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LABOUR FORCE AVAILABILITY AS AN ECONOMIC DEVELOPMENT FACTOR IN POST SOCIALIST COUNTRIES

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ABSTRACT. The article examines impact of human resources availability in post-socialist economy on its rate of economic growth in conditions of high dependency on the import of intellectual labour products from developed countries. The thesis about meaningful constraints, which active involvement of European post-socialist countries in the international system of labour division impacts on the ability of such countries to overcome the lack of human assets in the medium term, is substantiated. Two legitimate reasons of such restrictions are identified in the article. A regular concentration of economic management functions that require the most highly skilled performers in economically developed countries is called the first cause. The institutional shortcomings of post-socialist countries, where social sphere was not transformed into a source of competitive advantage for national business is called the second cause.

JEL Classification: F2, E66, O11

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Introduction

Unprecedented growth of physical capital reproduction system's capacity and flexibility caused quality changes in the developed countries' productive factors hierarchy (see, for example Stewart, 2007; Edvinsson and Malone, 1997). In particular, skilled labour took the position of factor, which limits production output, long-term growth rate and and acts as a scarce in relation to the other resources. Neoclassical economics suggests that intensification of implementation of scientific-and-technological advance achievements in economic activity promotes the growth of skilled labour relative rareness, even with the continual advancement of the labour force's educational level. Thus, recognition of the human development as a decisive factor for specification the growth ratio of society's welfare, became a theoretical base for economy policies in developed countries. However, priority of creation of prime conditions for human potential development contradicts with short-term financial stabilization problems. Aggravation of social contradictions, long periods of

recession, inherent to developed as well as emerging economies, signifies the result of domination of priorities for short-term financial stabilization above requirements for social development during state economy policy formation process (see for example, Krugman, 2013; Anand and Segal, 2008).

Therefore, studies of the mechanisms which mediates the effect of additional investment in human capital on growth in the short and long term remain relevant even for developed countries.

Definition of personal factor's role in production in developing and post socialism countries is more problematic. In domestic science contradictory between tasks of financial stabilization and accumulation of human capital is practically not considered. Typically, economic growth is associated with an increase of spending on education and health, but problem of resource allocation between the public and market financing, or problem of combining (interchangeability) institutional reforms and additional funding are not considered (see, for example Grishnova, 2001 or Amosha and others, 2006). Therefore, the theoretical framework of economic policy in the post-socialist countries even more urgent need to clarify how the economy's provision of labour resources affects the pace and trajectory of its development, what are the requirements from contemporary processes of globalization to funding of human development.

Consequently, the *subject of the research* is mechanisms of labour resource availability impact on long term economic growth pace in the modern global economic environment in countries with post-socialist transforming economy.

The aim of the research is theoretical justification and empirical testing of the thesis that post transformational stage of economic system development fundamentally changes labour resource availability impact on its economic growth, and increase of skilled labour availability is less significant factor of economic growth than institutional and structural reforms for post-socialist countries with weak institutions.

In order to achieve this goal within this article, it is attempted to work out the following *issues*.

Firstly, interpretation of the "labour force availability" concept is to be adapted to the conditions of modern stage of global economies development (it is to be specified with the impact of informatization and intellectualization of production as well as globalization of economic activity).

Secondly, on the basis of such adaptation, we will establish a time series of indicators that will characterize the dynamics of labor resources availability in selected countries.

Thirdly, we compare the dynamics of the labor endowments indicators with economic growth rates in selected countries.

Fourthly, neoclassical tool of explanation of the connection between labour force availability and economic growth rate is to be supplemented taking into account institutional barriers which block the countries with immature institutions from overcoming the skilled labour shortage.

Literature Review

This work prolongs two vividly developed directions of neoclassical growth model's rationalization.

Firstly, their transformation for showing the impact of growing interconnections between national economic systems, resource mobility, principally – skilled labour resource, which is of crucial importance for economic growth.

Secondly, their adaptation to qualitative changes in the content of labour processes, growing importance of information among the economic resources, and social sphere – among the sectors providing reproduction of society's resource potential.

P. *Krugman's configurations, based on the model of monopolistic competition by Dixit-Stiglitz, are considered to be the most successful example of basic neoclassical growth models transformation with the aim of increasing their ability to define the role of personal factor in global economy. Thesis about closed economy are eliminated by additional assumption of the labour force and other resources productive and price commonality not depending on their national identity* (Kyreev, 2010).

Within the constraints of this model important results were obtained about processes of production, income and consumption concentration which dominate in the world economy in the last decade of XX first decade of XXI century. Production scale effect comes as a key source of growth and the role of human resource narrows to the implementation of this effect. To illustrate this the following example may be given.

As more skilled work force is required for managing global companies then for managing many of smaller firms, then the quality of human resource appears in the ability of national economy to use the production scale effect for productivity gain. Obtaining the scale effect structures cannot develop under the conditions of human resource quality lack but leading positions in the world economic relations hold the countries able to resist the decline in decision-making efficiency from the growth of the company's scale.

We consider it crucial that concentration of income and resource process has cumulative nature: advantages like human resource allows to use the scale effect more comprehensively which means to concentrate the incomes. It allows to ensure wider consumption which again means to obtain the advantage of scale effect by virtue of larger market as well as human resource availability. In contrast to many other neoclassical models, which provide automatically (created by market) limits for concentration of crucially significant resource under the big firms' control. Krugman's model grounds the regularity of constant human resource concentration in the most developed regions, which strengthens the inequality between the countries (Krugman, 1979).

In our study, this theoretical premise is developing in form of hypothesis that the accumulation of human capital in the countries which caught up in the periphery of the world economic system (including – post-socialist countries) becomes a subordinate, derived for similar processes in developed countries.

The second direction of neoclassical growth models adaptation to modern conditions – displaying the growing role of human capital accumulation processes to determine the rate of economic growth.

In this context can be considered the work (Mankiw, Romer, Weil, 1992).

Functional connection between the national product and its factors displayed by these authors using the production function of labor (Lt), capital (Kt), human capital (Ht) of the form:

$$Y(t) = K(t)^{\alpha}H(t)^{\beta}[A(t)L(t)]^{1-\alpha-\beta},$$

Where: A(t) characterizes the level of technology and changes in time with pace g: $A(t)=A_0e^{gt}$; α – the contribution of the capital increase in the change in output; β – the share of human capital in output growth ($0<\alpha<1$, $0<\beta<1$).

For the statistical verification of the model was using data from 75 countries that provide a significant formal evaluation of model's explanatory ability, but eliminated the influence of specific national institutions: they were averaged and displayed only by the model parameters that are common to the three large groups of countries. We are interested

here in the impact of specific national institutions, so we used a statistical basis for a longer-term period and explored the individual indicators for countries, and not the coefficients or the variables, showing the result of averaging qualitatively heterogeneous processes.

To estimate the contribution of human capital to growth of added value these authors used the additional income, gained through the excess of the average salary over the minimum (the latter was treated as income not related to human capital). Interestingly, the ratio of the minimum and average wages, used by mentioned researchers in developed countries (30-50%) is close to the current performance of many post-socialist countries. However, the nature of this ratio is fundamentally different in these groups of countries. While in developed countries exceeded the average salary over the minimum really should be considered as a function of investment in human capital, in such country as Ukraine, namely legislative changes in the minimum wage are the decisive factor of the growth of the average wage, and growth of the population educational level of the had virtually no correlation with the size of the payment work (see, for example Zaycev, Verba, 2010, or Leushina, 2012).

It makes critically evaluate and suitability of widely used Mincer's mathematical apparatus for displaying the influence of human capital on earnings. For example, in work Y. Bilenko analyzes the impact of the integration of some post-Soviet countries in the European Economic Area on the various aspects of their social and economic efficiency. To assess the human capital using the same exponential function, as in the works of Mankiw, Romer, Weil: «We estimated human capital h according to the income method, where the function φ(E) (4) reflects the efficiency of a unit of labour with E years of education h = e φ(E) (4) relative to one with no education (φ(0) = 0).

The derivative φ'(E) is the return to education estimated in a Mincerian wage regression, where an additional year of education raises a worker's efficiency» (Bilenko, 2013).

But if the accumulation of years of education is not a decisive factor of earnings differentiation, then is that correctly to interpret the first derivative of earnings function from years of training as a return on investment in human capital? And according to the work (Lukiyanova, 2007) difference in the number of accumulated years of schooling explains no more than 12% earnings differentiation in Russia. In the work of J. Tomkiewicz provided estimate which shows that difference in educational level explains less than 4% of the total inequality in Russia and Ukraine, less than 2% – in Armenia (Tomkiewicz, 2008).

In addition, for the empirical verification of the model Mankiw, Romer and Weill to assess human capital ability used the rate of population aged 12 to 17 years enrolled in secondary school, and the proportion of students among the working population aged 15-19 years.

For developed countries, these indicators really show the economic choices of young people: to start work or continue their education, investing in human capital accumulation. However, it is common known that until recently in Ukraine and Russia today the decisive factor of the graduating from school young people's choice, there was a desire to avoid conscription into the army, but not the comparison of the expected increase in revenues and costs, associated with continuing education, as suggested Mincer's work (Mincer, 1974).

Thus, the classic method of evaluating stocks of human capital accumulated by the number of years of education (Park, 1992, Johnson, 1965) may have a distorting effect on the data of the post-socialist countries, due to the specifics of their institutional framework. Accumulated including post-socialist countries, experience shows that getting the effect of additional investment in human capital can be locked by unfavorable institutional conditions.

Most vividly this concept within a framework of quantitative approach is implemented in the institutional quality models. In Mehlum works, for example, the quality of institutions, being an external cause, defines the profitable type of activity: the one which aims rent

seeking by artificial production limiting or the second, aimed at production extension by virtue of implementation of scientific and technical advance (Mehlum, Moene, Torvik, 2006).

Therefore, in empirical testing our hypotheses, first, we will avoid the formation of indicators and ratios, which average the influence of institutions in different countries, and secondly, we will to give preference to such indicators, which eliminate the effect of the amount of resources allocated by the society on the accumulation of human capital, respectively, allow to display the effect of institutional quality "ceteris paribus".

Initial hypothesis theoretical justification

Qualitative changes in the nature of connection between skilled labour force availability and economic growth occur in process of globalization and growth of informational richness of production.

Development of automation of production control, along with high globalization power and concentration of production in the decision making and IT sphere where such products are created, for instance, fundamentally changes the main point of the “human resource mobility” concept.

Being objectified in the informational products, economic human potential separates from its carrier and obtains the wide sphere to be applied and, as the source of growth and development momentum can act immediately in many economies.

Before mass extension of automation management decision-making, the unit of skilled labour could provide the contribution into the economic growth process only within domestic economic system. For other economic system, the benefit from that unit was limited by just the access to cheaper products (resources) or more efficient international specialization (comparative advantages).

The situation qualitatively changes with the mass introduction of automation management decision-making Human potential, accumulated in one economic system, by virtue of IT applying extension, automation management decision-making, may give rise to other economic systems through the improvement of management quality and labour processes efficiency growth – as a consequence of IT products usage, which realize skills and knowledge in the form available for wide algorithms application.

On the one hand, it allows counties with poor human resource availability compensate the shortage of skilled labour force. On the other hand, dependence of such countries from foreign source of skilled labour force is stabilized and range of comparative advantages sources for their national production is essentially bounded.

Thus, qualitatively new alternative appears to the countries which are at the post transformational stage.

First alternative is to use accessibility of human potential products, accumulated by other countries, as a foundation for growth. The second alternative is keeping up to standards of effectiveness, which are set by international experience of such products usage, develop their own sphere of intellectual capital implementation and form more sustainable national system of its reproduction.

From there, in our opinion, post transformational economies (primarily – post socialism economies) face additional growth barriers and difficulties exactly due to their great access to intellectual products created in developed economies. Such products substitute own human resources in less developed countries, deprive national system of intellectual capital reproduction from economical factors of development.

Even in case of investments in human capital return at higher rate than investments in physical capital, countries with post-socialist economies are capable for continuing of

physical capital extension at the expense of human, due to drawbacks of the institutes and the market mechanisms of human development financing.

According to the formal Paretian and Walrasian models of resource flow such disproportion may not stay long term: increase of investments in human capital is to saturate the economy and cause the decrease of its marginal effectiveness and as a result – economic viability. The scope of such reduction is given by making up the efforts directed to human and physical capital accumulation.

However, this economic regularity (equalization of income from investment in various productive resources) is a theoretical abstraction, which is implemented only to the extent to which necessary institutional structures are created.

Concentration of economically significant innovation functions and creation of automation decisions for economic management efficiency, to our mind, is an conformation of that fact.

For example, companies, creating software products which regulate and standardize procedures of management functions in many countries, among the most significant companies (Microsoft, Oracle, Cisco Systems, Western Digital etc.). Virtually, escalation of such products means that decision making functions in economic sphere are concentrated in the centres of development software products for management activity automation when millions of its users turn into consumers of such decisions which were developed without their activity. This means that countries which have taken active part in international division of intellectual labour in the position of users, not the creators of crucially important information products, consequently play subordinate role in global distribution of income system.

Various ways of connection between improving the resources skilled force ability and economic growth indicators (primarily – labour efficiency) may be the form of appearance such processes. Countries, where the economic growth relies on extension of high skilled labour availability as on the source of competitive advantages on global markets, should not match the improvement rate of such resource with decrease of its productivity. In this fact, exactly, is the peculiarity of this resource and fundamental difference of the growth mechanisms, based on this resource accumulation and improvement of its usage efficiency and development processes, based on the industrial sector extension and usage but not the intellectual products creation.

Countries where post-industrial and informational sectors are not a growth driver and do not generate the forward momentum for economic growth, labour efficiency is to shorten or the growth pace is to slow down when such labour availability increases.

Post-socialist industrial countries, in such context, are classical example of relatively high dissolution between national skilled labour rate and economic effect of its implementation. Shattering impact of transformational processes determined almost the lowest rates of human capital efficiency in these countries. The margin of human capital in countries like Russia, Ukraine and other post-soviet countries is much higher than in countries with similar net national income per capita rate while net national income per capita rate in other countries with similar human capital rate is much higher than in post-soviet countries (Kapelyushnikov, 2008).

Summarizing mentioned above, for testing our hypothesis we can use following signs of its correctness.

Firstly, labour force availability's growth in the most developed economic systems at the present stage must be accompanied by constant or even increasing efficiency of this resource, which is to be measured in labour productivity or return from investment in human capital.

Secondly, in industrial post-socialist countries, the growth of labour force availability must lead to decrease of this resource efficiency, which is to be measured in labour productivity or human capital accumulation cost return.

Thirdly, in post-socialist countries, the influence's power of human resource availability on economic growth must to be as low, as the high technology sector fast vanishing during the adaptation to participation in international labour division, as more conservative the structure of national production with domination spheres which are characterized by small share of value added.

Database creation and representation of statistics

All the researched countries have been divided into two groups: developed countries with high economic potential of post industrial sector (8 countries) and post-socialist countries with the ambiguous social and economic results of de-industrialization (7 countries).

Historic period for developed countries covers the distance from 1960 till 2010. When creating the database average indexes of the decades were used to levell-off the short-term fluctuations (1961 – 1970, 1971 – 1980, 1981 – 1990, 1991 – 2000 and 2000 – 2010 years).

Historic period for post socialist countries covers the distance from 2000 till 2010. When creating the database average indexes of the two quinquenniums were used to to levell-off the short-term fluctuations: 2001 – 2005, 2006 – 2010.

Integrated index with equal weights showing the influence of two components is used as a characteristic of labour force availability. The first component is an average hours worked by a worker in industrial sphere, the second one is average quantity of accumulated academic years for one representative aged 15 and older.

This index is a descriptor of labour force availability as a result of social and economic rather than demographical processes which, to our mind, corresponds with the point of the development factor at the present stage.

Situation at the appropriate market is represented by the concept of "resource availability", which includes resource of labour: accepting the theses of human resource homogeneity, greater resource availability is considered as a capability to receive more units of labour for its fixed payment rate for the economy or receive fixed quantity of labour for lower prices, which is equivalent.

As can be seen from above, the growth of relative rareness of demanded resource by the economy is to be accompanied by (to the extent of corresponding market flexibility) average working hours growth within a year. On the contrary, the increase of the economy's availability of this resource is to be accompanied by reduction of working hours spent by one worker.

Taking into account that institutional changes (reduction of standard working day or week, limitation of overtime works etc.) reflect challenging situation at the labour market, it may be presumed that average working hours appear to be the precise indicator of the economy's labour force availability – as a representation of this resource's supply and demand balance.

To simplify calculation we chose a direct form of functional connect between the degree of economy's labour force availability and its complex indicator's size, then inversed working hours index number is used for the calculations (1/ AWH).

The second component of complex indicator is to represent quality changes of resource features (higher amount of accumulated academic years, all other factors held equal, represents growth of skilled level of labour force) as well as available human capital burden of demand.

The last is conditioned by the fact that regularly at higher relativity of resource rareness, driving forces to early school leaving and beginning of labour activity increase. On the contrary, when the higher resource availability, driving forces to continuing educational process increase, and, consequently, higher labour availability of the economy is related to higher average amount of academic years which were accumulated by population aged 15 and older.

Index of average working hours is replaced with index of total employment for post-socialist countries due to some reasons. Firstly, higher market flexibility of such countries then in developed ones, higher ratio of shady employment, much higher payment rate vulnerability to macroeconomic environment changes cause higher reliability of total employment index. Secondly, dynamic de-industrialization of Russia and Ukraine is accompanied by employment flow not to more productive spheres of knowledge-intensive non-productive areas but to inefficient middlemen's sphere, which decreases the capability of trends, which were find out by total index number of industrial production, extension.

Moreover, wage share index in GDP is included to post-socialist country's database to represent the particular characteristics of national system's relations over economic implementation of human capital. Growth of that indicator is associated with more positive forms of post-socialist countries' adaptation to economic globalization, accumulation of social environment which are necessary for transformation of high level of skilled population into main source of competitive advantages at global markets. Decrease of this index is considered as a feature of worse social environment for human potential implementation, displacement of high value added spheres from its economy.

The results of database creation for developed countries, which were researches, are shown at the ***A*** enclosure. The results of database creation for post socialism countries, which were researches, are shown at the ***B*** enclosure.

The peculiarity of created database is applying of factor and dependant indicator values which represent characteristics' rate of change but not the modulus or specific values at some period of time (i.e. shown in average group percentage or scope share of variability). As a consequence, models based on this database are of higher value for illustration of factor and dependant indicator's interconnection and are less important for illustration of researched characteristics fluctuations between countries and comparing the strength of relations of two certain countries in the group.

An important feature of developed countries database is application of average data of a long period (10 years) which allows to minimize distort impact of short-term fluctuations and assure more explicit emergence of long-term trends.

Post-socialist countries' data base creation of much shorter historic period appears to be the only possible way to represent the special aspects of institutional structure which formed in post transformational development period of this countries, although narrows the possibilities of comparing the results of two databases.

Labour force availability and economic growth pace functional relations' analysis

As we have mentioned before, factor indicator values were calculated as an average at a specific period of time growth rates. Basically, such values of each decade represents the product of two indexes. The first index is a geometric average of annual growth rate of annual working hours duration in national industrial sector. The second index is geometric average of two quinquennial growth rates of average academic years accumulated by the population aged 15 and older.

The values of dependant indicator also present geometrical average of annual labour efficiency growth rates. It allows to calculate elasticity index as a ratio of dependant index's

change (the growth rate of labor productivity, %) to factor index's change (the growth rate of integrated labour force availability indicator, %). The results for developed countries are shown in the *Table 1*. The results for post socialism countries are shown in the *Table 2*.

Table 1. Labour efficiency growth pace flexibility index under integrated labour force availability indicator change (for developed countries)

Country	61-70	71-80	81-90	91-00	01-10	6110
Belgium	0,892	0,779	0,928	0,967	0,937	0,585
USA	0,860	0,893	1,022	1,013	1,005	0,799
Denmark	0,814	0,842	0,945	1,078	0,916	0,639
France	0,884	0,753	0,772	0,753	0,885	0,342
Germany	0,970	0,826	0,651	0,817	0,817	0,348
Italy	0,853	0,787	0,892	0,886	0,859	0,455
Finland	0,790	0,792	0,984	0,887	0,910	0,496
Great Britaian	0,831	0,879	0,980	0,925	0,927	0,615
Unweighted average in the group of countries	**0,860**	**0,817**	**0,888**	**0,910**	**0,906**	**0,515**

Source: calculated by the authors based on enclosure A data.

For example, flexibility index for Belgium 61 – 70 years was calculated as:

Mid-year labour efficiency change during 1961 – 1970 years (column 2 line 7 of Enclosure A) / Complex indicator of labour force availability change during 1961 – 1970 years (column 2 line 6 of Enclosure A).

For the aim of our research it is important that for the group of developed countries the degree of change of dependant index (average economic growth pace for decade) in respond with factor index changes (labour force availability complex index) growths from the first three decades of historic period (since 1960 till 1990) till two last decades (1990-2010). This may be interpreted as statistical prove of our hypothesis in relation to the first form of its performance (no recede efficiency trend in the measure of skilled labour availability of the economy).

Table 2. Labour efficiency growth pace flexibility index under integrated labour force availability indicator change (for post socialism countries)

Country	2005/2000	2010/2005
Russia	0,971	0,990
Poland	1,046	0,907
Hungary	0,984	1,018
Slovak republic	0,985	0,996
Romania	1,190	1,000
Czech republic	0,959	1,031
Ukraine	0,947	1,014
Unweighted average in the group of countries	**1,009**	**0,993**

Source: calculated by the authors based on enclosure B data.

In this case, total unweighted runup of response flexibility of labour productive growth pace to increase of labour force availability equaled 2.5% (0.91/0.89×100) in the 1990-2000

decade in comparison with 1980-1990 for developed countries. In the period of 2000-2010 flexibility of change of dependant index while the factor index increases, remained almost unchangeable in comparison with 1990-2000 and exceeds the average value of flexibility of three preceding decades of historic period almost for 4% (0.906/0.872×100).

For the group of post socialism countries, second quinquennium of historic period is defined by the decrease of flexibility of labour efficiency growth pace respond to increase of labour force availability level of the economy. Thus, if during the period of 2000-2005 there was 1,009 change of dependant index for growth unit of factor index, then during 2006-2010 there was only 0,99 (total flexibility index decrease almost 2% in post-socialist countries.)

In this case one more feature of the dynamics of the studied parameters appears. Direct relations between decrease of such flexibility indexes and decrease of wage share in the country's GDP appear. Thus, correlation rate between vector quantity of flexibility indexes growth and wage share in GDP growth pace accounts for 0,51 for the first quinquennium and 0,45 – for the second.

It is also significantly that almost all countries which have lower than average flexibility index runup in the second quinquennium comparing with the first, are defined with lower wage share in GDP than unweighted average in the group of countries.

Consequently statistical prove of the second form of initial hypothesis's performance has been obtained: decrease of human resource availability impact on labour efficiency growth pace in the economy appears more in countries with worse conditions for human capital implementation, according to the principles of statistical data representation offered – in the countries with lower wage share in GDP.

Model building of relation between increase of human resource availability pace and increase labour efficiency with the help of affine function $LP = b + a \times LE$ (for processing of factor and explaining variable matrix first least square method has been applied) allowed to obtain the following function specification for the group of developed countries (*Table 3*).

Applying similar process for the data for post socialism countries has given the following results (*Table 4*).

Comparison of obtained function parameters provides suitable for interpretation results.

First, for developed countries inherent higher "autonomous", i.e. independent from the improvement of human resources ability growth rate of labor productivity (for the group of developed countries, 0.95, and post-socialist – 0.91). Secondly, the marginal and average returns to improve labour resource ability are higher in the group of post-socialist countries (coefficient near variable is 0.116 for the group post-socialist countries and 0.064 – for the group of developed countries).

Table 3. Results of model building of human resource availability impact on labour efficiency for the group of developed countries

Function parameters	Coefficient at the variable (a)	Intercept (independent on human resource availability pace of labour efficiency growth), (b)
Specification	0,064087306	0,952854705
Constant error	0,006748213	0,009760936
Determination coefficient	0.6675	
F criteria	90.19 (significant at degrees of freedom given)	

Source: calculated by the authors based on enclosure A data.

Table 4. Results of model building of human resource availability impact on labour efficiency for the group of post socialism countries

Function parameters	Coefficient at the variable (a)	Intercept (independent on human resource availability pace of labour efficiency growth), (b)
Specification	0,116200939	0,91026632
Constant error	0,054120492	0,05591522
Determination coefficient	0,28	
F criteria	4,6 (not significant at degrees of freedom given)	

Source: calculated by the authors based on enclosure B data.

At the same time, in the group of developed countries explanatory ability of factor variable's dynamic decreases approaching last decades of historic period. Comparison of mean-square deviation of vector quantity of factor and dependant variables confirm this.

At the last three decades of historic period the reduction of mean-square deviation of factor variable's vector (from 15,5% of average vector's quantity for the decade 80-90 to 10,8% of that average for decade 1990-2000 and 5,2% for decade 2000-2010) is observed. As well as growth of dependant variable's deviation (0,43% for the decade 80-90, 0,67% – for decade 1990-2000 and 1,02% for decade 2000-2010). Among other things, when putting factor variable value in the function of the last three decades of historic period, variables increase too, in comparison with the results of putting the human resource availability data of the first three decades of historic period.

An additional, when we change the structure of database (including data only of two last decades of historic period) determination coefficient of the obtained function growth more than halves. Thus, if factor variable oscillation in the database of the total historic period accounts for more than 65% of dependant one, than when narrowing the database only by two last decades, this index shortens to less than 25%.

The reasons of its appearance in created database are related to the fact that indexes of human resource availability, which have been taken, do not take into consideration the quality of education (accumulated academic years are considered as an explaining variable in the same way, regardless educational programs).Thus, the growth of education quality significance, not taken into consideration in the model offered, decreases its explaining capability for the last decades of historic period.

As far as post socialism countries are concerned, much shorter historic period caused absence of considerable fluctuation of factor variable's capability to explain the changes of dependant one.

Conclusion

As can be seen from above, statistical proves of two forms of initial hypothesis performance were obtained. Firstly, labour efficiency runup per unit of skilled labour resource availability of the economy in the group of researched developed countries do not represent the trends of decrease in long term period.

Flexibility indexes calculated for five decades prove this as well as quite high explaining capability of linear function which supposes constant marginal change of efficiency when the skilled labour resource availability increases.

In this connection, the decrease of explaining capability of factor variable taken in the last years of the historic period is connected with the growth of significance of intellectual component of human capital in evaluation of labour availability and educational quality levels as a factor of production dynamic.

Consequently, the index of labour availability taken does not represent the changes in resource availability of professional qualifications and educational quality which significance for evaluation the pace of production growths in the last decades.

Lower flexibility of production growth pace at the change of the labour force availability for the group of post socialism countries circumstantially proves the second form the original hypothesis performance: countries taking part in the global labour division as users not creators of intellectual products face additional barriers in transforming better skilled labour availability in increase of economic growth pace.

Finally, such barriers appears as more intensively as less conductive conditions for the implementation of human potential in the economic sphere evolve in national economy. Direct links of flexibility coefficient decrease pace in terms of "productivity-labour availability" truss and decrease of wage share in GDP significance confirm this. Countries with post socialism economy, which have lower wage share in GDP are marked by high paces of productive flexibility coefficients decline at the change of labour availability.

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Enclosure A

Characteristic database of labour availability and economic growth pace of some developed countries

	index	1961-1970	1971-1980	1981-1990	1991-2000	2001-2010	1961-2010
A	1	2	3	4	5	6	7
Belgium	Average quantity of accumulated academic years change of the population aged 15 and older	1,08	1,14	1,11	1,06	1,04	1,53
	Mid-year growth pace of annual working hours of the industrial sector worker	0,92	0,86	1,01	1,01	0,97	0,80
	The opposite index of mid-average annual working hours	1,08	1,16	0,99	0,99	1,03	1,25
	Complex indicator of labour force availability change	1,17	1,32	1,10	1,05	1,07	1,92
	Mid-year labour efficiency change	1,04	1,03	1,02	1,02	1,01	1,12
USA	Average quantity of accumulated academic years change of the population aged 15 and older	1,18	1,11	1,02	1,04	1,03	1,43
	Mid-year growth pace of annual working hours of the industrial sector worker	0,99	0,99	1,03	1,02	1,00	1,02
	The opposite index of mid-average annual working hours	1,01	1,01	0,97	0,98	1,00	0,98
	Complex indicator of labour force availability change	1,19	1,13	0,99	1,02	1,03	1,40
	Mid-year labour efficiency change	1,02	1,01	1,01	1,04	1,04	1,12
Denmark	Average quantity of accumulated academic years change of the population aged 15 and older	1,12	1,08	1,01	1,03	1,03	1,30
	Mid-year growth pace of annual working hours of the industrial sector worker	0,88	0,89	0,94	1,09	0,94	0,76
	The opposite index of mid-average annual working hours	1,13	1,12	1,06	0,92	1,07	1,32
	Complex indicator of labour force availability change	1,27	1,21	1,08	0,95	1,10	1,73
	Mid-year labour efficiency change	1,04	1,02	1,02	1,02	1,01	1,10
France	Average quantity of accumulated academic years change of the population aged 15 and older	1,13	1,25	1,25	1,28	1,10	2,51
	Mid-year growth pace of annual working hours of the industrial sector worker	0,95	0,91	0,95	0,95	0,97	0,76
	The opposite index of mid-average annual working hours	1,05	1,09	1,06	1,05	1,03	1,32
	Complex indicator of labour force availability change	1,19	1,37	1,32	1,35	1,14	3,32
	Mid-year labour efficiency change	1,05	1,03	1,02	1,02	1,01	1,14
Germany	Average quantity of accumulated academic years change of the population aged 15 and older	0,98	1,12	1,43	1,24	1,19	2,31
	Mid-year growth pace of annual working hours of the industrial sector worker	0,91	0,90	0,92	0,98	0,96	0,72
	The opposite index of mid-average annual working hours	1,10	1,11	1,08	1,02	1,04	1,39
	Complex indicator of labour force availability change	1,07	1,24	1,56	1,26	1,23	3,21
	Mid-year labour efficiency change	1,04	1,03	1,01	1,03	1,01	1,12
Italy	Average quantity of accumulated academic years change of the population aged 15 and older	1,16	1,20	1,15	1,14	1,08	1,95
	Mid-year growth pace of annual working hours of the industrial sector worker	0,93	0,91	1,00	0,99	0,93	0,79
	The opposite index of mid-average annual working hours	1,07	1,09	1,00	1,01	1,08	1,27
	Complex indicator of labour force availability change	1,24	1,31	1,14	1,15	1,16	2,48
	Mid-year labour efficiency change	1,06	1,03	1,02	1,02	1,00	1,13

A	1	2	3	4	5	6	7
Finland	Average quantity of accumulated academic years change of the population aged 15 and older	1,21	1,21	0,99	1,15	1,06	1,76
	Mid-year growth pace of annual working hours of the industrial sector worker	0,92	0,92	0,95	0,99	0,95	0,76
	The opposite index of mid-average annual working hours	1,09	1,09	1,05	1,01	1,05	1,32
	Complex indicator of labour force availability change	1,32	1,31	1,04	1,16	1,11	2,33
	Mid-year labour efficiency change	1,04	1,04	1,03	1,03	1,01	1,15
Great Britain	Average quantity of accumulated academic years change of the population aged 15 and older	1,16	1,06	1,05	1,07	1,08	1,50
	Mid-year growth pace of annual working hours of the industrial sector worker	0,94	0,92	1,01	0,97	0,99	0,84
	The opposite index of mid-average annual working hours	1,07	1,09	0,99	1,03	1,01	1,19
	Complex indicator of labour force availability change	1,23	1,16	1,04	1,11	1,09	1,79
	Mid-year labour efficiency change	1,03	1,02	1,02	1,02	1,01	1,10

Source: calculated by the authors based on the following data: Statistical annex of European economy, spring 2013, Barro R. & J.W. Lee, Educational Attainment for Total Population, 1950-2010, International Comparisons of Manufacturing Productivity and Unit Labour Cost Trends, 2011 Division of International Labour Comparisons (ILC).

Enclosure B

Characteristic database of labour availability and economic growth pace of some post socialism countries

country	index	2005/2000	2010/2005
Russia	Labour force availability complex index (growth pace for a period)	1,07	1,04
	Labour efficiency growth pace	1,04	1,03
	Wage share in total factor incomes (growth pace for a period)	1,09	1,11
Poland	Labour force availability complex index (growth pace for a period)	1,00	1,15
	Labour efficiency growth pace	1,04	1,05
	Wage share in total factor incomes (growth pace for a period)	0,89	0,97
Hungary	Labour force availability complex index (growth pace for a period)	1,05	0,98
	Labour efficiency growth pace	1,04	1,00
	Wage share in total factor incomes (growth pace for a period)	1,04	1,03
Slovak republic	Labour force availability complex index (growth pace for a period)	1,06	1,05
	Labour efficiency growth pace	1,05	1,05
	Wage share in total factor incomes (growth pace for a period)	0,92	1,04
Romania	Labour force availability complex index (growth pace for a period)	0,86	1,03
	Labour efficiency growth pace	1,02	1,03
	Wage share in total factor incomes (growth pace for a period)	0,95	1,02
Czech republic	Labour force availability complex index (growth pace for a period)	1,08	0,99
	Labour efficiency growth pace	1,04	1,02
	Wage share in total factor incomes (growth pace for a period)	0,93	1,03
Ukraine	Labour force availability complex index (growth pace for a period)	1,07	1,00
	Labour efficiency growth pace	1,01	1,02
	Wage share in total factor incomes (growth pace for a period)	1,16	1,01

Source: calculated by the authors based on the following data: Statistical annex of European economy, spring 2013, and Україна у цифрах у 2011 році. Статистичний збірник/ За ред. Осауленка О. Г.