that, on the one hand, $I = S$ and, on the other, $I \neq S$. Certainly this is contradiction. However, in equations (1) and (2) investments I reflect the same stream in different intervals of time. But the profit from investments P_I, absence of which in equation (1) causes the contradiction between the equations (1) and (2), arises just in a space between these intervals of time. But, because in the static model the time isn't structured on past, present and future intervals, the occurrence of such "contradiction" is inevitable.

The chain of causes and effects gets appearance: $I_g \rightarrow P_I \rightarrow A\ (+ I_n) \rightarrow I_g'$. The contradiction mentioned above is a result of that the relation of cause and effect is represented as functional relation, for the static model can show only functional, but not cause and effect relationships.

$$I_g = S_g = \sum_{j=1}^{n} \gamma_j \, y_j \, v_j = \gamma_0 \sum_{j=1}^{n} y_j \, v_j \; ; \qquad (15)$$

where γ_0 - average norm of investment into production (as a share from cumulative cost of consumed primary resources).

That is under condition of $\alpha_0 = \beta_0 = \gamma_0 = \delta_0 = r_0$ we have:

$$P_g = \; S_g = I_g = D_g = r_0 \sum_{j=1}^{n} y_j \, v_j \; ; \qquad (16)$$

where: r_0 - interest rate which regulates all these parameters not only by means of money market but also thanks to that any economic decision, concerning use of money, considers alternative cost of this decision.

Condition of macroeconomic equilibrium is equality $P_g = S_g = I_g = D_g$. Even if all private markets are balanced, the general economic balance will not be reached until equality $P_g = S_g = I_g = D_g$ will be reached which means that: $\alpha_0 = \delta_0 = \beta_0 = \gamma_0 = r_0$.

10. According to a condition III the "Walras Law" is maintained:

$$\sum_{i=1}^{n} y_j v_j \; + P_g \; = \sum_{i=1}^{m} x_i \, p_i + I_g \; ; \qquad (17)$$

That is GNI = GDP. At that, $y_j \le y_{max}$, $x_i \ge x_{min}$, i.e. GDP can be increase and decrease in the limits caused by these restrictions. In the case under consideration depreciation A = 0, therefore we receive NNI = NDP, or:

$$\sum_{i=1}^{n} y_j v_j + P_n = \sum_{i=1}^{m} x_i \, p_i + I_n \; ; \qquad (18)$$

or:

$$\sum_{j=1}^{n} y_j \, v_j \; + \; \alpha_0 \sum_{j=1}^{n} y_j \, v_j = \sum_{i=1}^{m} x_i \, p_i + \beta_0 \sum_{j=1}^{n} y_j \, v_j \; ; \qquad (19)$$

From this it follows that at $\alpha_0 = \beta_0$ takes place $\sum_{i=1}^{n} y_j v_j \; = \; \sum_{i=1}^{m} x_i \, p_i$ and, hence:

$$P_g = S_g = I_g = D_g = r_0 \sum_{i=1}^{n} y_j v_j = r_0 \sum_{i=1}^{m} x_i \, p_i \; ; \qquad (20)$$

and $\alpha_0 = \delta_0 = \beta_0 = \gamma_0 = r_0$. (21)

11. Considering that in equilibrium state are observed (17) and (18), we receive:

1) Target function for entrepreneurs - maximization of profit,

$$\Psi_p = (1 \; + \; r_0) \sum_{i=1}^{m} x_i \, p_i - \sum_{j=1}^{n} y_j \, v_j = P_g \; \rightarrow max \; ;$$

From here a dual problem:

Primal problem: maximization of incomes. **Dual problem**: minimization of expenses.

$$f_p = (1 + r_0)\sum_{i=1}^{m} x_i\, p_i \rightarrow max\,; \qquad g_p = \sum_{j=1}^{n} y_j\, v_j \rightarrow min\,;$$

$$\sum_{i=1}^{m} a_{ij}\, x_i = y_j(1-\gamma_j),\ \ (j = 1,2\ldots.n); \qquad (1+\alpha_i)\sum_{j=1}^{n} a_{ij}\, v_j = p_i,\ \ (i = 1,2\ldots.m);$$

$$x_i \geq 0. \qquad \sum_{j=1}^{n} \gamma_j\, y_j\, v_j = r_0 \sum_{j=1}^{n} y_j\, v_j\,;$$

$v_j \geq 0.$

2) Target function for owners - maximization of saving,

$$\Psi_c = (1 + r_0)\sum_{j=1}^{n} y_j\, v_j - \sum_{i=1}^{m} x_i\, p_i = S_g \rightarrow max\,;$$

From here a dual problem:

Primal problem: maximization of incomes. **Dual problem**: minimization of expenses.

$$f_c = (1+r_0)\sum_{j=1}^{n} y_j\, v_j \rightarrow max\,; \qquad g_c = \sum_{i=1}^{m} x_i\, p_i \rightarrow min\,;$$

$$(1+\delta_i)\sum_{j=1}^{n} b_{ij}\, y_j = x_i,\ \ (i = 1,2\ldots.m); \qquad \sum_{i=1}^{m} b_{ij}\, p_i = v_j(1-\beta_j),\ \ (j = 1,2\ldots.n);$$

$$\sum_{j=1}^{n} \beta_j\, y_j\, v_j = r_0 \sum_{j=1}^{n} y_j\, v_j\,; \qquad \sum_{i=1}^{m} \delta_i\, Q_i\, p_i = r_0 \sum_{j=1}^{n} y_j\, v_j\,;$$

$v_j \geq 0$. $x_i \geq 0$.

12. According to the target and dual problem, production optimization is reduced to a finding of optimal vectors **x** and **v**. At that vectors **p** and **y** are set as constraints. On the other hand, consumption optimization is reduced to optimization of vectors **p** and **y**. At that the vectors **x** and **v** are set as constraints. That is by their actions consumers and producers form for each other conditions necessary for optimization. By their actions they mutually complete each other. The parameters optimized by each of the parties serve as restrictions on the basis of which the optimal decisions are accepted by the other party.

13. In the aspiration to maximization of profit P and saving S economic subjects optimize economy for they promote to achieve the "saddle points" at which **minmax** of one party is equal to **maxmin** of the other party. At that $P_{max} = S_{max} = I_{max} = Q_{max}$, and $\mathbf{y_j} = \mathbf{y_{max}}$. That is the problem is reduced to an optimization problem. In such optimal condition, increase of profit is possible only at the expense of decrease of saving, but to increase saving – only at the expense of profit decrease[10]. To be at maximum they can only simultaneously, and only in case of their equality. Thus, it is important to notice that macroeconomic parameters are immediately formed on the basis of microeconomic processes, i.e. there is no gap between micro- and macro-processes.

14. Quantity of equations in the model is: 2m + 2n + 3, and quantity of unknowns: 4m + 4n. Unknowns are more than equations. The system has uncountable set of decisions. That is, there can be an uncountable set of equilibrium states at the most different levels of interest rate (accordingly, at different levels of average rates of profit, saving, investments and consumption on credit).

4. Self-regulation of economic structure in market economy

How is it possible to interpret the economic meaning of this model?

1. As the quantity and price of a sold and bought product is the same magnitude, it is clear that if incomes from sale of this or that product surpass the costs for its production (accordingly if the price of unit of a product surpasses its cost price), then also the total quantity of sold products should be more than that quantity which is necessary for covering of mentioned costs. So, there should be a source of payment of producer's profit. The quantity of sold product necessary for compensation of costs for its production is a necessary product, but other quantity, from which the profit is paid – is the surplus product. But it means, also, that consumers pay for whole product more than producers have spent for its production. And someone should pay for this surplus product.

The similar problem arises at the market of primary resources. Owners demand for their resources such prices, which allow them not only to satisfy current needs, but also to make saving. From this follows that by how many times the price of a resource is more than costs for its reproduction, by the same times the quantity of sold resource should surpass that quantity, which is necessary for covering of mentioned costs. There should be a source for covering of consumers' saving. The quantity of sold resource necessary for compensation of costs for its reproduction is a necessary resource, but other quantity from which saving are paid – is a surplus resource. And again, someone should pay for surplus resource. As to surplus resources and

[10] At that, profit and saving have an opposite sign.

surplus product, surplus resources are invested into production of physical capital, and surplus products are invested into the human capital.

2. It follows from the above-mentioned that proportions, in which the prices of products are distributed on costs and profit, correspond to proportions, in which quantities of produced products are distributed on necessary and surplus products. But proportions, in which the prices of primary resources are divided into consumer expenses and saving, correspond to proportions, in which quantities of corresponding reproduced resources are divided into necessary and surplus resources. But it means also that producers (buyers of primary resources) pay for all resource more than consumers (owners) have spent for its reproduction. For, besides payment for a necessary resource they should pay for surplus resource. Finally, it turns out that consumers pay for final product more than producers have spent for its production, but producers pay for primary resources more than consumers have spent for their reproduction. But where is a source of payment for surplus product and surplus resource? Who is their buyer?

3. According to this model a source of payment for surplus product, from which entrepreneurial profits are formed, are themselves entrepreneurial profits. The entrepreneurs themselves are also consumers buying the final products from their incomes which their profits just are. That is, they buy a part of products produced by them from each other in the same way as all other consumers. At that in its essence consumption of entrepreneur is investment in the human capital. For entrepreneurs invest earlier received profits in current consumption, in other words, this is consumption in debt for them, which will be paid by the future profits. But a source of payment of surplus resources, from which consumers' saving are formed, themselves are the saving. For saving are those free money resources, which through the money market are transformed into credit resources for investments into production. Just it is a source of payment for surplus resources.

That is, surplus resources are bought by entrepreneurs, but they buy them by loaned money resources, which are generated from the saving of owners of these resources. Thus, the saving, transformed into credit resources for investments, additionally pour into the resource market. And the profits of the whole class of entrepreneurs, consuming these products, additionally pour into the product market.

4. As we saw, it followed from the analysis of this model that in conditions of equilibrium the cost of primary resources spent for production of the given product corresponds to the cost of this product spent in reproduction of primary resources. And the profit received from realization of this product corresponds to the cost of this product consumed on credit (invested in consumption). On the other hand, the cost of final products, consumed in the process of

reproduction of given resource, corresponds to the cost of this resource consumed in production of final products. But the saving, formed from incomes of this resource's sale, correspond to the cost of this resource invested in production (consumed on credit). Generalizing the above mentioned, it follows from this model that in conditions of equilibrium the cost of these or those goods consumed in production of other necessary goods, is equal to the sum of costs of other necessary goods consumed in production of given goods. It is the "iron law" of general equilibrium. Just it provides formation of optimal proportions of commodity and financial flows[11].

5. The prices of final products allow to get profit, and the prices of primary resources allow to do saving. That is, the prices of final products comprise the premium over the cost of primary resources spent in their production. But the prices of primary resources comprise the premium over cost of final products consumed in the course of their reproduction. And it means that profit and saving compensate each other in composition of each price (whether it be the product or resource price). The profit in composition of product price is compensated by saving which is a component of prices of spent resources. But saving, as a part of resources' prices, are compensated by profits, which are a component of prices of consumed products. The price is system magnitude. Each price is a function from all other prices; they cause each other, forming a group. Therefore, from the macroeconomic point of view the equilibrium price is the price in composition of which profits and saving counterbalance each other. And in case if prices of all goods represent the equilibrium prices, then in economy, as a whole, profits and saving counterbalance each other and, it means, the economy is in a condition of macroeconomic equilibrium.

6. In the measure in which producers force consumers of their products to pay excess over their expenses for consumed resources, in the same measure they are required to pay excess at purchase of these resources. And the profit is only a source for covering of additional expenses on resources. But in that case a question arises: If the profit covers only additional expenses for resources, then what is the benefit of entrepreneurs? Why does he run risks if it does not give him surplus?

But the question is that, as a matter of fact, the profit is not any surplus, the same as saving. Only on a surface of phenomena it seems that the profit and saving are surpluses in a composition of prices of products and resources, which arise in the course of an exchange. But

[11] The theory of imputation, based on the law of diminishing return, doesn't give the satisfactory answer to a question how imputation proceeds and what part of products value should be imputed to various production factors by which these products are created.

actually the profit is a payment for risk, which society pays to entrepreneurs [12]. This is the money expression of that part of a social product, which producers of this product demand as a payment for entrepreneurial services to the society (for services of subjective production factor). Also, saving aren't simple surpluses of resource prices over costs for reproduction of these resources. But it is a component of costs on reproduction of these resources in the sense that saving are costs on satisfaction of one of necessary needs in a system of consumers' needs. These are costs on insurance of future consumption, as one of the needs, along with other needs. So, profit and saving are not mutually covered surpluses of products' and resources' prices over the costs of their production (reproduction). It is a payment for risk and insurance, for entrepreneurship and thrift, for enterprise and abstention.

7. Rates of profit are different in different sectors of production. But in these sectors the degrees of entrepreneurial risk caused by non-economic (natural, social, etc.) factors are also different. Therefore, even in conditions of a perfect competition, sectoral profit rates differ from each other (deviate from average profit rate). But in condition of the general equilibrium sectoral profit rates should be equal to sectoral norms of surplus product. The profit rate is the price of risk. Conditions of a perfect competition mean its alignment not between various branches, but between the separate producers of the same sector. It only means that sectoral profit rates correspond to degree of entrepreneurial risk in these sectors. Entrepreneurs shift to other sectors if this correspondence is broken.

Similarly, the same is in the sector of resource reproduction (consumption sector). The saving rates in different "sectors" of reproduction of resources differ from each other. But the efforts of abstention, which are necessary for creation of these saving, also differ in them. Efforts of abstention for creation of saving depend on the size of incomes. Abstention from satisfaction of needs in necessary means of existence demands bigger subjective efforts than abstention from

[12] The neoclassical theory divides profit into normal and economic profit. But what it names a normal profit, is a payment for services of own production factors which the subject pays to himself as he is the owner of these factors, and would pay it to another if these factors belonged to another. However, in "symmetric" model, flows of incomes aren't differentiated depending on who the proprietor of factors is and to whom they are paid - to themselves or to another. Therefore, the so-called "normal profit" is decomposed by factorial incomes and is included in the structure of corresponding flows. As to economic profit, according to neoclassical theory it doesn't exist at all in conditions of static equilibrium. The argumentation is that the profit is a payment for not insured risk, which is bound to functioning in conditions of uncertainty and presence of innovations. (We do not concern problems of monopolies, as a profit source). Therefore, existence of profit is bound to dynamic economy, in which future always is indefinite. But in static economy the future is predicted, and there are no innovations and uncertainty i.e. the static economy isn't bound to risk and, hence, its compensation in the form of profit converges to zero. But it is necessary to object that static character of model doesn't mean at all that it models economy in a static condition. The static economy doesn't exist as that. The model itself, but not an economy which it models, is static. It models real, hence, dynamical economy in which both risk, and uncertainty and profit always take place. The static model abstracts not from presence of risk and necessity of compensation for it, but from changes in time of economic parameters which are caused by various factors, including the most entrepreneurial activity. Certainly, the model always means simplification of reality. But simplification shouldn't mean distortion of the reality and under the pretext of simplification instead of modeled object put something which doesn't actually exist.

satisfaction of need in luxury. But a problem is not at all only in this. The problem is that difficulties of transition from one "sector" of reproduction of resources to another are caused by non-economic (social, political, etc.) factors. But in any case, however the saving norms in reproduction of various resources in conditions of equilibrium differed, they are equal to the norms of investments of these resources in production.

8. Above we have partially simplified the analysis to facilitate perception of article's content. At the given stage it is necessary to make some specification. As it has been noted, surplus product is completely invested in a human capital, and its cost, in conditions of equilibrium, compensates the profits from sale of all products. But the surplus product consists not only of the products consumed by entrepreneurs, and it is paid not only from profits. As it can be seen from table 2 the surplus product consists of 3 components: 1) entrepreneurial' consumption, 2) consumers' consumption on credit, 3) changes of consumers' stocks of product. Accordingly, these expenses are paid not only from the profits invested in consumption, but also from consumers' saving, reinvested in consumption[13].

Similarly, surplus resource is completely invested in a physical capital and in conditions of equilibrium by cost corresponds to volume of saving. But, the same as in this case, the surplus resource is paid not only from saving (transformed into credits). According to this model (see Table 2) the surplus resource also consists of 3 components: the resources used on 1) restoration of depreciated capital, 2) net increment of capital, 3) changes of stocks of finished goods at producers. And these expenses are financed not only from consumers' saving invested in production, but also from profits, reinvested in production[14].

A part of producers' profit is invested in consumption, a part is reinvested back into production, and the remaining part corresponds to changes of money saving in production sector. Also, a part of consumers' saving is invested in production, a part is reinvested in consumption, and the remaining part corresponds to changing of money saving in consumption sector. (See: Fig. 1 and Appendix B).

---

[13] Like investments into production, investments into consumption also can be conditionally divided into "depreciation" and "net investments" into the human capital. For example, expenses for consumption of entrepreneurs, as well as expenses for maintenance of the law and order, security, public health services, social protection or state management, are some kind of expenses for restoration of human capital, i.e. these are costs necessary to be permanently carried out for maintenance of existing level of human and social capital. However, this doesn't happen at accumulation, increment of human capital or any values. But net investments into the human capital are investments into the rising of a level of welfare (consumption on credit housing services, cars, domestic appliances, etc.), in education, science, culture, public health, etc. And in result of these investments there occurs not only a net increment of able-bodied population (labor and enterprise potential), but also an increment of public goods, non-material values. That is, there takes place increasing of human, social and intellectual capital, assets, which raise economic potential of a society.

[14] Depreciation charges are also reinvestments of profits which only conditionally concern to expenses for production as they are intended for reproduction of worn out capital.

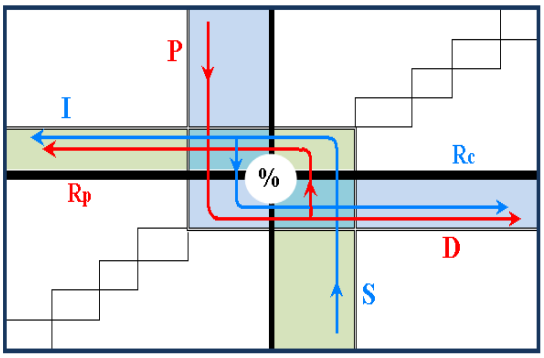

Figure 1. The scheme of allocation of gross profit and gross saving between investments and reinvestments.

9. So, the profit is formed only from the incomes from sale of surplus product, and saving – only from the sale of surplus resource. But the profit is used for investments into consumption and reinvestments into production, and saving, on the contrary – for investments into production and reinvestments into consumption. I.e. each of them (profit and saving) is spent for payment, both for surplus product, and surplus resource. But both profit and saving are the money not different from each other despite various sources of origin. Both together they form free financial resources, which are transformed into production and consumer investments. These transformations are regulated by credit relations in which the balancing function is carried out by the interest rate. And an essence of these processes is redistribution of production and consumption possibilities in time.

At that, demand for money for investments by D and I (see Tab. 2) can be satisfied not only through supply of money from money flows P and S, but also at the expense of money assets. The significant role in supply and demand formation at the money market is played not only by money flows P, S, I and D, but also by monetary accumulation from previous saving. In the form of assets money plays the function of a tank from which monetary resources from monetary flows replenish and into which they leak. Fluctuations of velocity of money circulation complicate even more the problem of interdependence of flows P, S, I and D in the short-run. Therefore, in the short-run these flows possess large degree of independence from each other and are interdependent through the interest rate and the money market. But in the long-run they are interdependent with all economic flows for they carry out system functions. Accordingly, achievement of equalities P = S = I = D is provided only in a tendency, through fluctuations in time of all economic system relative to equilibrium condition, that is through business cycles.

10. In conditions of equilibrium the outflow from producers' incomes as withdrawn profit P_n should be compensated by inflow of means in the form of credits for production investments I_g. But outflow from consumers' incomes in the form of saving S_n should be compensated by inflow of means for financing of consumption on credit D_g. That is the condition of maintenance

of demand at resources markets is $P_n = I_g$, and at product markets - is condition $S_n = D_g$[15]. But that, which as saving S_n outflows from sector 4 in conditions of equilibrium, should equal to that, which through the money market inflows in sector 1 as production investments Ig. But that, which as withdrawn profit P_n outflows from sector 1, should be equal to that, which as consumption on credit (consumer investments) D_g inflows in sector 4. It is reflected in the model according to which production investments I and gross saving S correspond to the same element of a diagonal of sector 2. Therefore, in conditions of equilibrium of system, if there are preserved equalities $P_I = A$ and $R_c = R_p$, then $I_g = S_n$. Similarly, consumer investments and gross profit correspond to the same element of a diagonal of sector 3. Therefore $P_n = D_g$.

11. Both producers and consumers of final products have certain stocks of products, which are a component of their investments. Stocks of product at consumers are paid, but not consumed products and as such, they are investments into consumption. Stocks of finished goods at producers are investments into production. Stocks of finished goods at producers are not yet realized product, thus it is only a potential product. Only realization of product proves that the product is recognized as a product, as social utility. But before that, it represents only embodiment of costs or the invested resources which in the future can bring both profit and loss.

12. According to this model the market equilibrium between supply and demand is the market condition at which during the time interval under review at the market as many goods are sold and bought as they are produced and consumed. Clearly, quantities of goods sold and bought in some interval of time, cannot be unequal. Only consumption and production, which stand behind supply and demand, can be unequal. Deviations of production from consumption are reflected on change of size of stocks of products at consumers and producers. Or there arise the supernormal stocks, or stocks are exhausted. These fluctuations of stocks are reflected on a ratio between the desire to buy and the desire to sell the goods, that is, on a ratio of supply and demand and, as consequence, on market price fluctuations[16]. In such conditions producers want to sell, and consumers want to buy at the given price different quantities of goods, or the given quantity - at the different prices. But the prices and quantities of sold and bought goods can't

[15] At this equality $P_I = A$ and $R_c = R_p$ (See, fig. 1) should be observed.

[16] If it is produced less than is consumed, stocks are reduced at producers, and at consumers; if on the contrary - stocks increase both at those, and at others. These changes of stocks are exactly in opposite way reflected in desires of consumers to buy, and desires of producers to sell. That is, this has an opposite influence on supply and demand. Growth of stocks at consumers weakens a competition between them (i.e. the high prices are not offered), and growth of stocks at producers – triggers a competition among sellers (to agree on the low prices). As a result - the price decreases. But reduction of stocks causes inverse processes. Market price in a surveyed time interval is only an average from many individual prices in individual transactions (conducted within the same interval of time) between set of sellers and buyers, who are in competitive relations.

differ. There arise economic forces which restore balance[17]. I.e. according to this model consumption can be both more or less than production at the expense of changes in stocks. At that the price deviates from equilibrium price, but it isn't equal to zero even if the excessive supply takes place[18].

13. The general economic equilibrium is a condition of Pareto optimality, which means that all resources are used completely and redistribution of resources can give advantage to someone, only at the expense of another's disadvantage. Such equilibrium means that everybody, who wants to work, and works as much as he wants to work. That is, all those, who work, consider that 1) their work is paid adequately, and 2) at the given payment they have found optimum balance between work and rest. All the entrepreneurial don't want to pass to other sectors either and, hence, consider that their risk is paid by adequate profit (i.e. profit rate corresponds to risk). And all savers consider that their efforts on abstention allow creating saving adequate to these efforts. At that, an interest rate plays a regulating role in equilibration of flows of resources, products, money and debt instruments. Therefore, to each level of interest rate there corresponds the certain state of equilibrium.

At that, in condition of general equilibrium in economy there occurs not only renewal, but also a net increase of physical and human capital, that is, increase of economic potential occurs. Thus economic equilibrium in itself wears a germ of development and, hence, disturbance of equilibrium. The economy in a state of equilibrium itself pushes itself out of this state. The equilibrium is a condition of optimality at which existing potential is completely used. And just in this condition an increment of this potential occurs. But in conditions of increased potential, existing state of economy ceases to be optimal for there appears an unused potential. Accordingly, the equilibrium existing before ceases to be equilibrium, for there appear the economic forces directed at use of this potential. The competition leads to a new state of equilibrium and optimality, which will also be broken owing to the internal logic of market economy functioning.

---

[17] Attempts of neoclassical theory to explain the equilibrium prices and quantity of goods through a market supply and demand, and to understand a market supply and demand as a sum of individual supplies and demands, which in turn depend on market prices, is logically vicious circle. To understand how market equilibrium is formed, the model should reflect logic of interaction between production and consumption, but not only between supply and demand, which are derived from them.

[18] According to the model of Arrou-Debreu and equilibrium models derived from it, "the goods delivered over available demand receive the zero prices". *(See,* Karlin *1964, p. 330.).* But existence of goods with zero prices has no sensible explanation from the standpoints of economics. After all, excessive supply (as well as supply and demand) exists in time. If overproduction and excessive supply takes place, then there will appear the supernormal stocks of those finished products, which can be sold in the future. Therefore, these products won't have the zero prices. But if there is no demand on this or that product at all and it is absolutely clear that it won't arise in the future too, then this product has no social utility at all. In that case this good is no good any more, it is no product. Such "product" becomes an embodiment of losses measured by cost of spent resources, and receives "negative price", but not the zero prices.

In condition of dynamic equilibrium the optimality of economic activity means a growth of welfare in economy not at the expense of such redistribution of resources, at which benefit of some is got at the expense of losses of others. In condition of dynamic equilibrium the growth of welfare occurs only at the expense of a net increase of physical, human, social and intellectual capital. As a result of this, not only the quantity of available primary resources increases, but also the technological coefficients decrease that, in its turn, allows to increase the consumer coefficients for all consumers. A unique source of economic growth is the increment of economic potential, which occurs in the state of equilibrium and, it means, optimal use of existing potential. That is, self-increasing of economic potential and the economy together with it takes place.

5. Self-regulation of economic activity

1. Economic ups and downs are a self-excitation and self-retardation of economic processes within turn points - peak and trough. The movement of ingoing and outgoing spiral of income - expenses. Expansion and recession feed themselves, with each new turn strengthening themselves until they reach these extreme points. Therefore, it is important to understand what occurs in these extreme points of a business cycle. In short it is possible to say – the peak is caused by the fact that society cannot produce more, and the trough – that society cannot consume less. In these turn points of business cycle the change of correlation of relative prices of products and resources causes the change of ratio of propensity to produce and propensity to consume on the opposite. This is the reason for change of a phase of cycle. Like a pendulum the market economy moves by inertia from one extreme to another, but can't stop in a point of balance, where inertia of its movement is maximal.

2. In monetary economy the barter exchange is mediated by an exchange of goods for money. In such conditions change of nominal prices leads to change of real (relative) prices. Nominal prices of products comprise profit, and the prices of resources - saving. And the exchange of the goods occurs under the formula $q_1p_1 = q_2p_2$, then $q_1/q_2 = p_2/p_1$. That is change of the relative prices (q_1/q_2) is inversely proportional to change of a parity of nominal prices (p_1 and p_2) and consequently to change of rates of profit and saving on which nominal prices depend.

All this is important, because the change of a parity of profits and saving, mutually paid in the course of exchange, changes the relative prices, that is, real proportions of exchange of goods. But economic agents react just on the relative prices. But nominal prices are only «a monetary veil» under which the relative prices hide. It means that in state of general equilibrium, as it has already been mentioned, profits and saving in composition of prices of all products and resources should balance each other. Accordingly, average rates of profit and saving should be

equal in economy on the whole. In the process of ups and downs of economic activity the misbalances between profits and saving in the prices of goods are accumulated at micro level, and at macro level are transformed to a misbalance between gross profit and gross saving, and thus in a misbalance between investments and consumption on debt.

This means that misbalances between mutually paid profits and saving in composition of prices of various goods generate stimulus of expansion or recession of given branch of economy and thus provide accordance of structure of economy to structure of social needs. But if these deviations don't compensate each other, if gross profit in production sector is more or less than gross saving in consumption sector it already means a misbalance at macroeconomic level between social production and consumption. It already is that, which generates fluctuations of business cycles.

3. Increase of production promotes to decrease of relative prices of products and their increase on resources[19]. Decrease of production, on the contrary, promotes to increase of relative prices of products and their decrease on resources. It means that increase of production promotes to decrease of rate of profit, and decrease of production – to increase of rate of profit[20]. The rate of saving reacts in opposite way on changes of relative prices. At macro level changes of relative prices of products and resources simultaneously and in exactly opposite way affect an average rate of profit and average rate of saving. Increase of one of them is only the reverse form of displaying the decrease of another. One is impossible without the other.

Through such influence on rates of profit and saving the change of relative prices at the level of economic sectors causes redistribution of inputs and outputs between sectors, that is, it optimizes structure of economy. But the same process at the level of all economy causes cyclic fluctuations. It is optimization of level of economic activity, which occurs in the form of restriction of its deviations in limits stipulated by maximum of production and minimum of consumption possibilities of society.

When resources are exhausted and economy cannot expand in one of the sectors without decrease in others, the accelerated growth of relative prices for resources begins. At the same time, in conditions of satiation of needs the relative prices of products decrease. Deviations of rates of profit and saving in various sectors don't compensate each other anymore. So, by now, the general tendency of decrease of profit rate in all production sectors takes place, and –

[19] While the market grows, producers aspire to grasp the market and to increase profits first of all at the expense of quantity of output, but not of prices. I.e. the competition forces them to reduce the relative prices of products and to increase quantity of output. Such policy leads to increase of risk and decrease in the rate of profit.

[20] That is, at expansion the producers' profits increase basically at the expense of increase of realization, but not at the expense of the rate of profit, and at recession, they are decreased also basically at the expense of decrease of realization, instead of rate of profit.

increase of saving rate – in all consumption sectors. Accordingly, in the whole economy decrease of average propensity to produce and average propensity to consume takes place. On the peak, average propensity to produce reaches a maximum and average propensity to consume - a minimum. Accordingly, marginal propensities to produce and to consume are equal to zero. Just this is the peak, when producers don't want to expand production anymore, which means that 1) consumers also can't enlarge selling of labor services (and don't want because of decreasing of propensity to work) and, consequently, 2) can't enlarge consumption (and don't want as needs are saturated).

At recession, the opposite processes happen. In conditions of total decrease of production the accelerated falling of resource prices (consumers' incomes) begins. At the same time as society can't anymore cut down consumption of necessary products, their relative prices begin to raise against background of falling of other prices. So at the trough, the saving rate decreases and profit rate increases in the sectors producing necessary products. These sectors begin to grow against background of stagnation. Just this is a trough as a turn point, when consumers don't want to reduce consumption anymore and, consequently, producers get opportunity to stop decline of production and begin to increase output. Average propensity to produce decreases to minimum and starts to grow. At trough the marginal propensity to produce and to consume is equal to zero.

4. On peak, as a result of competition escalation for redistribution of resources between sectors, the prices for them grow faster comparing with product prices. Profits are reduced to the extent that they don't cover the risk, which increased in connection with difficulty of realization[21]. In conditions of decreasing of profit rates this means that compensation for risk decreases. Profit is a compensation for entrepreneurial efforts, but profit rate is a "price" for bearing the risk burden. In conditions of recession and increasing of profit rate, on the contrary, the risk price increases. On the other hand, on peak, at high incomes of consumers, their needs are more or less satisfied. It means that abstention is mainly connected with abstention from excesses and luxury. But this needs less subjective efforts than abstention from necessary products though they cost much more expensive than necessary products. In conditions of high saving rate, all this means that compensation for abstention efforts grows, as the norm of saving is just abstention "price". In conditions of recession and low incomes - all happens on the contrary and abstention price decreases. For the prices of necessary products are low and abstention from their consumption demands the more efforts. So the price for abstention efforts sharply increases in peak and decreases in trough of a business cycle. But the price for risk on

[21] Especially grows the risk for realization of investment and durable goods.

the contrary sharply falls in peak and increases in trough. Thus at peak neither producers want to increase production, nor consumers want to increase consumption. At trough on the contrary – they don't want to reduce either production or consumption. These are extreme points of a cycle.

5. Rates of profit and saving change as a result of expansion and recession in the opposite way. When divergences between gross profit and gross saving and accordingly deviations of actual prices of products and resources from optimal reach the culminations, this is reflected on relative prices. Having reached a critical point, deformation of relative prices of resources and products, causes change of dominating propensities in opposite direction. The phase of a business cycle changes and the further processes proceed by a self-excitation or self-retardation principle until the new turn point is reached. The market can't restore macroeconomic equilibrium differently as through fluctuations between extreme points of a peak and a trough caused by a maximum of production capacity and a minimum of consumer ability.

Economic expansion occurs against a background of integrity and preservation of proportions between different parts (economic flows), but recession means rupture of coherence between them and integrity destruction. Therefore, if the recession, which has arisen in this or that sector within the sectoral fluctuations of economic activity, reaches critical level, it accepts cumulative character and is transferred by chain reaction. In conditions of crisis the balance is restored. But it is restored not by expansion of deficient sectors, but by recession of less deficient (relatively redundant) sectors. Those sectors are reduced, which still insufficiently were reduced. They come to accordance with those sectors, which cannot be reduced more and have reached the "bottom". But why cannot they reduce more? Because society cannot do without products of these sectors, thus it cannot consume less necessary products. Therefore, demand for their products ceases to fall at the expense of reallocation of solvent demand from other sectors, and, hence, at the expense of acceleration of falling of demand for products of other sectors. At trough, proportions and integrity of an economic organism are restored. Expansion in condition of dynamic equilibrium begins.

6. Needs and, accordingly, demand are real, only if they are solvent. But the solvency of demand of some sectors for resources is stipulated by the solvency of demand of other sectors on its products, and vice versa. Low volumes of production and consumption of various goods mutually cause insolvency of various subjects[22]. To provide economic recovery the gradual and coordinated expansion of production of products and consumption of resources of all sectors,

[22] In conditions of crisis there are many unused resources (products) and unsatisfied needs. But for a while they are only potential resources and needs. For resources are in the property of not those subjects, who can satisfy own needs by them. While there is no solvent demand for resources, there is no solvency of these needs either. As production and consumption are unadjusted, and monetary circulation is upset, nobody can sell, because nobody can buy. And they cannot buy, because cannot sell. and, thus, cannot consume and produce.

interconnected in a single whole, is necessary. Growth of each sector depends on growth of others. No sector can increase production without increase in consumption of resources. And no sector can increase consumption of resources if its suppliers do not increase production of products, etc. That is why expansion happens gradually.

Beginning from the trough, free resources are gradually put into operation in those sectors, which extend in harmony with other sectors. However, having reached the peak an expansion of production and consumption stops, on the one hand, because of physical limitation and exhaustion of free resources, and because of consumer demand saturation – on the other. These processes begin at first in separate sectors. In them the finished goods are in poor demand, production is reduced. Integrity of economy is broken[23]. Disproportions between sectors are spread by chain reaction. Recession begins which unlike to expansion, occurs sharply, and cannot stop until reaches a trough and all is repeated.

7. Finally, in the background of general growth of production, on economic expansion in the production sector there is an increase of investment fraction and decrease of withdrawn profits fraction, but in consumption sector - decrease of fraction of consumption on debt and increase of saving fraction. Opposite processes occur at economic recession. But withdrawn profit and saving are an outflow from incomes of producers and consumers. But investments and consumption on credit are an inflow of financial means to their expenses. If the balance of outflow and inflow of incomes of producers and consumers is broken, then the balance in circulation of incomes and expenses is broken. It leads to violation of balance of a supply and demand in the markets of products and resources. The prices for them begin to deviate from optimal prices. The optimal correlation between the prices of resources and products is broken. Just this is the cause of change of phases of business cycles.

8. With increase of incomes the supply of labor at first grows, and then decreases. With growth of wage, there comes the moment when recreation becomes more valuable than the additional wage. In conditions of a full employment the size of additional wage, necessary for attraction of additional unit of labor, increases. But in trough, falling of incomes and consumption restriction reaches the points when the further reduction of demand for labor, and hence of incomes, does not only reduce the labor supply but, on the contrary, increases the labor supply. People are compelled to somehow fill a shortage of incomes for supporting at least a minimal level of habitual consumption. They agree to work even for very low wage. The resource prices again begin to go down relative to product prices. Again the relative prices for

[23] Origin of deficiencies and excesses , i.e.isbalance between utility and costs, is a sign of violation of integrity of an economic organism, i.e. violation of conformity between various parts of economic system, as single entity. It means violation of conformity between structure of production and structure of needs.

resources and products start to deviate from the optimal prices in opposite direction, compared with deviations in a recession. That is, the curve of supply of labor has such form:

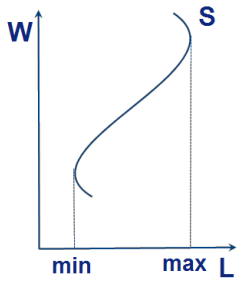

Figure 2. Supply curve on labor market

9. Market prices represent average magnitudes from the set of individual prices on which individual transactions are done. These market prices as average economic parameters determine economic decisions and actions of individuals. They serve for them as reference points for making individual decisions. However, except market prices, in each given transaction individual considers also those conditions in which he happens to function. Along with general economic conditions (expansion or recession, inflation, unemployment, expectations, public moods of optimism or pessimism, etc.) individuals consider also conditions unique for each of them. Each of them has different needs, production possibilities, comparative advantages; each of them in unusual way reacts to changes of the same general conditions, etc. Therefore in each transaction individual prices in some extent deviate from average market prices. Accordingly, the set of individual prices which will be generated as a result of individual deviations from existing market prices, in general, will reflect the changes of social needs and production possibilities. Thus, it will differ from that set of individual prices, averages from which are current market prices.

Thus, the individual prices are formed on the basis of individual deviations from average market prices. But in aggregate these individual prices make that set on basis of which average market price is formed. That is individual and market prices form each other. At that this process of mutual formation occurs simultaneously, in a parallel mode. But the problem is that individual deviations from market prices occur deliberately, but formation of market prices as average magnitudes from individual prices occurs spontaneously. Because spontaneously is formed the set itself, average from which the market price is. That is, spontaneously the market prices are formed from which, as result of parties' reasonable compromise, the individual prices deviate deliberately. It turns out that in competitive market deliberately formed individual prices depend on casual market prices. Just it is the reason of spontaneity and unpredictability of market economy.

10. Economic recession is also accompanied by complications in money turnover. Those, who could not realize their product, do not receive incomes, and consequently, cannot pay off the debts. Non-payment of debts extends by chain reaction, accelerating economic recession. In attempt to stop recession, the government often launches anti-recessionary monetary and fiscal policy. However, artificially supporting the aggregate demand, economy is not given the chance to reach the bottom of recession, as to the logical end of business cycle. By this the obstacles are created for restoration of deformed proportions. But just the crisis restores the broken integrity of economy, by which it restores the ability of economy to expansion. That is, the anti-recessionary policy in that kind in which it is performed at the present stage, actually preserves disproportions in economy and blocks ability of the market to self-regulation. At the same time the economy "is pumped up" by money that leads to permanent inflation.

11. In respect to this model the reasoning given above takes the following form[24]. In conditions of equilibrium monetary flows, running through tanks (resource markets and product markets) and a pressure in them are equal, as outflows of money P and S counterbalance each other the same as inflows of money I and D. (See Fig. 3). In such conditions resources and products have optimal prices. At such prices entrepreneurs get normal profit which they consider as adequate compensation for burden of enterprise risk. Owners make the normal saving satisfying them as a payment for abstention.

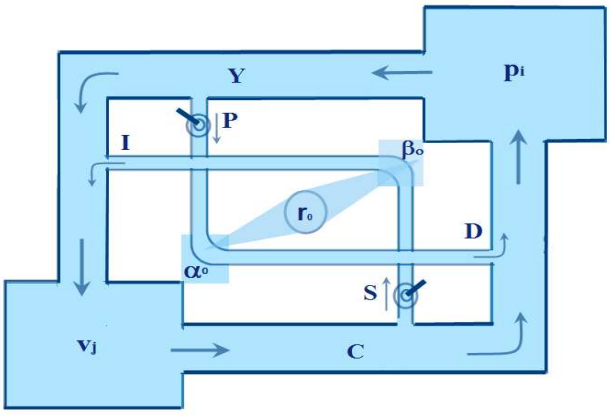

Figure 3. "The symmetric scheme" of circulation of financial flows (reinvestments left out).

Flows of incomes and expenses increase in an economic expansion phase in economy. At that, as a result of Keynes's psychological law, consumers' marginal propensity to saving increases and marginal propensity to consume decreases. As consequence of this, in the general

[24] For the purpose of simplifying the analysis, the reinvestments in production Rp and reinvestments in consumption Rc are assumed equal and aren't considered.

background of ascending of all monetary (and commodity) flows, share of S increases in consumption sector, and share of C decreases. On the other hand, as a result of formation of optimistic moods, producers' propensity to risk increases. As consequence of this, in production sector the opposite processes take place. Marginal propensity to produce (to industrial consumption) increases and marginal propensity to withdrawal of profits (to industrial saving) decreases. Accordingly, in the general monetary flow the share of P decreases, and the share of Y increases.

As a result of such redistribution of flows a "monetary pressure" in the top tank (product markets) decreases and in bottom tank (resource markets) - increases. Accordingly, the relative prices of products start to decrease and the relative prices of resources - to increase. But such changes in price system provoke change of phase of a business cycle. Recession begins. The profit rate, which causes reduction of propensity to risk, decreases. As a result of this, production reduces, and incomes of consumers and their propensity to saving – decreases, etc. So there arise opposite tendencies - shares of S and Y decrease, and shares of P and C increase. This leads to redistribution of flows, the parity of "monetary pressure" in product and resource markets changes on the opposite. The relative prices of products again start to increase, but those of resources - to decrease. So, revival begins.

As a result of fluctuations of economic activity the monetary mass, necessary for service of transactions, also fluctuates. In the phase of expansion the money resources are introduced into circulation, and in the recession phase – they are deduced. At that it should be taken into consideration that though rates of received and withdrawn profit of producers are different, as well as rates of received and withdrawn saving of consumers, but changes of parities of these rates in the course of expansion and recession cause only redistribution of economic flows, but not a change of general monetary mass in circulation. Input and output of money resources occur at the expense of monetary assets of economic subjects. And all these processes of input and output of money in a circulation or redistributions of money flows directly depend on a level of interest rate, that is, on the price for right of using of money resources. For level r_0 influences economic decisions and by that - P, S, I, D and α_0, β_0, δ_0, γ_0. But P and S are temporarily free money resources which form supply of money, but I and D form demand for money. But supply and demand of money form the interest rate with the help of which economy aspires to restore "a gold proportion" $\alpha_0 = \beta_0 = \delta_0 = \gamma_0 = r_0$, accordingly, equilibrium and optimal ratios between the prices of resources and products.

In conditions of monetary economy the fluctuations of a business cycle are the unique mechanism bringing into accord P, S, I and D (accordingly, α_0, β_0, δ_0, γ_0 and r_0). At that, it

doesn't provide their equality which is necessary for general equilibrium. It only keeps their divergences within certain borders. The decentralized economy represents a system with "feedback", i.e. relationships of cause and effect are closed into a circle and transformed into functional connection, thanks to which any deviation raises forces for its self-elimination, proportional to a force of this deviation. Spontaneous laws of market are "blind" laws in force. And "blindness" is revealed in the fact that uncontrolled self-excitation and self-retardation of economy proceeds until critical points of a turn - a maximum of production possibilities and a minimum of consumer possibilities – will be reached. Therefore, without government regulation of economy, to eliminate cyclic fluctuations is basically impossible. But this regulation should not be based on the idea of maintaining aggregate demand, but on the idea of maintaining equality between the flows P, S, I and D. (See Fig. 4).

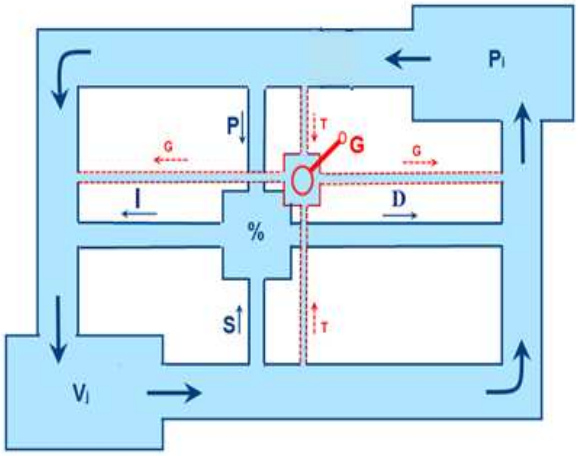

Figure. 4. The scheme of economic flows in a regulated economy,
where G - government transfers, T - taxes.

1. That, which the given model reflects, isn't visible behind external manifestations of relationships between private subjects with their conflicting interests. The present article considers the movement of counter-directed commodity and financial flows which form the closed contour. These flows caused by objective economic laws, form "live" self-developing and self-regulated system. Though finally it is brought to motion by energy of egoistical interests of millions of independent private subjects, but, nevertheless, this system doesn't depend on a will of separate subjects. On the contrary, it structures this energy of egoism and forces private subjects to act in one way or another by causing their economic decisions. Just this system of interdependent economic flows generates that anonymous force, which binds them into a single economic organism and makes them dependent on each other, though they do not quite realize logic of this interdependence and think that they operate only in their own interests. This

anonymous force and system of economic flows are outcome of market mechanism and division of labor due to which subjective egoism turns to assistance to satisfaction of all others.

2. The given model reflects formation of logic of concrete parameters of resource allocation into various products' manufacturing and imputation of products to resources (to production factors). At that level of abstraction, on which the model is constructed, it is only important that in conditions of production factors' scarcity their services should be paid by corresponding quantity of products, but it is not important whether the subject pays for factors' services belonging to other subjects, or pays a payment to himself for services of his own factors. It is as though only "legal" side of problem.

In real economy not only various consumers own simultaneously various production factors and their services, but also various producers manufacture simultaneously various kinds of products. Until there arise monopolies, for functioning of decentralized economic system it is not important how production factors (and incomes from them) are distributed between millions of private owners or how manufactures of various goods (and incomes from them) are distributed between millions of private entrepreneurs. This distribution can be most different. So, from positions of this model it is important what shares of products to various production factors are amputated, but not how this production factors (together with products manufactured by them) between private subjects are distributed.

3. According to the given model economic equilibrium exists when the cost of various resources consumed in production of this or that product is equal to the cost of this product consumed in reproduction of various resources. But the cost of various products consumed in reproduction of this or that resource is equal to the cost of this resource consumed in production of various products. This is the "iron law" of general economic equilibrium. Self-regulation of market economy consists just in the ability to provide this correspondence by means of market interactions of independent subjects forming single economic organism. Thanks to this law, inside of economic organism there are formed appropriate proportions of commodity and financial flows, which provide its integrity. Finally, just this law gives clear understanding of what parts of cost of manufactured products are imputed to various production factors (Labor, Land, Capital) by which these products are manufactured. The theory of imputation, based on the law of diminishing returns, doesn't give the satisfactory answer to this question. And as for how production factors themselves and together with them national product are distributed between

economic actors – this is already the question, which depends not only on economic, but also on social and political factors[25].

4. According to this model, like the model of P. Sraffa, the economy is a circular process of "production of commodities by means of commodities". In this sense this model, as well as the model of P. Sraffa, is opposite to the neoclassical model, according to which the economy is the one-way process directed from primary resources to final products and in which the problem of how primary resources are reproduced isn't considered. However, P.Sraffa considered production of production factors by means of final products in a physical sense. For him there is no difference between production factors and final goods, "commodities are produced by means of commodities". For example, for him Labor is commodity, which is produced by means of other commodities (foods, clothes, etc.). But at such interpretation of manufacture of production factors it is impossible to answer the question – what forces form a wage. For unlike early stages of capitalism, when the salary consisted of consumer goods necessary for survival of workers, today there is no direct link between consumption of goods and reproduction of Labor. Ultimately, the consequence of this approach is that it is not clear from his model how national product is divided between profits, wages, etc.

In this model, like in the model of Walras, and unlike the model of P. Sraffa and many other modern models, production factors from their services are distinctly differentiated. Producers buy not production factors, but the rights of temporary use of their services. Accordingly, costs for reproduction of primary resources are reduced to costs of final products expended for reproduction of life of production factors' owners (but not of factors themselves), as the legal owner, selling rights for use of factors' services. Due to such understanding, this model gives a fair idea about imputation of national income to various production factors depending on services rendered by them in its creation. Distribution of production factors between different owners (including - financial resources between entrepreneurs) in turn, stipulates the distribution of national income among the individuals. .

5. The theory of marginal productivity assumes a full compensation of products' cost at a price of each production factor, and in this case no place is left for profit. It is considered that in the process of movement toward the equilibrium the economic profits of some producers are compensated by losses of another's, and as a whole the economy aspires to a condition of zero profit. But it doesn't correspond to reality. Profits of producers are compensated not by losses of other producers, but by saving of consumers. Accordingly, the average profit rate is more than

[25] Struggle for the property, for redistribution of incomes, struggle for survival or economic ambitions of concrete people - all this generates energy of economic stimulus. Nevertheless, this problem is beyond the competence of only economic theory. Struggle for possession of the most scarce production factors (be it labor, land or capital) always was an epicenter of conflict of political interests and defined the course of historical development.

zero, and in conditions of equilibrium – is equal to a saving rate. Profit and saving are the opposite magnitudes having an opposite sign, just as the prices of products and resources, and just as incomes and expenses formed on the basis of these prices. Just this is reflected in the "symmetric model".

6. In the neoclassical theory there is fixed a strong relationship between saving and investments, but is not apprehended the existence of relationship between profit and saving, and hence between profit, saving and investments. Also, there is no explanation of the link between profit and consumption in debt, and consumption in debt is not perceived as the reverse side of investment in human capital. In the end, there is no understanding of a deep inner interdependence between profit, saving, investments and consumption in debt. But without this it is impossible to understand how a general equilibrium is formed and it is impossible to create an adequate mathematical model of a decentralized economic system.

But the reason of misunderstanding of significant interdependencies among the most important financial flows lies in the methodology of scientific analysis and the research methods of the neoclassical theory. Namely, the neoclassical theory does not consider the deep inner connection between production and consumption in general. But consumption and production are the opposite moments of the same process of economic activity. They are inextricably linked. Production of products is consumption of resources and consumption of products is the reproduction of resources. For primary resources are services of production factors. At that, in conditions of commodity production these resources exist as a specific commodity – as the right of temporary use of production factors' services sold by owners of these factors. Therefore, reproduction of primary resources is reduced to reproduction of life of owners of production factors, and hence reduced to consumption of final products by these owners.

Also profit and saving are intrinsically linked. Profit is "saving" of producers, and saving is "profit" of consumers, and they both occur in the process of production and consumption of goods in the same price system. After all, the alternation of incomes and expenditures takes place in both sectors of production and consumption. Incomes of producers are expenditures of consumers, and expenditures of producers are incomes of consumers. Accordingly, the difference between incomes and expenditures takes for them the mirror opposite form – of profit and saving. But that's why profits and saving are internally interconnected. As long as incomes of some are expenditures of others and vice versa, the profits and saving cannot be independent quantities. Since the incomes and expenditures of both producers and consumers depend on the prices of products and resources, the more the prices of products are ahead of the prices of resources, the greater are profits and the smaller are saving and vice versa. The more resources'

price increase and products' prices decrease, the greater is saving and the less is profit. That is the change in ratios between prices of primary resources and final products in a market economy, in the opposite way affects the magnitude of gross profit and gross saving.

Also, in neoclassical theory it is not taken into account that the demand for goods is supply of money and supply of goods – demand for money. Sale of goods is purchase of money and purchase of goods - is sale of money. Also, investments and consumption in debt are the opposite moments of the same process. For example, investments of primary resources in production of physical capital are the consumption of these resources in debt, and in consumption sector the consumption of final products in debt is investment in human capital, etc. Just these internal, essential interdependences between economic flows form an economic activity as integrity. The "Symmetric model" just reflects these essential interdependences in the result of which a closed economy is represented as a single system. But the neoclassical theory is not aware of these interconnections. Moreover, it does not recognize a consumption of final products as part of the economic process, in which the reproduction of primary resources as commodities happen, and therefore the mathematical model, constructed based on it, cannot adequately reflect the real economic processes.

7. The present economic crisis has shown that the neoclassical theory and the equilibrium models based on it cannot help in the decision of real economic problems. It became suddenly clear to everybody that these models are torn off from reality. As Blaug writes: " 'Economics for economics sake' will soon become, indeed already is, the battle-cry. At this point, someone might observe that economics is too important a subject to be left to economists" (Blaug 1997, 8). The task of scientists in the established situation is to radically rethink a neoclassical paradigm and "inhale a life" into lifeless models of economic equilibrium.

References

1. Blaug M. 1997. Ugly currents in modern economics. // *Policy options*. September 1997.
2. Karlin S. 1964. *Mathematical Methods and Theory in Games, Programming, and Economics*. Moscow. "Mir",
3. Leiashvily P. 2011a. "The Dialectics of Economic Activity (In Searching of Symmetry in Economy),"*Georgian International Journal of Science and Technology*, V.3, Issue 3.
4. Leiashvily P. 2011b. *The Economic Activity: teleological analisys.* Nova Science Publishers, Inc. Commack, New York, p. 192.
5. Leiashvily P. 1990. *The Analysis of Economic Value.* Moscow: "Economika", (in Russian).
6. Leiashvily P. 1996. "Towards the teleological understanding of economic value". *International Journal of Social Economics*, V. 23. Namber 9, pp. 4-14.
7. Walras L. 2000. Elements of Pure Economics. Moscow, "Isograph", p. 448.

Appendix 1

Sector 1					Sector 2				
$- a_{11} x_1 v_1$	$- a_{12} x_1 v_2$	. . .	$- a_{1n} x_1 v_n$	$- \alpha_1 C_1 x_1$					$x_1 p_1$
$- a_{21} x_2 v_1$	$- a_{22} x_2 v_2$	. . .	$- a_{2n} x_2 v_n$	$- \alpha_2 C_2 x_2$				$x_2 p_2$	
. . .	. . .	. . .	. . .	. . .			. . .		
$- a_{m1} x_m v_1$	$- a_{m2} x_m v_2$	. . .	$- a_{mn} x_m v_n$	$- \alpha_m C_m x_m$		$x_m p_m$			
$- \gamma_1 y_1 v_1$	$- \gamma_2 y_2 v_2$	. . .	$- \gamma_n y_n v_n$	$- P_I$ / $-Rc$	$I = S$				
				$P = D$	$- (A + Rp)$	$- \delta_m Q_m p_m$	. . .	$- \delta_2 Q_2 p_2$	$- \delta_1 Q_1 p_1$
			$y_n v_n$		$- \beta_n y_n v_n$	$- b_{nm} y_n p_m$	. . .	$- b_{n2} y_n p_2$	$- b_{n1} y_n p_1$
		. . .			. . .	. . .	. . .	. . .	. . .
	$y_2 v_2$				$- \beta_2 y_2 v_2$	$- b_{2m} y_2 p_m$	. . .	$- b_{22} y_2 p_2$	$- b_{21} y_2 p_1$
$y_1 v_1$					$- \beta_1 y_1 v_1$	$- b_{1m} y_1 p_m$	. . .	$- b_{12} y_1 p_2$	$- b_{11} y_1 p_1$
Sector 3					Sector 4				

Table 1. Matrix of closed economy

x_i - final products, i =1,2, . . . , m;
p_i - price of final product, i =1,2, . . . , m;
y_j - primary resources, j =1,2, ..., n;
v_j - price of primary resources, j =1,2, ..., n;
a_{ij} - consumption of recourse j for production of unit of product i (technological coefficients);
b_{ji} - consumption of product i for reproduction of unit of recourse j;
α_i - profit rate in production of product i;
β_i - saving rate in reproduction of recourse j;
γ_j - share of recourse y_j , consumed on credit;
δ_i - share of product x_i , consumed on credit;

C_i - cost price of product i.
Q_i - quantity of product i consumed in reproduction of all recourses
P - gross profit;
S - gross saving;
I - investments into production
D - consumption on credit (investment into consumption)
P_I - profit from investment;
Rc - reinvestments into consumption;
A - depreciation charges;
Rp - reinvestments into production;

Appendix 2

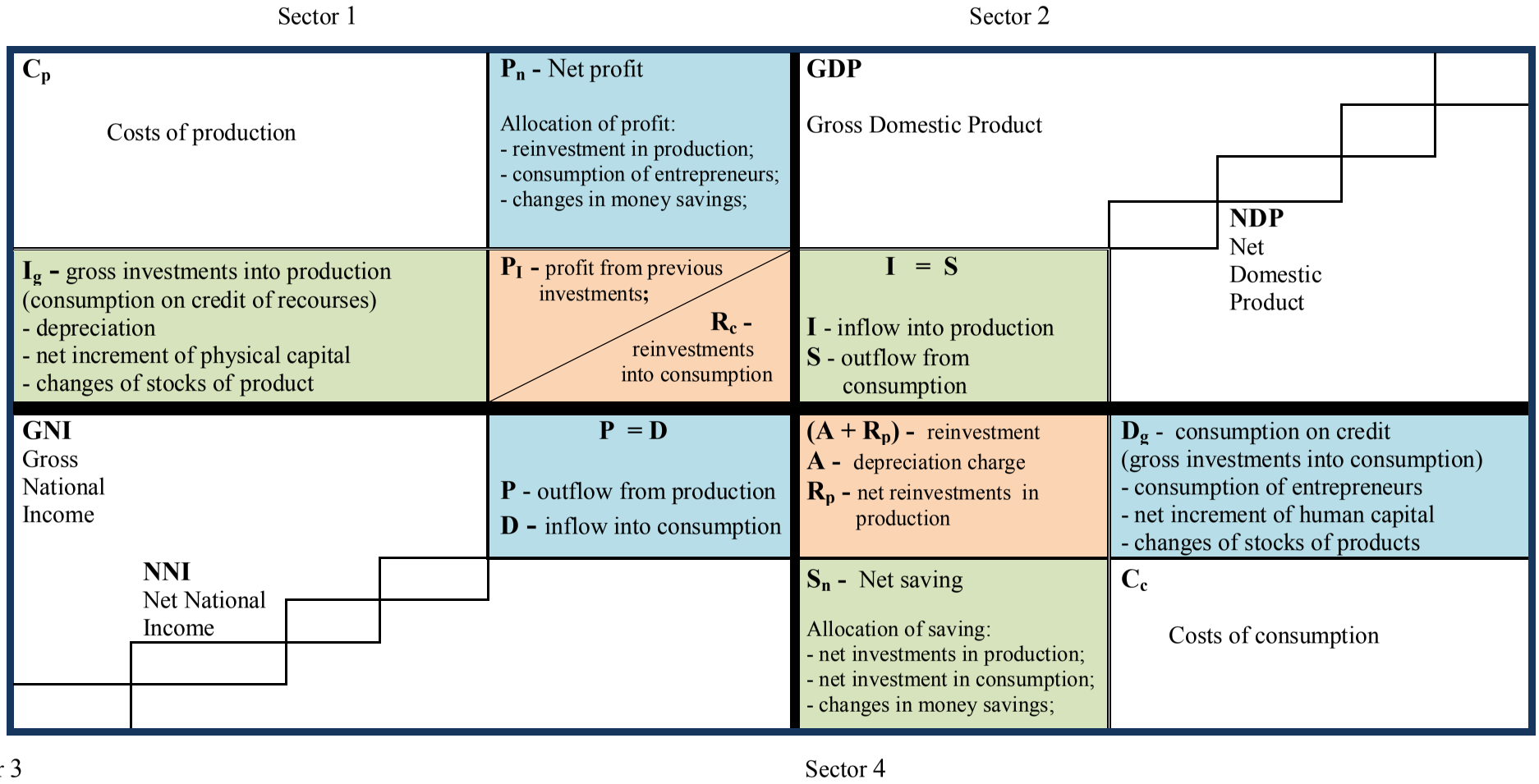

Table 2. The main economic flows in closed economy