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D12, E03**MODERN TRANSFORMATION
OF RELATIONS BETWEEN
PRODUCTION AND CONSUMPTION**

ABSTRACT. In this paper we study the antecedents and consequences of modern transformation which happens with relations between production and consumption. A theoretical justification of the thesis about blurring relationship between growth of consumer's opportunities and resource provision's improvement for human capital accumulation is proposed. The reason for this phenomenon is called the predominance of one from two forms of consumption expansion.

Specifically, the predominance of the growth of consumer goods diversity, in comparison with increase of their availability is in our opinion the reason for weakening the positive impact of consumption growth on the accumulation of human capital. An empirical confirmation of this thesis is revealed in the analysis of variance in connection between scale of individual consumption and labor productivity in the group of European countries, as well as the U.S. and Japan.

Keywords: consumption, human development, human capital accumulation, labor productivity.

Introduction

Desire of Humanity to expand the tight restrictions imposed on individual consumption by production possibilities has always been an important driving force of social development. For many centuries, the technical component of social development appeared for people as a process of creation the new ways to meet human needs. The last two hundred years, social component of development seemed as ensuring availability of such ways for more and more people. Increasing diversity of goods, available to members of the society and economic progress were inseparable: the first acted as the main purpose of development, and its most important prerequisite, since the improvement of the living conditions increased endowment of economic activity by the most important resource – educated, healthy, prone to constructive interaction and creative people.

Capitalist economy, using this fundamental human desire to expand consumer choice, provided unprecedented success in the growth of the comfort and safety of life, creating a powerful and reliable mechanisms for associate the owner's personal welfare with productive force of his resource (see, for example, Schumpeter, 2011, North, 2010).

However, countries which have reached the highest standards of general population's well-being, faced a qualitatively new problems of relationship between production and consumption. And tasks of formulating a new hierarchy of development priorities, defining a new role of consumption in the reproduction system of post-industrial global economy are actualized for modern economic science.

The problem of "irrational", "wasteful" consumption is actualized by virtue of tangible successes in the development of productive possibilities and improvement of income distribution's mechanisms: the rationalization of consumption becomes more promising source of pulses for welfare's growth, just in light of the "decreasing marginal utility" of production's and distribution's enhancements. With the growth of the effort needed to make further progress in the spheres of production and distribution, the increasing of negative (and in many ways – irreversible) effects of growth the intensity of material resources' flow (Daly, 1994), more attractive, and in many respects, even uncontested become need of consumption's rationalization.

Therefore, an important and promising direction of modern economic theory's development seems clarifying the functional role of consumption in the reproductive process of the post-industrial economy, defining the role of various public institutions in the formation of "socially necessary consumption's measure" and the allowable deviations from such measure. As well as learning how to reconcile the principles of personal freedom and "consumer sovereignty" with necessity to take into account growing social consequences of individual consumer choice.

The object of this article is the relations of production and consumption in the post-industrial economy.

Subject – the role of personal consumption processes in ensuring of resource and institutional environment for economic growth in condition of priority to reduce its resource requirements.

The purpose of this article is to assess the relative importance of consumption patterns as a factor of economic growth and the formulation of principles for classification of consumption's patterns, depending on conditions, which they create for economic growth.

Analysis of the literature and creation of analytical tools for research

The theoretical basis of this article is formed by the junction of two research areas. The first is connected with the study of the economic conditions for the formation and realization of human potential of society: the theory of human development, foundations of which were laid in the works of Sen and Ul Haq (Sen, 1976 and Ul Haq, 1973).

The second is related to the modeling of market mechanisms balancing investment in human knowledge, skills, health, spatial and occupational mobility with the additional income from growth of employees's qualifying level: human capital theory, in which considered classical works of Becker, Schultz, Mincer (Becker, 1964; Schultz, 1963, Mincer, 1974).

Combining of those directions, known diametrically opposing views on the role of government intervention in the reproduction of human capital, for formation theoretical basis of this research, seems paradoxical. However, we will try to propose approaches for organic synthesis analytical tools from these theoretical directions.

In the theory of human development critically important for us are the two principles. First – empirically confirmed idea that similar levels of national income per capita leave open the possibility of huge variability of quality of life and the conditions for the formation of society's human potential, due to differences in the methods of utilization of available economic opportunities (see, for example, Human Development Report UNDP 2010, 2013).

Second, base for our investigation principle, grounded in the theory of human capital – the importance of social institutions governing access to the benefits and direction of their use (see, for example, the above-mentioned reports and Polanyi, 2002). This principle, in practice, means a statement of the importance of private consumption processes, significance of its structure, quality and priorities. We emphasize on focusing not on the distribution of income, as in the orthodox theory of social well-being (see, for example, Pigou, 1918), but on consumption patterns, on way of using the opportunities offered by production.

Theory of human development focuses on the performance of economic sectors, which provide conditions for the formation and development of the person, we do focus our attention on the choice of the individual himself, because even with equal opportunities, which social sphere gives to people, the results of their activity regularly, non-stochastically will be different, depending on the preferences of consumers and their behavior patterns.

Thus, in one aspect, the article continues, in the context of the theory of human development, the study ways of economic opportunities' using to create optimal conditions for the formation of society's human potential.

In the human capital theory for us is fundamentally important thesis about bilateral connection: "the growth of investment in human capital (i.e. improvement of endowments for the formation and development of knowledge, skills, motivation, etc.) – the growth of labor productivity in the process of using increased stock of human capital". However, according to human capital theory the phenomenon of "excess" or "faulty", in terms of the productive capacity's formation, private consumption is simply impossible. This is due to a completely artificial and conditional division of all the costs, required for the reproduction of the personal factor on "investment in human capital" and the individual consumption. Moreover, if the second are governed by the laws of consumption, the first – by the laws of production. Accordingly, the connection between productivity and the amount of expenses for reproduction of the personal factor is characteristic only of investment and consumption in general excluded from the analysis of resources' provision of productivity growth (see, Schultz, 1971, Becker, 1964; Mincer, 1975).

We see a distinct lack of such theory in this artificial and obviously subjective division. As a source of both costs: and investment, and consumption expenditures there is the unified consumer budget, and the decision is taken by the same consumer. Then is it correct to assume that buying clothes, consumer is guided by "tastes and consumer preferences" but buying education – only by estimate of expected investment profitability? Where should the line be drawn between buying, predefined by expected future revenue growth and by expected increase of satisfaction from nonproductive using? And is it necessary that distinction? Is it true that buying education, we really compare future revenues and current loss, and not just choose most attractive affordable lifestyle for the future?

We believe that if we consider all consumer spending as a prerequisite for the growth of labor productivity, we can to formulate of this article's central issue: to which extent the growth of consumption contributes to accumulation of human capital and increasing of economic efficiency?

Formulation of the initial hypothesis

In our focus will be growth of diversity of the needs and ways to meet them, with the obvious decrease in the positive impact of such growth on economy's endowment by human resource.

We tend to treat this increase was not as constant companion of development, but as a cyclic process having some optimum, above which turns the further growth of a variety of goods into an obstacle rather than a prerequisite for the development of society.

Most abstract argument in favor of such a vision can be, in our opinion, the limited variety of human needs, with almost infinite variety of ways to meet them. All needs can be reduced to a few major groups (eg, food, clothing, housing, education, health, ways of spending free time, etc.) and within each group, there will be a steady increase in the diversity of goods (and their characteristics), proposed to meet those needs. In the context of the Lancaster's works (Lancaster, 1966), this process can be defined as "the complication of consumption's technology" when a growing number of consumer properties affect consumer choice, and one can get each of these properties by means of more diverse set of products.

We are going to substantiate the advisability of the application of known law of decreasing marginal utility not for a separate benefit, but to describe the measure of increasing the human potential of the economy with growth of goods variety, available for consumption.

Theoretical study of the relationship: "the expansion of consumption – growth of economic efficiency" in economically developed countries

The most important aspects of change in the relations between production and consumption appear in two interrelated trends. First – growing variety of products available to the ordinary consumer. The second – the decreasing rate of improvement of conditions for the formation and development of the economy's personal potential, which accompanies such increase in diversity.

Huge amounts of accumulated production capabilities and the need for their constant expansion under the threat of deterioration macroeconomic conditions turn increasing the value of production into necessary condition of its survival. In high level of satisfaction of traditional human needs, increase of product variety becomes the only possible form of implementation of the urgent need to expand production. Therefore, the growth of amounts of production and increased product diversity are inseparable, and the dynamism of these processes is cumulative. Empirical confirmation of this thesis can be found, for example, in (Luk'janenko *et al.*, 2013).

From the described above change in the relations between production and consumption there follows our vision about two fundamentally, qualitatively different stages of social development. The first stage, when the development and growth of social welfare were manifested mainly in the increasing availability of sufficiently stable set of benefits. Second – when the welfare gains associated mainly with an increase in the diversity set of proposed goods, with its relatively stable availability. We associate the second type of growth with modern global consumption model. An important consequence of that consumption type's dominance, we believe is the weakening of the connection "growth of consumer's opportunities – improving the quality of human resource" in the national economy.

Important for separating the types of consumption aspect is connected with the motives of consumer behavior: its focus on the functional effect of consumption means that additional income and consumption possibilities will be turned into the best conditions for the development of human potential. Directionality of consumer on priorities diversity means that a significant part of the additional consumption possibilities will not turn into increasing stocks of human capital.

The growth in revenue does not prejudice the spread of unwanted distribution ratios of consumer budgets in the economy, but only creates the preconditions for the aggravation of this problem. When the budget constraint is close then natural to assume that every or almost any new consumer opportunity is really necessary for the development of personality. We do not consider here the question about rationality of its use, we are only talking about definite need for providing it. Even if consumption within budget, limited significantly is tougher than the average member of society, has obvious signs of irrational, it is clear that further

tightening of restrictions imposed on consumption, cannot be regarded as a source of social welfare growth.

But with receding budget constraints there appears more effective background for situation where providing new opportunities for person, although contributes to growth of subjective satisfaction, but in no way associated with the growth of its ability to participate in the multiplication of social welfare. Increase in the consumers' number from this group and growth of the share of resources that cater to their needs, now creates serious threats to many countries.

This vision is qualitatively different from the principle of decreasing marginal utility of income (it does not provide the key to understanding the mechanism of consumption patterns' influence on the economic growth), and from the principle of decreasing marginal productivity of investment in human capital (it postulates rationality of human behavior and the adequacy of market incentives for meeting need of the economy in investment).

The above, allows us to formulate a number of key provisions that reveal our vision of the interaction of production and consumption in modern conditions.

First, the growth of income and consumption's possibilities, not just creates a prerequisite for consumer's better satisfaction, but substantially increases his freedom of choice with respect to the proportions of their budget allocation, which are critically important to the economy. So critically important criterion is a measure of the use of ever-increasing consumption opportunities for the development of individual potential, including – economic.

Second, despite the conventionality of separation of consumer spending on "investment in human capital" and "current consumption", extension of the diversity of products that satisfy the need in growth of comfort can be considered as an alternative to increase the availability of goods needed for development and human capital accumulation.

The choice between these alternatives, on the one hand, has significant effect on the reproduction of the national economy's potential. Thus, the predominant growth of consumer diversity is accompanied by the worst and wasteful use of economic opportunities for the formation of personal potential of the economy, is pushing to increase its resource consumption. In contrast, consumption growth based primarily on expanding the availability of goods involves the best use of created economic opportunities for the formation and development of human capital.

On the other hand, this choice itself is determined by consumer preferences and priorities, particularity of national institutions, regulating the distribution of consumer's budget between large groups of costs.

Third, for several reasons, which will be subject to a more detailed examination of our future researches, for modern developed countries growing consumption's diversity is observed. This trend cannot be explained only by the growth of income inequality, and is a manifestation of the qualitative changes in the relations of production and consumption, which essentially boils down to the fact that this increase in diversity in modern conditions turns into natural result of interaction of interests by consumers and producers.

Fourth, the growth of consumption's diversity is accompanied by worsening of using economic opportunities for development of human potential of society. For an empirical test of this thesis, we formulate it as follows. The last two decades (as the period of growth diversity of consumption, at the expense of smaller availability of goods that are important for the development of personal potential) in economically developed countries the expansion of consumption less affects on the increase of the personal factor's contribution in the economic performance of the society than was typical for the period 1960s – 1980s.

Empirical testing thesis about decreasing ability of growth diversity of consumption to generate human potential

As an indication of the scale of consumption, we use the relative level of private consumption expenditure (expressed in % from the average for EU-15 level) for a group of European countries, as well as the U.S. and Japan.

The study involves the comparison of the scale of consumption in various countries, so the indicators are expressed in U.S. dollars at purchasing power parity, and not in the national currency, which provides them with an opportunity to correct the comparability and interpretation of results.

For the characteristic of personal factor's contribution in economic growth we are using relative indicators of labor productivity (size of annual GDP per person of population, expressed in % of the average EU-15 level).

Bringing both indices to the relative form (% of the average in the EU-15 level), using of dimension "PPP dollars" and reaching a sufficiently long time period (from 1960 to 2010) allows us to use the database:

- First, to test the hypothesis about a link between fluctuations of factorial and dependent indicators by countries;
- Secondly, to test hypotheses about the connection between dynamics of factorial and dependent indicators in separate countries.

The authors, at this stage of the study, deliberately use limited set of influencing and dependent factors, although we understand weak suitability of formed database for assessing the significance of the impact of consumption expansion on economics growth. Dependent indicator is influenced by many factors not considered in our database (at least – the rate of accumulation of physical capital and the many of institutional factors that determine the extent of using resource potential in different national economic systems). And we have no formal confirmation about dominance of factor we have chosen, among other factors. But more important for us is an entirely new vision of the role of consumer spending among growth factors. If in the works that have become classics (Shell, 1966, Swan, 1956, Anderson and Bowman, 1965, Hanushek and Woessmann, 2010) consumer spending are only considered as limiting the growth by the demand side, or as an indicator of the existing basic to increase investment in human capital, we consider the quality of their structure, functional orientation. It serves as the theoretical foundation for appropriateness of introduction to formal models of the new variable for displaying the influence of structure of consumer spending on economic growth. However, we refer the choice of adequate mathematical model to the subject of future research. Here we try to only confirm that the thesis about the reducing of consumption growth's positive impact on labor productivity does not contradict the available statistics.

But at this stage we do not set goals to get enough reliable quantitative assessment of the impact of consumption patterns on the labor productivity's growth – this will require a far more complex multifactoral model.

Initial data is rendered in Annex A.

Correlation and linear functional analysis (*Tables 1, 2, 3*, based on data in Annex "A") reliably confirms the thesis about the weakening of the link between the differentiation of productivity level in the surveyed countries and differences of consumer's spending level.

Firstly, the correlation coefficients calculated from annual data vectors clearly reduced during the motion along the time axis (see *Table 1*). If the 60s period, the correlation between fluctuations in productivity and consumer spending in the included countries is estimated from 0,954 in 1960 to 0,949 in 1965 (a very close dependence in both cases), then in the 70s, is 0.89 and 0.88 (close dependence). The same close dependence is observed for fluctuations

of the studied parameters and in 80s (0.89 and 0.90), but in the 90s, the tightness of connection drops significantly (unweighted average correlation coefficient for the 90s – 0.77), and in the 2000s is reduced to 0.62.

Values of Durbin-Watson criteria confirmed the hypothesis about nonexistent of significant first order autocorrelation (DW for all correlation coefficients is in the range from 1.5 to 2.5, or just little exceeds the upper limit).

If we consider not only the similarity in deviations of individual values from the average for the relevant years, but the similarity of the dynamics of these indicators too (calculating correlation coefficients between arrays), we obtain a similar pattern (*Table 2*). Thus, for the data sets of 1960-1985 the correlation coefficient between the values of relative productivity and relative size of consumer spending reaches 0.91 (confirms very close connection), for the period of 90s – 0.13 (no formal signs of kinship between deviations of consumer spending and productivity from average in the EU15), and for the period of the 2000s – 0.67 (the signs of link of average strength).

Table 1. The correlation coefficients between the vectors of the relative estimates of the consumption scale and labor productivity

Year	R	Year	R
1960	0,954	1999	0,793
1965	0,949	2000	0,736
1970	0,897	2001	0,717
1975	0,876	2002	0,676
1980	0,890	2003	0,711
1985	0,904	2004	0,707
1990	0,858	2005	0,723
1991	0,090	2006	0,719
1992	0,854	2007	0,648
1993	0,870	2008	0,612
1994	0,874	2009	0,629
1995	0,859	2010	0,620
1996	0,860	2011	0,052
1997	0,846	2012	0,633
1998	0,825		

Source: calculated by the authors according to Annex A.

Likewise, linear functions of the form $Y = a + b * X$, calculated from data vectors for all studied periods (indicator of consumer spending - explanatory variable and indicator of productivity – dependent) showed a clear decrease in elasticity of productivity reaction on the change in consumer spending. And the share of variation of the dependent variable which is explained by factor β decreases too (see *Table 3*). Thus, the coefficients near the explanatory variable steadily reduced from 0.96 for the most remote periods to 0.38 for the 2010 data, i.e. marginal change in the productivity which corresponds to a single increment of scale consumer spending declined more than twice.

Coefficients of determination are also reduced from values close to 0.9 and 0.8 for data of 60s, and 70s (up to 90% of the dependent indicator's variation can be explained by factor's variation), to less than 0.5 for the second half of the 90s and 2000s (changes of factorial variable explain less than half of the variation of dependent).

Table 2. The correlation coefficients between arrays of relative estimates of the consumption's and productivity's scale

	1960-1990	1991-2000	2001-2012
R	0,914	0,135	0,684

Source: calculated by the authors according to Annex A.

Table 3. Characteristics of linear functional relationship between the scale of consumption (factorial variable) and labor productivity (dependent variable)

Year	Value of the coefficient near the factorial variable (displays marginal change of dependent indicator as a growth result of factorial indicator)	The coefficient of determination (% of the dependent indicator's variation, which is explained by the variation of factorial)
1960	0,962	0,911
1970	0,910	0,805
1975	0,906	0,77
1985	0,833	0,817
1990	0,731	0,737
1993	0,671	0,757
1996	0,605	0,740
1999	0,502	0,629
2002	0,410	0,457
2005	0,462	0,523
2008	0,384	0,374
2012	0,431	0,401

Source: calculated by the authors according to Annex A.

The above results of correlation and regression analysis confirm the existence of formal signs of weakening the link between productivity levels and the extent of consumer spending. We have not received formal evaluations of the impact of structural shifts in consumer spending on productivity growth (formation of quantitative indicators to characterize the changes in consumption patterns we see as a promising direction for further research). However, these data suggest the empirical confirmation of the thesis about formation in sphere of household consumption is quite effective factors that have a negative impact on economic growth.

The steady decline in marginal reaction of labor productivity on growth of consumer spending is indicative during the motion along the time axis (from 1960 to 2008). And also a steady decline in the explanatory ability of factorial variable. This constancy, firstly, meets the constant increasing variety of goods offered by buyers of modern production, secondly, indicates the presence of non-random factor that determines the degree of influence of additional consumer spending on productivity gains. We emphasize that neither the propensity of people and communities to invest in education, neither investment activity with physical capital for a retrospective period was characterized by a so stable dynamics (Alehina, 2009). Therefore, we believe quite likely the following thesis, which though, requires further confirmation: reducing the impact of additional consumer spending on productivity growth was due to changes in the direction of consumption rather than the influence of other (non-consumptive) factors.

Then, we can consider it appropriate to find formal ways to display this particular connection between the additional consumer spending and the growth of labor productivity in the modern world. The higher directionality of consumer spending on diversity growth is (this trend is observed during recent decades in developed countries), the lower is the "coefficient of efficiency" with which the additional consumer spendings turn into improve the quality of national economy's human resources. Therefore, among the possibilities to apply the obtained results we focus on one. It is associated with the refinement of the interpretation of regression coefficients near the variable which displays consumer spending. This interpretation for models where consumer spending is used as a factor that acts on the part of the aggregate supply and where linear functions are used for modeling. Then bringing that coefficient (regression coefficients near the variable which displays consumer spending) closer to "1" will indicate a bigger part of the additional consumer spending which improves the quality of human resources of the economy. And approximation that coefficient to the "0" – about the growth of part of the additional consumer spending which hasn't positive impact on the quality of human resources of the national economy. This interpretation is qualitatively different from the interpretation of such coefficients as the propensity to invest in education (by motives of decision) or physical capital (by motives and decision-making mechanisms of the investment).

Conclusion

1. We offer to consider increasing diversity of ways to meet individual needs as a cyclic process having some optimum. The excess of that optimum turns the diversity's of goods increasing into obstacle rather than a prerequisite for the development of society, because of the apparent decrease in the positive impact of such growth on endowment economy by human resource.

2. We believe that the processes of economic growth in recent decades are qualitatively different from similar processes of the second half of the twentieth century, due to the new nature of the relationship between the expansion of consumption possibilities of individuals and increase of their ability to participate in economic activity (growth of labor productivity). Until the early 1990s, the expansion of consumption possibilities implied mainly the improving of availability of goods that are functionally required for the formation of human capital (increase in the share of the population provided such benefits). On the contrary, in recent decades, this expansion has involved mainly increasing diversity of goods available to the general consumer, without significant improvements in the conditions for formation of stocks of human capital.

3. In the empirical test of confirmed thesis about blurring relationship between the expansion of consumption (as an explanatory variable) and productivity of labor (as a dependent), by data for the group of developed European countries, USA and Japan. Indicators of marginal increase of productivity with the growth of consumption and the share of variation of the dependent variable, which is explained by the variation of the factorial, is significantly reduced in the 90s, the 2000s in comparison with the previous three decades.

4. In models where the dependent variable is the growth rate of labor productivity and consumer spending is seen as a factor, acting from the side of aggregate supply and where using linear functions, it is advisable to consider the regression coefficient near this variable as a display of functional directionality of consumer spending, the result of the predominance of the increasing availability, or diversity of goods in process of expansion of consumption.

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