Solidary Model of Development of Society

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Abstract
The results of the study of different approaches to the formation of the model of the economy in different countries are presented. Socialist economy with elements of state capitalism, the social-democratic model, the socialist economy “with self-reliance” and two examples of countries with a share of the solidarity economy are considered. The used approach of summation of the allocated economic indicators of development of the countries has shown good agreement with real data on GDP per capita. It is recommended to extend the use of the solidarity economy.

Keywords: Solidary economy; Economic model; GDP per capita.

1. Introduction
The development of human society is guided by certain economic models. Modern society adheres to the consumer model, but this does not mean that this model is the only one. In recent years, various researchers, as well as politicians, have spoken more about the importance of the transition to a solidarity model. However, they do not give a specific description of the features of this approach to the economy. The solidarity model embodies the best aspirations of humanity. However, apart from General ideas about the need for collective action and work for the benefit of society, nothing is known about it.

In the solidarity model, apparently, the distribution of wealth must be carried out according to work while retaining private ownership of the means of production. However, the mechanism of such distribution in these conditions has not yet been worked out and is unclear. In this regard, the functioning of this model of the economy is unclear.

The purpose of this article is to describe the solidarity model of economic development.

2. Literature Review
When considering this model, many researchers gravitate to capitalist or socialist model of the economy, depending on their own preferences.

So, according to Petrukhin (2018), the essence of the present stage of development consists of a contradiction between capitalist and socialist ways of the economy. «The elements of a solidarity economy are not taken into account by him.».

Bresser-Pereira (2012), describes five models of capitalism, some of which may contain elements of the solidarity economic model. He lists, among others, « liberal democratic model, in which state intervention is as limited as possible. The state has a limited role in education, in health care and social care, and in social protection or welfare.

“Labor” protection . Labor protection laws cost falls on business enterprises and not on the state is minimal. The number of government-owned companies is minimal and the regulation of business enterprises is limited. Individualism, technological innovation and competition prevail over cooperation and social solidarity.

In the social democratic model, the power of the professional class, especially the public bureaucracy. State intervention takes place at the production or industrial-policy level, in labor protection, and in the free or almost free provision of collectively used social services. Among the European countries in this group, some are more social than others, because they guarantee social rights more extensively and effectively.

Yet in the Japanese model of capitalism the state leaves social protection to households and business enterprises, and therefore to the traditions or to the spirit of solidarity they share. This model does not rely on the institutions of the social state: individual security is left to households and business enterprises.

This model also moved in several aspects toward the liberal model.

Among the developing countries, the developmental model is characterized by the informal existence of a national development strategy — a system of laws, public policies, agreements and understandings that create lucrative investment opportunities for entrepreneurs - implemented by strong state intervention in the economy so as to make this strategy operational, and by a low level of labor protection.

The liberal-dependent model is characterized by the dependent nature of its elites in varying degrees, and by the absence of a national development strategy.

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From the standpoint of the social structure, this model is characterized by a political alliance between an incipient industrial bourgeoisie and an equally incipient public and private bureaucracy». 

Malashkhia (2003), writes that the economic person was created under the influence of the economic environment and as a matter of experience generations, laws of economy. He has developed «a certain rationalism, rules of interaction with the nature and various spheres of life of society - political, scientific, educational, cultural».

Laville et al., set out the basic principles underlying the functioning of «solidary economy structures:

- The organization of economic activity in accordance with the principle of serving by economic processes the person and the collective, and not capital.
- Autonomy from the state structures. At the heart of the creation of solidarity structures, as well as capitalist, lies a private initiative.
- The organization of activity of structures of the solidarity economy on democratic principles.
- The priority of man and public good as the guiding principle of the distribution of profits».

However, these statements do not allow to formalize the description of solidarity economy model.

Kim (2012), indicates that growth and solidarity form a virtuous cycle. «Solidarity has two dimensions that are especially critical today. The first can be called global solidarity. The second dimension is intergenerational solidarity. This is the bond of interdependence and responsibility that connects us to future generations».

The editorial on the website (Social and Solidarity Economy), lists the following principles of the solidarity economy, that «occupies 10% of GDP and 12% of private employment in France:

- Freedom of membership. No-one can be compelled to join or to remain a member of a social economy organization.
- Individual not-for-profit principle. This principle does not preclude gaining financial surpluses, but prohibits individual appropriation thereof.
- Democratic management. Strategic decisions are made by the General Assembly following the principle “one person = one vote”.
- Public or social usefulness of the project or pooling of resources. A social economy organization necessarily serves a collective aim, and not an aim pursued by a single individual in his own interest.
- Variety of resources. Resources in this sector are either private (cooperatives and mutuals), or mixed (not-for-profit associations). Social economy organizations are independent of the public authorities, but may be recognized as a privileged partner in the implementation of public interest policies and consequently be entitled to grants, specific aids for employment or tax benefits».

However, a simple enumeration of factors does not allow to formalize the description of the solidary model of the economy.

The most complete representations of various researchers on the solidarity economy are summarized «from the point of view of sustainable development in the source (Melnyk et al., 2014),

- Harmonization of economic and social development objectives (including environmental).
- Principle of voluntary participation.
- Self-organization and self-management.
- Collective economic and social responsibility for results of the activity.
- Initiative in the solution of any public purposes.
- Autonomy; each association is built on its own principles of organization and is independent of the state.
- Aiming at development. Unlike cooperatives in the organizations of solidarity economy profit, as a rule, isn't shared between participants, and reinvested in further development.
- Differentiation and specialization of individuals in the implementation of various social functions; the interaction of individual participants is mutually supplemented and enhances the synergetic effect.
- Variety of forms and economic pluralism; the organizations of the solidarity economy significantly differ in the forms, the principles of management, types of activity and scale.
- Democratism of the organizations; the maximum number of participants participates in decision-making (in any case all who want and can); the organization is under construction from bottom-up.
- A spirit of community and trust.
- Priority of protection of the most unprotected segments of the population.
- Reciprocity as a way to transfer goods, which consists in their ritualized donation, and is the alternative to the market and redistribution».

3. Materials and Methods

As an object of a research, the economic behavior of the population of the countries of the world was analyzed. Data are obtained from the Internet by means of the main search engines. Most of the data were obtained from the World Bank website.

4. Theory

Based on the literature data, the following hypothesis can be put forward.

Hypothesis: the solidary model of the economy is hybrid and includes elements of capitalism and socialism.

The entire sequence of economic formations can be represented as a continuum, the modern part of which may look like the one shown in Fig.1.
The leftmost position on the continuum is occupied by a substantially heterogeneous society, which is commonly called "capitalism". Socialism involves obtaining from each member of the society according to their abilities and obtaining from the society of remuneration accordingly their labor. It is supposed that at communism the individual will give to society on abilities, and to receive on requirements.

5. Results

We will not go into the distinction between the economic variants of capitalism presented in work (Kim, 2012). Instead, we will consider it from positions of the consumer model anyway presented in all modern cases of the capitalist relations. The similar model was studied by us in work (Surkov and Trofimova, 2018). In accordance with this model, GDP per capita \( F \) defined by the formula

\[
F = (B - G + H - Q + I - N + L + P + S)I t \tag{1}
\]

where \( B \) is the borrowed funds;
\( G \) - interest on the loan;
\( H \) - domestic savings;
\( Q \) - expenses of entrepreneurs for personal consumption;
\( I \) - rate of inflation;
\( N \) - corporate tax;
\( L \) - investments;
\( P \) - labor productivity;
\( S \) - Human Development Index - HDI;
\( t \) is the current time.

In this case, the income of the owner

\[
E_1 = V_0C - k_1V_0C + B - G - H + I - N + L + P + S - Z = V_0C(1 - k_1) + A_1 \tag{2}
\]

where the \( k_1 \) is share of income going for payment of the salary;
\[ A_1 = B - G - H + I - N + L + P + S - Z \tag{3} \]

In this case, the income of the owner-state will be

\[
D_1 = V_0C - E_1 + N = V_0C - (V_0C - k_1V_0C + B - G - H + I - N + L + P + S - Z) = k_1V_0C + B + G + H - I - L - P - S + Z \tag{4}
\]

The return on capital under the formula (2), or the volume of production in monetary terms, in the second stage will be

\[
E_2 = [V_0C(1 - k_1) + A_1]dt. \tag{5}
\]

Community members can buy for the amount
\[ M_2 = k_1E_2 \tag{6} \]

At the third stage the owner-state will gain income

\[
D_3 = [V_0C(1 - k_1) + A_1]dt + N - M_3 = [V_0C(1 - k_1) + A_1]dt + N - k_1[V_0C(1 - k_1) + A_1]dt = (1 - k_1)[V_0C(1 - k_1) + A_1]dt + N. \tag{7}
\]

At the "n" stage of income will be

\[
D_n = (1 - nk_1)[V_0C(1 - k_1) + A_1]dt + nN = V_0(\Sigma C / n)(1 - k_1) + A_1]dt + nN = V_0(\Sigma C / n)(1 - k_1) - k_1 V_0(\Sigma C)(1 - k_1) + nN. \tag{8}
\]

Given that \( C = \Sigma Ci/n \) and neglecting small terms, this formula is converted to the form

\[
D_n = (1 - nk_1)[V_0(\Sigma Ci / n)(1 - k_1) + A_1]dt + nN \]
nN can be represented as $\frac{1}{n}$. If we consider that the term with $1/n$ at $n$ tending to infinity tends to 0, then formula (9) transforms to the form

$$D_n = atN - k_1 V_0 (\Sigma C_i)(1-k_1).$$  

(10)

Using the example of the USSR, $V_0$ can be calculated as the ratio of GNP volumes in 1970 and 1984. $V_0 = \frac{V_{1970}}{V_{1984}} = \frac{433.4}{993} = 0.437$.

The value of $a = 1$, since $t$ and $n$ have the same meaning, only expressed in different scales. $\Sigma C_i =$ const, since the quantity of goods in the Soviet Union practically did not change over the years. It is difficult to estimate this size, therefore as a measure of this indicator we will accept GDP relation per capita of the USSR and the USA in 1984 from a source (The truth about the standard of living in the USSR, 2011), 2375/4436 = 0.535.

According to the source (The share of wages in the structure of prime cost, 2008), the share of expenses for the salary of workers $k_1$ was the value determined by the schedule of Fig.2.

$k_1 = -1.015t + 0.984$.

![Figure-2. The dependence of the share of wages in the cost value in the USSR from time](image)

The tax on the income of enterprises in the USSR was determined by the document (Law of the USSR, 1990). Then the wealth accumulated by the state will be

$$D_n = 0.22at - k_1 V_0 (\Sigma C_i)(1-k_1) = 0.22t - (0.437)0.535(0.016 - 1.015t) = 0.22t - 0.234(-1.015t + 0.984)(0.016 + 1.015t).$$  

(11)

This value is compared with the real value of GNP per capita, taken from the source (Macroeconomic Research). The dependence of GNP is per capita given in Fig.3.

![Figure-3. The dependence of GNP per capita in the USSR on time](image)

In Fig.3, only the ascending branch of the graph was taken for processing, since political changes began in the USSR in 1983-1985. The functioning model was modified and ceased to exist in its pure form. Comparison of calculated and real GNP per capita is presented in Fig.4.
For the dependence Fig.4, the correlation coefficient is 0.96. It is substantial for all levels of significance, exceeding the level of 0.01. The regression equation shows that real GNP per capita is much higher than estimated. With a high correlation coefficient, this indicates that some permanent factors are not taken into account.

Similar to such an approach, one can consider the situation in Sweden, which is commonly called a social-democratic country. In fact, a variant of state capitalism takes place there. Differences consist only in the level of taxes. According to the source (Tarasov), the level of the tax burden is 51%, or, in relative units, 0.51. Averaging of these sources Korotkevich et al. (2015) and Potudanskaya et al. (2016), gives for a salary share in prime cost the indicator equal to 62.5% or, in relative units, 0.625. The formula for the dependence of income which can be interpreted as GNP per capita has an appearance

\[ D_n = 0.51t - k_1 \sum C_i(1-k_1) = 0.51t - 0.625(1-0.625) = 0.51t - 0.234, \]  

(12)

where \((\sum C_i)\) is taken to be equal to 1 due to the diversity of goods, and \(V_0\) is equal to the ratio of GNP at the beginning and end of the period under consideration (2000–2017), \(V_0 = 102.36/538.58 = 0.1911\).

Data on GNP and GNP per capita are obtained from sources World Data Atlas and World Atlas of Data. The latter magnitude is shown in Figure 5. The correlation coefficient for this graph is 0.943. It is substantial for all significance levels exceeding the level of significance of 0.01.

Comparison of calculated and real values of GNP per capita is presented in Fig.6.
Figure 6. Interdependence of real and settlement GDP per capita for Sweden

![Graph showing interdependence of real and settlement GDP per capita for Sweden.](image)

From the graph and the calculated correlation coefficient close to 1, it is clear that the social-democratic structure of the economy is well described by the proposed model.

The next possible option for economic development is a purely socialist economy. It differs from the previous one only in the absence of a general tax. Based on this situation, the closest example of such an economy is the North Korean economy, which is characterized by a maximum “reliance on its own strength” (or “self-reliance”). Calculations are complicated by “opacity” of this country and backwardness of its economic statistics. Therefore, all the results are difficult to assess, they can be considered only as approximate.

The formula for GNP per capita, in this case, is as follows:

\[ D_n = -k_1 V_0 (\sum C_i) (1-k_1). \]  

(13)

The negative type of the equation (13) means that only the negative branch of the schedule is considered.

It was succeeded to find the source showing growth of the average salary in this country by years (Arenova). For this country, because of extreme poverty, it can be assumed that all funds are spent on the purchase of goods. A (\( \sum C_i \)) can be considered approximately equal to the level of wages, namely, 0.964 \( \pm 0.036 \).

The initial value of production volume \( V_0 \) can be defined as the ratio of the minimum and maximum production volumes taken from the source (Kushnir, 1970-2016).

\[ V_0 = V_{1995}/V_{2014} = 0.276. \]  

(14)

The share of wages in prime cost according to the source (Osipov, 2012), is 20-25%. This value is given for Russia, but the archaic nature of production in both countries suggests that for the studied country this value has the same order. For calculations, we will accept value 0.225.

After the substitutions we obtain

\[ D_n = -0.048(0.964t-0.036). \]  

(15)

The graph of the dependence GNP per capita is shown in Fig.7 (North Korea - GNI per capita USD, 2016). Such a rough quadratic approximation

\[ y = -0.341t^2 + 0.181t + 0.573 \]  

is used because of low confidence in the data used.

Figure 7. The dependence of GNP per capita in North Korea by time

![Graph showing the dependence of GNP per capita in North Korea by time.](image)

Comparing the calculated GDP per capita by the formula (15) and on approximation gives a correlation coefficient of 0.859, which is essential for all significance levels exceeding 0.01.

Considering the assumptions used, it can be noted that the calculation model reflects real trends for a given country.
We now turn to the evaluation of the hypothesis of this study. The solidary model of economic development in accordance with the hypothesis put forward above is a hybrid between capitalist and socialist models.

Then

\[ F = K_2 (B-G+H-Q+I-N+L+P+S)(1+k_1 V_d(S)(1-k_1)), \]

where \( K_2 \) and \( K_3 \) are dimensionless coefficients, showing the share of this type of economic relations in the total volume.

According to the website (Social and Solidarity Economy), for modern France, the share of the solidarity economy in the total GDP is 10%. Then \( K_2=0.9 \), and \( K_3=0.1 \).

The refined formula is as follows

\[ F = 0.9(B-G+H-Q+I-N+L+P+S)(1+k_1 V_d(S)(1-k_1)). \]  

The data for calculations were obtained from sources (Domestic credit provided by financial sector % of GDP; Foreign direct investment net outflows (% of GDP); France - Productivity; GNI (current US$); Gross domestic savings current US$; Gross fixed capital formation current LCU; Human Development Data, 1990-2017; Inflation; Lending interest rate (%) France; Total tax rate (% of commercial profits); Vertinskaya, 2011; View France's Bank Lending Rate from Jan 2003 to Aug 2018 in the chart Caïr CEIK).

In Europe, the share of wages in prime cost of 50-60% (Vertinskaya, 2011). On average, this value can be considered equal to 0.55. \( \Sigma C_i=1 \), since the choice of goods, and therefore their number in France is the maximum possible. The initial volume of production is defined as the minimum value of this indicator, normalized to the maximum value.

\[ V_0=V_{1990}/V_{2000}=63.184/2986=0.021, \]

\[ Nt- k_1 V_d(S)(1-k_1)=(-0.577t + 0.816)t-0.55x0.021(1-0.55)= (-0.577t + 0.816)t-0.0001(-0.577t + 0.816)t, \]

\[ F = 0.9(B-G+H-Q+I-N+L+P+S)(1+k_1 V_d(S)(1-k_1)). \]  

After substitution and bringing similar we get

\[ F=(0.075t^2+7.465t+0.504)(-1.207t^2 + 0.487t + 0.836)t+(0.082-0.058)t. \]  

Comparison of settlement and real GDP per capita gives a correlation coefficient indicator without solidary economy in 0.827, and taking into account this way 0.828.

Fig.8 shows the comparison of the calculated and real values of GDP per capita for France.

Both indicators are substantial for all levels of significance exceeding the level of 0.01. Small differences in these indicators are due to the fact that the share of the new economy in the economic mechanism of France is relatively small.

A higher share of the solidary economy can be assumed in Greece. In this country, the traditionally high proportion of small businesses whose owners are united in cooperatives to safeguard their interests (Gusakov, 2015). Therefore, we can assume that the remaining part of the economic volume is filled by the state. Information about this is contained in the source (Weisbrot et al., 2015). The share of the state by years according to this source makes

\[ -1.384t^2 + 1.865t + 0.157. \]  

Then the settlement indicator of GDP per capita will be

\[ -1.384t^2 + 1.865t + 0.157 \]

\[ F= (1+1.384t^2-1.865t-0.843)(B-G+H-Q+I-N+L+P+S)(1+1.384t^2 + 1.865t + 0.157 ) (Nt- k_1 V_d(S)(1-k_1)). \]

As before, \( V_0=V_{2000}/V_{2008}=131.026/343.903=0.381, \( \Sigma C_i=1 \), and \( k_1 \) is equal to 0.55.

The remaining data were obtained from sources (Domestic credit provided by financial sector % of GDP; Foreign direct investment net outflows (% of GDP) Greece; GDP per capita (current LCU); GDP per hour worked; GNI (current US$); Gross domestic savings (current US$); Gross fixed capital formation (current US$); Human Development Data 1990-2017; Inflation; Lending interest rate (%); Total tax rate % of commercial profits; Total tax rate (% of commercial profits)).

The substitution into formula (22) and reduction of similar terms allowed to receive expression (23) for settlement GDP per capita.
The correlation coefficient is 0.759, but if you do not consider the impact of solidarity economy it is 0.721. Both indicators are substantial for all levels of significance exceeding the level of 0.01. The relatively low level of the correlation coefficient can be explained by the imbalance of the Greek economy, as well as the multidirectional of an occurring processes.

6. Discussion
The differences in correlation coefficients obtained for the two countries, France and Greece, are significant. As for each country these coefficients are higher with the attraction of solidarity model, the hypothesis put forward can be considered as proved the first approximation. Relatively small differences in correlation coefficients are probably due to the fact that the publicists writing on the solidarity economy and even some researchers overestimate the influence of this way of life in the modern world. Perhaps, such a structure will continue to progress further, but for assessment of the speed of this progress, there are not enough data. Besides, the functioning of the new structure happens in an environment of the traditional market economy and closely with it is crossed. Therefore, it is difficult to isolate in a pure form the signs of a solidarity economy. The statistics relating to this issue may need to be clarified.

7. Conclusion
On the basis of the carried-out calculations, it is possible to draw a conclusion on the operability of the applied technique of calculations as it yields positive results for the States with various economic ways. In particular, a close agreement of the calculated and real indicators for GDP per capita in the variant of socialism with elements of state capitalism, in the variant of the social democratic model, in the variant of pure socialism and in the variant for two countries with a share of the solidarity economy is obtained.

8. Recommendations
The solidarity model of economy carries in itself the bases for more humane relations in society. Therefore, it needs to be developed in every possible way, at the same time without neglecting a question of efficiency of the economic relations. It is therefore necessary that all stakeholders take into account the possibility of a reasonable combination of elements of different economic models, depending on the national characteristics of the country and its relations with other countries.

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