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Human capital dynamics: essence and determinants

Key words: capital, human capital, economic growth, fixed wages, household

S u m m a r y: The origin of the studies on human capital as one of the most important economic resources is presented in the first part of the paper. Then, the concept of human capital is discussed which explores the general model of capital by Mieczysław Dobija. In the light of this concept, human capital is the capital embodied in human resources. The rules for measuring have been also given which allow isolation of the structure of human capital. The principles of payment for work of human capital are given in the following part of the paper. These principles result from the nature of capital. The most significant impact to which human capital is exposed are the forces that fragment its value. Maintaining this value requires the appropriate compensating stream. Otherwise, the value of human capital will be degraded, which leads to a number of negative micro- and macroeconomic consequences. It has also been proven that the proper institutional solutions and attitudes of people may help human capital increase with benefits for the entire population. The process of increasing of human capital is happening in the family (household). The last part of the paper provides analysis of the factors which have positive or negative effect on the value of human capital. The entire discussion has been properly summarised.

1. Introduction

One of the objectives of basic studies in the field of economics and management is learning the economic aspects of human life. Formulating unanimous and coherent theories on the basis of research results constitutes the basis for further conclusions, recommendations and, finally, practical solutions. Problems of special importance are connected with issues directly related to people and living. However, one has to remember that the nature of these issues is very broad. In case of economic and re-

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lated sciences, the subject matter of the studies conducted in this area should be narrowed down to the issues of human capital. The most important issues in this respect include defining the “human capital” term and creating a model for its measuring. Detailing the model for measuring human capital enables the analysis of interactions which result in changes in its value. Isolation of the factors which affect dynamics of human capital constitutes the basis for human capital management in individual and macroeconomic approaches. The value of human capital directly translates to the condition of the economy, as it is the key resource in the micro- and macroeconomic approaches. The objective of this paper is to present the natural impacts on the value of human capital and the possibility of developing its value with the appropriate institutions and human attitudes. Achieving permanent economic balance requires implementation of mechanisms which allow maintaining or increasing the value of human capital. The unique nature of human capital is related to the special method of managing it. Human capital cannot be as freely transferred as it is in case of the capital embodied in material resources. Handing over human capital to successors is a long process which basically is happening within households. In the model approach, human being as the owner of human capital prepares his/ her successors to provide work and live in community. The length of this process and its major social significance require ensuring the mechanisms to facilitate its proper course.

2. Essence and measuring human capital

The basic subject matter of the economics studies are the rules which govern the allocation and multiplication of the national wealth. It means that any concept that brings important contribution to the description of these economic issues deserves attention and further growth. The model of measuring human capital presented in this chapter is no doubt one of these concepts. Human capital is defined as the capacity of human being to perform work. This model, in particular, presents the way human capital originates, the cost estimate of its elements, and the rules of its paying. Moreover, this model explains the material situation of the employee as the owner of human capital and a member of the household, and then coherently transfers these considerations to the macroeconomic ground. Thus allows capturing the relationships between the origin of the value in the economy and its allocation. It may be stated that the human capital model takes into account the principle of correspondence of wages with the value of the provided work.

In the last fifty years, human capital has become one of more important subjects of research in both economics and management. This interest resulted in developing numerous concepts of human capital which mostly come down to defining human capital as a set of features of a person or of a community which lead to specific economic consequences at the micro- or macroeconomic levels. This approach is correct, although it needs additional taking into account of the fundamental rights of capital

(5, pp. 160–174). Otherwise, unanimous and faithful measuring of human capital in monetary units is not possible.

One of the forerunners of the studies on human capital was Theodore Shultz who perceived human capital as a factor of economic development of the state. He defined it as a set of elements which determine the quality of the community. The quality of the community is increased by education, access to information, acquiring professional and life experience, as well as proper upbringing and health care. Human capital manifests in the acquired and inborn capacities and skills. Shultz assumed that spreading genes responsible for inborn skills is similar in all societies, thus the differences in the quality of the society between countries result from the differences in acquired skills (1, pp. 21–22).

Studies on the issues of human capital were preceded with the achievements of Garry Becker who analysed this problem from the point of view of the individual person. He believed that investments in education lead to increasing the amount of the future wages. Their guarantor is the competitive labour market which forces employers to properly pay the higher productivity of more educated employees (2, pp. 69–71). It is not a new view, as Adam Smith in “The Wealth of Nations” mentioned importance of knowledge and skills in employees who produce high quality goods. He remarked that wages should take into consideration not only the current effort and time dedicated on execution of work, but should also promote expenditures incurred on acquiring the skills which allow the employee to execute the tasks appropriate for his/ her place of work.

The truth in the statement that the market guarantees additional income on account of investments in human capital cannot be denied, however, two more aspects should be taken into account. The first is the noticed imperfection of the labour market and higher susceptibility to manipulations and erroneous economic assumptions in comparison with the market of goods. The other refers to the issue of specification of the regular income from the investment. The question should be answered what amount of additional income is to be expected as a consequence of the investments made in human capital. It is the key issue from the point of view of long-term social development and economic growth of the country. As it was noticed, as long as in the 1970s, T. Shultz observed that the level of development of the country and its further dynamics depend on human capital of its residents. It would be difficult not to agree that knowledge, experience and proper physical condition constitute the key factor of productivity of the given country. The value of human capital depends on its current resources and possibilities of further reproduction and development. Thus, it is necessary to create in the country such conditions which would allow the proper development of the stated designata of human capital. One of the conditions necessary to maintain the level and dynamics of human capital is ensuring the proper rate of return on human capital, that is fair wages.

The model of measuring human capital presented in this chapter was developed on the basis of the general model of capital by Mieczysław Dobija. It is important

that this concept ensures a broad view on the term of “capital”. One of the features which make it stand apart among most of approaches to the issue of capital is the fact that it is not limited to perceiving capital as common value. This concept takes also into account natural interactions which are the source of changes in the value of capital. In the light of this concept, the comprehensive analysis of the essence of capital requires the factor of time to be taken into account. The dynamic model of capital is represented by the formula (3):

$$C_t = C_0 e^{(-s+m)t},$$

where: C_t —the value of capital at the time t , C_0 —initial capital, s —natural capital loss index, p —economic constant, t —time passage variable, m —variable defining effect of work and management.

Capital is subject to three key effects of the environment: natural spread as a result of risk (s), increase as a result of work and good management (m) and 8% economic constant (p). With these effects, the initial value of the capital (C_0) may increase or spread. The scope of these effects is determined by the factor of time, because the formula of the capital requires application of the discount account.

One of the fundamental assumptions of the model of capital is the statement that capital is not generated out of nothing, that is it has its origin which allows its valuation in monetary units. This applies also to human capital which, according to the quoted author of the model, has its source in capitalised expenditures necessary for generation of economic potential to perform work which a person may have at disposal. These will mostly be the costs of professional vocational education, increased by the costs of living. Incurring the costs of living is absolutely necessary for physical preparation of the human capital medium which is the body. The properly developed human body is the necessary condition for emerging and development of inborn skills, capacities and possibilities during education and work. The expenditures are incurred at the time (t) necessary for preparation of the person for performing the given profession, that is from birth until readiness to undertake professional work. Although these expenditures are usually financed by the family and the society, the owner of the produced human capital is the person for the benefit of whom these expenditures were incurred. It is interesting that if the body is properly developed, and the young person has completed the pre-planned educational path, it means that the costs of risk (s) have been overcome by, among others, the efforts of the parents. These efforts are represented in the above formula by the parameter (m). Thus, introducing the category of ownership, that is assigning the capital to a specific person, we obtain the formula of the capital which belongs to the employee (H_t), which will depend on the initial expenditures (H_0), the economic constant (p) and the capitalisation time (t) (4):

$$H_t = H_0 e^{pt}.$$

It follows from the assumptions of the model that human capital is generated as a result of the expenditures incurred for the appropriate preparation of the person for work. Exploring the model of human capital allows presentation of this concept as the sum of the amounts representing capitalised expenditures for life costs (K) and education (E). These expenditures are the source of the capacity for performing specific work, and they are perfected along with length of service. This increase in skills and effectiveness in the place of work is represented by the experience factor $Q(T)$. One has to remember that the costs are incurred on the continuous basis, and that is why the expression H_0 representing their value has the nature of a stream of costs and not a one-time expenditure, as often is the case with material and financial investments. This rule is reflected in supplementary formulae which represent the process of establishing human capital from the costs of living K and from the education E . With the above taken into account, human capital defined as the source of financing human resources may be represented as the sum of three components:

$$H(T) = (K + E) \cdot (1 + Q(T)).$$

With the annual capitalisation of expenditures, particular components of human capital may be represented with the following formulae:

$$K = k \cdot 12 \frac{(1+p)^t - 1}{p} \quad \text{or} \quad K = k \cdot 12 \frac{e^{pt} - 1}{p}$$

$$E = e \cdot 12 \frac{(1+p)^t - 1}{p} \quad \text{or} \quad E = e \cdot 12 \frac{e^{pt} - 1}{p},$$

where: $H(T)$ —the value of human capital, K —the capitalised costs of living, E —the capitalised costs of education, $Q(T)$ —the experience factor, k —the monthly costs of living, e —the monthly costs of education, T —years of vocational work.

Acquiring experience in the process of work is happening in a similar way. Thus one can assume that the employee performing the same work will perform it in the next year easier and cheaper by (w) percent. Vocational experience understood in this way causes increase in the capacity to perform work, thus estimation of value of vocational experience and then including it with the structure of human capital is justified. The experience factor ($Q(T)$) is expressed with the function of years (4):

$$Q(T) = 1 - T \frac{\ln(1-w)}{\ln 2},$$

where: w —the learning index, T —years of vocational work, $T > 1$.

Transformations allow representation of human capital as the sum of the three components:

$$H(T) = K + E + D(T)$$

$$D(T) = (K + E) \cdot Q(T),$$

where: $D(T)$ —the value of the capital from experience.

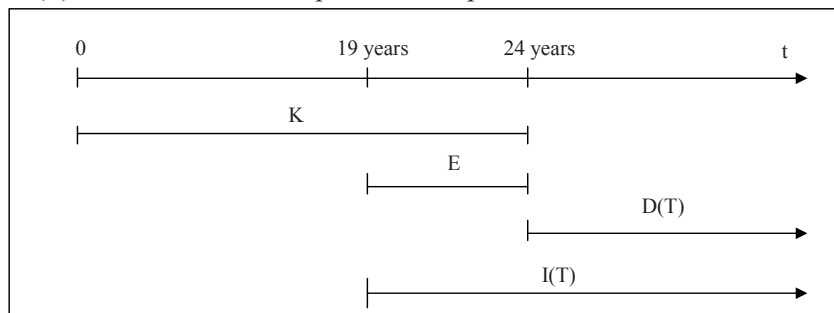


Figure 1. Model of increase in human capital

Source: author's own study.

The process of establishing human capital is presented in the graphic form in Figure 1. Breaking down the elements of human capital from the point of view of the period in its development is an alternative solution for presented classification of components of human capital. Initially, the increase in human capital is related to development of the human body which is accompanied by acquiring the basic scope of education. In developed countries, education is a commonly available and free good, thus at this stage the increase in human capital occurs as a result of capitalisation of the incurred costs of living. The resulting capital from the costs of living (K) constitutes the common and generally available component of human capital. Its value is equal to the capitalised costs of living incurred within 17–18 years. Then, the owner of human capital (K) makes a decision about initiation of gainful employment or undertaking further, professional education. Continuation of education causes further increase in human capital as a result of incurring costs of education and costs of living capitalised during education. In this case, the costs of living have a different economic meaning than they had in the initial stage of the increase in human capital. Moreover, during education, the value of human capital increases by the fair percent (p) on the capital resulting in the initial period (K). It is the equivalent of the value of time dedicated to education instead of gainful employment. In other words, it is the cost of resignation from undertaking gainful employment (the alternative cost) which increases the value of human capital. What results is the capital from education (E) calculated as the difference between the value of human capital ($H(T_0)$) and the costs of living (K). The third and last stage in the increase of the value of human capital is

the period of vocational activity characterised with the increase in the capital from experience ($D(T)$).

The presented model of measuring human capital allows for determination of the category of intellectual capital $I(T)$ as a derivative category. Its introduction requires presentation of the selected relationships between particular components of human capital:

$$\begin{aligned} D(T) &= H(T) - H = H \cdot Q(T) = (K + E) \cdot Q(T) \\ H &= H(0) = K + E \\ H(T) &= (K+E) \cdot (1+Q(T)) \\ I(T) &= H(T) - K = \dots = E \cdot [1 + Q(T)] + KQ \cdot (T) = E + H \cdot Q(T) = E + D(T). \end{aligned}$$

The value of the intellectual capital consists of the capitalised costs of professional education and the value of the gained vocational experience $D(T)$. All in all, the relationships between human capital $H(T)$, intellectual capital $I(T)$, and capital from vocational experience $D(T)$ are represented in the following formulae:

$$\begin{aligned} D(T) &= H \cdot Q(T) \\ I(T) &= E + D(T). \end{aligned}$$

The presented relationships between particular components of human capital enable the following additive model of human capital:

$$H(T) = H + D(T) = K + I(T) = K + E + D(T).$$

Figure 2 presents a sample course of the developing human capital of a person with higher education (equivalent to MA or MSc). The annual costs of living were estimated at the level of 7500 PLN, which will be capitalised for 24 years. Moreover, the annual costs of education were defined at the level of 4000 PLN, with the period of capitalisation at 5 years. This person, after completion of the studies at the age of 24, undertakes vocational work. During his/ her work, vocational experience is gained which translates into human capital from experience.



Figure 2. Increase in human capital of a person with higher education (equivalent of MA or MSc)

In some cases there are skills and qualifications which exceed beyond the capacity of the currently presented model of human capital, and the capital of creativity (C_r) is their source. The model of human capital including the component of the capital of creativity is presented in the following formula:

$$H(T) = K + E + D(T) + C_r.$$

The capital of creativity appears in the effective market which reports and appreciates increased productivity. In practice, the owner of this capital will receive remuneration in excess of the fair level of payment for his/ her formal qualifications, that is resulting from the education and vocational experience. More on this issue, see (5, pp. 94–96).

3. Principles of payment for human capital

The principles of remuneration of human capital are determined with the nature of the capital. Human capital is nothing more than capital embodied in human resources. Thus, the wages model must respect interaction of the environment with the changes in the value of capital and its natural capacity to increase. The fragmenting forces of risk affect the objects characterised with concentration of capital, that is the objects with economic value. This effect is random and in practice manifests with random losses. In case of material resources, the example of interaction of fragmenting forces is their continuous worsening as a result of time passage (e.g. rust appearing on metal surfaces). Keeping the capital substance requires continuous inflow of value, which will allow compensation of the effect of destructive forces of risk. The value of the capital will thus be maintained, on the condition that the assets in which capital is embodied will generate a stream of effects which will bring about the equivalent rate of return. Rate of return should not be lower than the index of capitalisation, otherwise the value of the capital will drop below the value of its historical acquisition (4). These principles refer also to human capital. The inevitable fragmentation of capital requires the appropriate action to enable compensation of the spread of the capital. The mechanisms of fragmentation of human capital and the possibilities of compensation of the spread of human capital are presented in the following part of the paper.

Human capital of an employee is reduced over time, and, additionally, giving it up for the employer's disposal causes its reduction as a result of the effort related to performing work. The compensation of this reduction requires remuneration determined by the size of the economic constant for prospective increase. Empirical studies show that this constant is at the level of about 8% per year. The capacity of the capital to generate value may be presented with the equation for the internal rate of return (IRR). The application of this equation for human capital as the source of annual wages may be presented as follows (6, p. 163):

$$H(T) \cdot (1+r) = W + H(T+1),$$

where: r —the internal rate of return, W —annual wages.

The left side of the equation indicates in the standardised way that human capital of the employee ($H(T)$) should increase within the year by the factor $(1+r)$. The right side indicates real values. In the given year, the employee will receive the wages (W) and his/ her human capital will increase as a result of the gained vocational experience to the amount of $H(T+1)$. On the basis of the above equation, the formula for wages (W) may be established:

$$W = H(T) \cdot r - H(0) \cdot [Q(T+1) - Q(T)]$$

that is $W = H(T) \cdot r - \Delta D(T)$.

This equation shows that the wages really constitute a percentage of human capital, but there is also a reducing factor because an employee gains professional experience from the performed work. According to the model, professional experience has a strictly specified value the increase of which will allow future financial promotions. Research on wages shows that increase in professional experience has major effect on the level of wages for persons who just start their professional career, yet it loses importance with passing time (see Figure 2). Therefore, in further analysis of development of human capital of the employee, the wages which are the manifestation of the model of wages based on the concept of human capital is of key importance for maintaining his/ her value. The following formula represents it:

$$W = H(T) \cdot r.$$

Further, it may be proved that fixed wages are specified with the payment index (r) equal to the 8% economic constant (p). For this purpose, the current value of the stream of wages is calculated:

$$PV = \frac{W}{d} = \frac{r \cdot H(T)}{d},$$

where: d —the relevant discount rate.

The question arises, what discount rate should be used to calculate the current value PV ? The discussions of capital show that the natural level of human capital loss is determined with the rate (s) in the general model of capital, thus:

$$PV = \frac{r \cdot H(T)}{d} = \frac{r \cdot H(T)}{s}.$$

Due to the relation $p = E(s)$, the current value (PV) may be calculated:

$$PV = \frac{r \cdot H(T)}{p}.$$

It follows from the above formula that $PV = H(T)$ if the rate of payment of human capital (r) is equal to the economic constant (p). Thus, the basic wages $L = p \cdot H(T)$ ensure that the current value of the stream of wages is equal to the initial value of human capital of the employee. It means that human capital with these wages has not been depreciated, that is its value was maintained.

The wages causing payment of human capital at the level of the economic constant enable maintaining of the value of human capital of the employed. If the level of payment of the capital drops below the 8% of economical constant, the value of human capital of the employed will decrease. It is noticeable for the employee and causes the feeling of harm and lack of justice which, enhancing, cause pressure and social dissatisfaction. In this way, the situation is coming closer to protests and strikes.

This regularity was confirmed during scientific research conducted in a 702-person group of employees. The research consisted in calculation of the value of human capital of each of the employees and then comparing it with the received one-year wages. The average value of the rate of return on human capital in the analysed group calculated in this way was 8.13% with the standard deviation equal to 1.91%, whereas the relative assessment error was at the level of 1.7%. The obtained empirical data will allow determination of the confidence interval for the estimated average value of the rate of return on human capital $[7.99\%; 8.27\%] = 0.95$. The value of 8% is within this interval, thus one may assume that the average rate of return on human capital is 8%. The above conclusion is completely justified due to the low relative error of the assessment (7).

The above analyses allow definition of the term of fair wages as the amount equivalent to the costs of risk, thus ensuring maintenance of the value of human capital. The adopted point of view may deviate from the definitions presented in the literature of economy and in the field of human resources management. The view is prevalent in these sciences which gives the market wages the original nature. It is often assumed indiscriminately that the market ensures balance by shaping the appropriate market wages.

4. Essence of human capital management

The unique nature of human capital requires the proper method of its management. This uniqueness results mostly from the non-disposable nature of human capital. This capital is individual or assigned to a specific person, the owner of human capital. However, this feature of non-disposability does not apply to a long period of time understood as time of exchange between generations. In this period, human being as the owner of human capital prepares his/ her successors (offspring) to provide work and live in the society. It means that he/ she gradually transfers them his/ her capital, both material and human. The subject matter of this point of analysis is the discussion of principles and mechanisms of transfer of human capital with a spe-

cial attention paid to the mechanisms which develop the value of human capital over a long period of time.

In the light of the above, the mechanisms need explanation which determine dynamics of changes of the value of human capital. In scientific works, the model of analysis of human capital is dominant understood as the resource which is at the disposal of the employee, that is the individual person, or as the macroeconomic resource. However, it is noteworthy that developing the structure and value of human capital of a person (employee) constitutes one of the processes happening within the household. “Household” may be defined as a management micro-unit based usually on family bonds which generates income allocated for various objectives, which produces goods, provides services and stores stock. Figure 3 presents the relationships of the household executing the function of maintenance and development of human capital (8, p. 34).

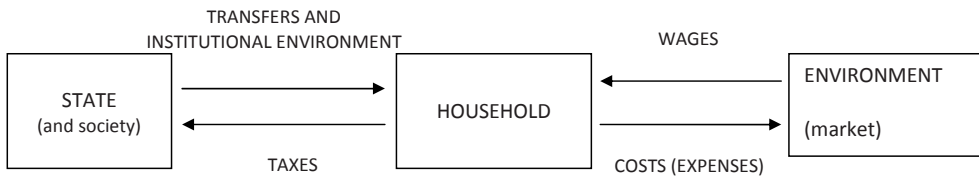


Figure 3. Economic balance of the household in the light of the model of human capital

Source: author's own study.

The level of human capital depends on the conditions of the family, especially on the income at their disposal, the level of expenses and the institutional surroundings which may facilitate or hinder growth of human capital. The household (mostly the parents) is the owner of human capital, and its task is replacement of human capital over a short and long periods of time. Replacement of capital over a short period of time means supplementing vital forces lost during daily activities (e.g. rest, meals, etc.). Replacement of capital over a long period of time means preparation of successors (children) for work and life in the society. Economic progress requires that system-based solutions will enable preparation of the following generations to perform work at the level not lower than that of their predecessors. From the point of view of dynamics of human capital, it means maintenance of the value of human capital in the context of exchange between generations. Achieving this objective is possible by the members of the household undertaking the appropriate actions in the economic dimension. It means, in particular, entering into economic relationships with other entities which consist its market and institutional environment.

The relationship of employment constitutes one of the most important elements of cooperation of the household with the environment. Household is the sole supplier of

human capital. It receives remuneration for making the medium of production available ($W = u \cdot H(T)$), whose amount in the effective market results from the value of the owned human capital ($H(T)$) and the level of payment for work (w). Household allocates the received wages mostly to cover the costs of restoration of human capital, in both long- and short-time perspectives. The amount of the stream of wages is thus not neutral from the point of view of long-term human capital dynamics of the household. Maintaining its value requires income in the amount which allows compensation of the costs of risk or fragmentation of the value of capital as a result of time passage. Achieving this objective requires undertaking active policy from the state which limits the consequences of the imperfect labour market. This applies in particular to the broadly understood system of minimum wages and responsible tax and social policy to motivate to enterprising behaviour.

As it was earlier stated, the passage of time is inevitably related to risk, which manifests in business activities in the form of loss of value due to random incidents. Maintaining human capital requires adequate stream of value which will allow full compensation of the loss of value. In the discussion of the wages model it was proven that the wages defined with the 8% economic constant give the owner of human capital the possibility of maintaining its value. Reducing the wages below 8% per year results in partial fragmentation of human capital at the disposal of the owner of the capital and his/ her family. Human capital is always fragmented at a similar rate, whether the person works or not. This applies to the modern post-industrial system of work. The costs of living of a modern family are similar in case of households with full employment, partial employment or none. The last case is related to the total loss of income. In this case, the possibility of compensation of fragmenting human capital in both long- and short-time period of time is dependent on receiving help from the outside, e.g. benefits. This situation is especially dangerous for the process of reproduction of human capital. From the point of view of human capital management in the situation of lack of work, human capital is not transferred to the places of work but to the environment, and is lost irrevocably.

In the light of this, the expenses of households are of the investment nature. This point of view is not a new one. Karl Gunnar Myrdal, one of the representatives of the so-called Swedish School, believed that the division of expenses into consumption and investments is harmful. This classification of expenses helped unfavourable allocation of income, which was justified with the necessity of accumulation of capital as the condition of a faster development. Myrdal argued that household expenditures for living and education are personal investments, although the traditional economists regard them as consumption expenditures (9, pp. 287–290).

The relations with the state are the second type of capital interactions of households, and these are most often conditions by the regulations of the law. The law imposes a number of taxes and other encumbrances, indirect and direct, on households. From the point of view of the capital analysis of households, taxes reduce the possibility of capital reproduction. On the other hand, taxes may constitute a source of

financing a public product (e.g. safety or creating state institutions) and transfers to households. Financing the basic education which improves the value of human capital of the youngest members of the households is the example of this type of activity. In this case, however, the issue appears of effectiveness of using the means released for the disposal of the state. This applies to both purposefulness of spending the funds and the method of their spending. The subject matter of the analysis is also effectiveness of the institutions created and initiated by the state. These institutions cover a wide range of areas of functioning of the state, including safety, education or the business field. The objective of the institutions, according to the definition of John R. Commons, is supporting individual entrepreneurship and preventing unfair competition and discrimination. Thus, good institutions will support effectiveness of collective activity or support economic cooperation between households and business entities. From the point of view of the family it means that the probability of good living and even increasing the value of human capital increases with good institutions. It is mostly done with the proper conditions of employment which allow fair level of remuneration. Thus, the analysis of human capital dynamics should in particular include labour market institutions. Susan Hayter defines labour market institutions as the ones which perform the function integrating the labour market with the process of establishing production (10). As it is stated in the first chapter, the institutional and intellectual capital of the society means the capacity for creative work and the ability to create the above defined good institutions. Such institutions contribute to maintaining balance, that is survival and development of the autonomous system.

Effective institutions, including labour market institutions, are the result of existence of institutional and intellectual capital of the state. At present, the “institutional capital” term is known and constitutes the subject matter of study in social sciences. The definition of institutional capital applied within the law of the European Union is a synthesis of the results of these studies, and it characterises with the following attributes (11):

- the capacity to concentrate on solving problems;
- the capacity to act;
- the pace of the decision process;
- the scope and flexibility of the information owned;
- the type of relationships between institutions and organisations.

High effectiveness of the institutions in any of the five listed areas contributes to increasing individual productivity, along with which productivity of the state increases.

The analysis of human capital dynamics across generations may be conducted with the general model of capital. The essence of the analysis consists in studying three basic interactions which develop the value of the capital, that is the costs of risk (s), the economic constant for prospective increase (p) and the management variable (m). With these assumptions, the dynamic model of human capital of the household may be presented with the following formula:

$$H_2 = H_1 e^{(p-s+m)t},$$

where: H_1 —the value of human capital in the first generation, H_2 —the value of human capital in the next generation, t —the period of one generation (the cycle of exchange between generations).

Maintenance of the value of human capital, especially in the context of exchange between generations, is the condition for long-term economic balance. It is the condition in which the equality $H_1 = H_2$ occurs. Adjusting the general model of capital to the specific nature of human capital requires an additional description of the elements of the formula. Every family has human capital at its disposal (H_1) which, according to the above formula, is subject to three effects specified by the parameters p , s and m . The next generation becomes the owner of human capital of the value (H_2) as a result of activities of the family and of the environment. Several observations come from the studied model. First, if the household is in existence, and the parents have specific capacity for performing work, it means that the family in the given moment has human capital with the value appropriate for this capacity (H_1). Fragmenting forces (s) impact the value of human capital randomly, and their effect may be scattered over a long period of time or at the present time. Maintaining the initial value of human capital (H_1) requires inflow which allows compensation of the effect of fragmenting forces (s). One of them is the remuneration obtained (W). If its value results from the value of the economic constant ($W = H_1 \cdot p = H_1 \cdot 8\%$), the household has a chance to maintain the value of human capital. Moreover, work and management represented by the variable (m) affect the value of human capital. As a result of creative and reasonable activity of the family members, the value of human capital may additionally increase. This activity may also have a different nature, for example negligence which consists in lack of care about health or using the available funds with harm to the family, e.g. alcohol abuse, may lead to reducing the value of human capital. As one can notice, the effect represented by the variable (m) is highly significant as it gives the household the possibility of increasing the chance for maintaining human capital or even achieving increase in its value. It is also interesting that the value of the variable (m) is mostly the result of existence of institutional and intellectual capital. Good institutions allow and even motivate to creative action by way of developing the appropriate attitudes of citizens.

The effect of work and management (m) often does not have nature of cash flow typical of wages (p). Most often, it is an additional increase in human capital represented, for example, by improving health condition or increase in the intellectual capital during increase of qualifications.

The issue of paying human capital from the point of view of the employer needs explanation. The employee provides work ordered by the employer, that is dedicates his/ her time for the subject matter of work. It means that human capital of the employee is transferred to the subject of work. As a result, the employer (the owner of

the subject of work) gains added value, and the employee receives remuneration as the equivalent of human capital provided. Thus economic balance may be said to need two general conditions to be met:

- the wages are fair;
- the employees work reliably.

It is interesting to quote the concept from the borderline of philosophy and economics, namely the theory of justice by John Rawls (12, pp. 110–115). Its major assumption is defining the just society by two rules. The first of them assumes equal access to the widest possible catalogue of freedoms. The other allows existence of inequalities only when their introduction brings about additional benefits to all. In the light of these principles, injustice means uneven allocation which brings benefits only to the chosen. The concept of wages based on the value of human capital in the light of the Rawls's theory is a good trend to equality. It is in line with both rules, thus it may greatly contribute to increasing the level of justice in the society. The existing differences in the value of human capital between people exclude the egalitarian system of equal wages. It is not a just system because such a stream of wages is not equal to the value of human capital transferred during work.

The said theory of justice is also the point of departure for explanation of the second condition of economic balance. This theory, apart from two general principles of justice, formulates also requirements for individuals. The most important is the so-called *principle of fairness*. According to it, an individual is required to do his/her duties if he/she voluntarily accepts the benefits of the arrangement or enjoys the possibilities offered by the society to pursue one's own plans and interests (12, pp. 171–184). Thus, in the light of the concept of human capital and the concept of value based on work, the principle of fairness gains practical significance.

5. Final remarks

Human capital is the capacity of a person to perform work. Human capital understood in this way has always represented the most important of economic resources, that is economic value of human resources. Effectiveness and stability of the economic system depends to a high degree on the course of the process of human capital management in the macro- and microeconomic approaches. The basis of effective management of the capital embodied in the resources is a credible and coherent measuring methodology. This applies in particular to human capital because study on the methodology of measuring human capital in monetary units is on a relatively early stage. One also has to remember that methodology of measuring human capital must be compliant with the general nature of capital and take into consideration the effect of the environment on its value. Identification of the factors which determine dynamics of the value of human capital should be the initial stage of the discussion of effectiveness of human capital management. Effective managing of resources and

capital embodied in them means first of all the capacity to maintain their substance, and then the skill of taking advantage of the potential increase specified with the economic constant. Maintaining the value of human capital is one of the most significant economic objectives. Its execution requires the appropriate payment for work and the responsible and conscious process of human capital management. It has to be added that good institutions may play a significant role in execution of this economic stipulation.

Bibliography

1. Shultz Th. 1981. *Investing in people: The economics of population quality*. Berkeley: University of California Press.
2. Cahuc P., Zylberberg A. 2004. *Labor economics*, Cambridge and London: The Massachusetts Institute of Technology Press. ISBN 0-262-03316-X.
3. Dobija M. 2009. "Fundamentalne przyczyny kryzysów finansowych". *Zeszyty Naukowe Małopolskiej Wyższej Szkoły Ekonomicznej w Tarnowie*, no. 2 (13).
4. Dobija M. 2002. "Kapitał ludzki i intelektualny w aspekcie teorii rachunkowości". *Przegląd Organizacji*, no. 1, pp. 8–13.
5. Dobija M. (ed.). 2010. *Teoria pomiaru kapitału i zysku*. Kraków: Wydawnictwo Uniwersytetu Ekonomicznego. ISBN 978-83-7252-500-0.
6. Dobija M. 2003. *Pomiar i sprawozdawczość kapitału intelektualnego przedsiębiorstwa*. Warszawa: Wydawnictwo Wyższej Szkoły Przedsiębiorczości i Zarządzania. ISBN 83-89437-08-2.
7. Kozioł W. 2011. "Stała ekonomiczna potencjalnego wzrostu". In: *Nierówności ekonomiczne a wzrost gospodarczy*. Ed. M. G. Woźniak. *Zeszyty Naukowe Uniwersytetu Rzeszowskiego*.
8. Pałaszewska-Reindl T., Michna W. 1986. "Gospodarstwo domowe: Ekonomiczna i organizacyjna baza rodziny polskiej". In: *Polskie gospodarstwa domowe: Życie codzienne w kryzysie*. Ed. T. Pałaszewska-Reindl. Warszawa: Instytut Wydawniczy Związków Zawodowych. ISBN 83-202-0486-0.
9. Przybyła H. 2001. "Sposób ujęcia ekonomii politycznej i gospodarki w szkole szwedzkiej". In: *Dokowania współczesnej myśli ekonomicznej: Teorie ekonomiczne a polityka gospodarcza państw*. Ed. U. Zagóra-Jonszta. Katowice: Wydawnictwo Uczelniane Akademii Ekonomicznej w Katowicach. ISBN 83-7246-889-3.
10. Hayter S. 2002. "Institutions and labour policy in an integrating world". In: *Globalization, growth and (in)equality*. Warwick: University of Warwick.
11. *Official Journal*. EU C318/14.
12. Rawls J. 2009. *Teoria sprawiedliwości*. Transl. by M. Panufnik, J. Pasek, A. Romaniuk. 2nd ed. Warszawa: Wydawnictwo Naukowe PWN. ISBN 978-83-01-16173-6.

Istota i determinanty dynamiki kapitału ludzkiego

Streszczenie: W pierwszej części artykułu przedstawiono genezę badań nad problematyką kapitału ludzkiego jako jednego z najważniejszych zasobów ekonomicznych. Następnie została omówiona koncepcja kapitału ludzkiego stanowiąca rozwinięcie ogólnego modelu kapitału opracowanego przez Mieczysława Dobiję. W świetle tej koncepcji kapitał ludzki to kapitał ucieleśniony w zasobach ludzkich. Ponadto podano zasady pomiaru, które umożliwiają wyodrębnienie

struktury kapitału ludzkiego. W dalszej części podano zasady opłacenia pracy kapitału ludzkiego. Zasady te wynikają z natury kapitału. Najistotniejszym oddziaływaniem, na jakie narażony jest kapitał ludzki, są siły rozprasające jego wartość. Zachowanie tej wartości wymaga odpowiedniego strumienia kompensującego, w przeciwnym razie wartość kapitału ludzkiego będzie ulegać rozproszeniu, co prowadzi do szeregu negatywnych konsekwencji mikro- i makroekonomicznych. Wykazano również, że dzięki właściwym rozwiązaniom instytucjonalnym i postawom ludzi kapitał ludzki może wzrastać z korzyścią dla całego społeczeństwa. Proces wzrastania kapitału ludzkiego przebiega w rodzinie (gospodarstwie domowym). W ostatniej części artykułu dokonano analizy czynników, które wykazują pozytywny lub negatywny wpływ na wartość kapitału ludzkiego. Całość rozważań opatrzone stosownym podsumowaniem.

S ł o w a k l u c z o w e: kapitał, kapitał ludzki, wzrost gospodarczy, płaca stała, gospodarstwo domowe
