Jurij Renkas

Department of Accountancy
Cracow University of Economics

WAGE EXPECTATIONS IN LIGHT OF HUMAN CAPITAL MEASUREMENT THEORY

Abstract

The aim of the paper is to examine the consistency between wage computations using an economic constant versus expected wages. Furthermore, the research compares the legal real minimum wage and wages computed in accordance with human capital theory. The author builds an econometric model of wages as a function of two variables. In addition, in order to facilitate the reader's understanding of the article, a human capital measurement model is presented along with a measurement of fair wages. The results show that the human capital model is useful as a comprehensive measure of value and present a technique for its reliable measurement. The paper's findings may make a significant contribution to the debate on how to measure human capital properly.

Keywords: human capital model, economic constant, wages, minimum wages, wage expectations.

1. Introduction. Labourism as an Original Scientific Research Programme

Research in the area of human capital (in light of its abstract nature as the ability to do work and the existing economic constant of potential growth) has been carried out for over fifteen years. The first article in this area was published in 1997 (Dobija 1997). Since then, there have been many publications in which authors have developed issues in the area of human capital measurement theory, the theory of fair wages for work, the theory of basic and premium wages, labour productivity theory, and the theory of money and economy without deficit (Dobija 2011a, Kozioł 2010b, Kurek 2008). These theories are a consequence of the implementation of the human capital measurement model and understanding the relationships between the categories of capital, labour, and fair wages.

According to T. Schultz's theory and the theories of other scholars in the field of human capital research in light of investing in people, we do not find effective attempts to understand the nature of capital. In accordance with these approaches, capital is "undoubtedly a good thing" (Dobija 2011c, p. 120), but the scientific formulation is missed here. This is the traditional approach in economic research, where the question of the nature of the capital is not resolved but just postponed. This is the reason for the lack of compliance in these studies between certain key economic categories.

Failure to fully understand the principle of duality is an obstacle to understanding the nature of capital. Therefore, there is insufficient knowledge of the basic connections between capital, labour, and wages. Nevertheless, these concepts are central for economics. This fact affects the majority of economic theories, for which the solution of basic problems in the "capital – labour – equitable remuneration (fair wages)" triad is a key question (Dobija 2011a, pp. 143–44).

Nowadays, there is every reason to conclude that the original academic research programme in the sphere of human capital has been formed as a result of economic research that began in the 1990s. From year to year, these studies become more and more developed and a wider range of issues finds proper theoretical explanation. What is more, such open economic questions as money, credit, and budget deficit are elucidated differently within the new research programme. One of the last publications of M. Dobija (Dobija 2011b) has signalled a fundamental changes in economic thought. There are signs that the new academic research programme, proposed by the author, is gradual in terms of the methodology of I. Lakatos. In this programme, capital, labour, and fair wages constitute an inseparable triad (as illustrated in Fig. 1), in which labour is presented as a capital transfer to labour products.
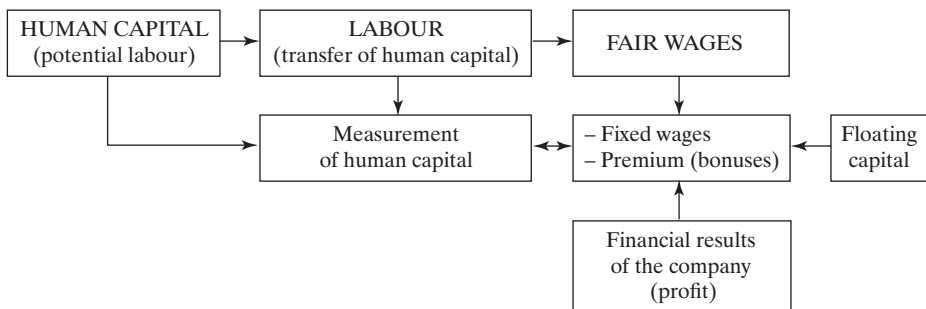

Fig. 1. The Triad: Capital – Labour – Fair Wages

Source: author's own research.

The research programme is based on an understanding of the nature of capital as the ability to work, and on an advanced study of its theory. It is precisely this fact which is most important in the programme.

2. The Human Capital Measurement Model

Human capital is a natural attribute of an employee. Its explanation is provided by human capital theory models. To determine each person's needed capital, expenditures such as the cost of living, education, experience, and capital expenditures on human work, as in the case of professors, must be identified. Identification of these expenditures and definition of the capital growth function as a result of acquired experience leads to the well-known and well-verified human capital model that was shown in many previous surveys (Dobija 2007, 2009, 2011a, Dobija (ed.) 2010, Kurek 2008, 2010, 2011, 2012, Kozioł 2007, 2010a).

Human capital is a function of many variables, where: k – monthly maintenance costs, t – the time variable, T – the length of a professional career (in years), and p – the economic constant of potential growth. The formula shown below represents the simplest model of human capital:

$$H(k, t, T, p) = K,$$

where $H(k, t, T, p)$ – the value of human capital, K – the capitalised cost of living with rate p.

The expanded model contains more variables associated with professional education and obtained work experience. Its character can be described as follows (Cieślak & Dobija 2007, pp. 5–24):

$$H(T, p) = (K + E) \cdot [1 + Q(T)],$$

where $H(T, p)$ – the value of capital of a person with T years of experience, K – the capitalised costs of living, E – the capitalised costs of education, $Q(T)$ – the growth factor experience after T years of work.

This model can also be presented in additive form:

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

where $D(T)$ is the capital of work experience after T years and $D(T) = H(0) \cdot Q(T)$, where $D(0) = 0$. This model is more convenient for analysing and explaining the wages.

The human capital model can be supplemented with the capital creativity ratio (*Cr*) or variable *Ui*, which is used in the human capital measurement model of university professors (Kozioł 2010a). It sets the level of capitalised costs of getting another academic degree (where *t* is the number of years from the date of receiving the degree to the measurement date). These models are shown in Table 1.

Table 1. The Human Capital Measurement Models of Employees

No.	Human capital measurement model	Characteristics of the human capital measurement model
1	$H(T) = K$	The human capital of an employee who does not have a university degree or work experience (consists only of the capitalised costs of living)
2	$H(T) = K + E$	The human capital of an employee who has a university degree (there is an additional variable – the capitalised costs of education)
3	$H(T) = (K + E) \cdot (1 + Q(T))$	The human capital of an employee who has work experience (the rate of capital growth experience depends on years of professional experience, especially in the first years of work)
4	$H(T) = K + E + D(T)$	The additive form of the employee's human capital model
5	$H(T) = K + E + D(T) + Cr$	The human capital of an employee who has a capital of creativity
6	$H(T) = K + E + D(T) + U_i \cdot (1 + Q(t_i))$	The human capital of university professors (where t_i – the number of years from the date of receiving the degree to the measurement date)

Source: author's own research.

Thus, you can determine the level of human capital of each employee by using the models described in Table 1 and this amount will be the basis for determining fair wages for every employee. It should be emphasised that level of capitalisation is also important and from study it is 8% per annum (Kurek 2008, 2010, 2012, Renkas 2011).

3. The Data and the Regressive Model of Wage Expectations

In October 2010, in the Volodarsk-Volynskii Employment Centre (Ukraine, Zhytomyr region), a survey was conducted in which 135 job seekers were interviewed. The survey included questions about age, number of years of education, and expected wage (Table 2). Obtaining such data makes it possible, on the basis of a large sample of interviewed people ($n = 135$), to use multiple regression and determine the relationship between age, number of years of education, and the expected wage of people registered in the Volodarsk-Volynskii Employment Centre.

The wages calculated using the model are comparable to the actual or minimum wage in Ukraine, which is defined by state law. Such kinds of comparisons indicate the level of compatibility of wages and can help to determine whether the derived econometric model can be used to calculate employees' wages.

The advantage of the research carried out at the Employment Centre is that job seekers were analysed. While those people were under pressure of unemployment and a free job market, they did not expect high wages. Their expected wages would provide them with the opportunity to support their families and maintain human capital at least at the same level. Therefore, expected wages are good material for analysing the economic constant of the growth potential.

As part of the survey, 135 respondents were interviewed. The confidence interval of the economic constant defining the level of human capital payment of respondents was obtained (7.60–8.53%) at a confidence level of 0.95. The average value of the constant was 8.1%. As one can see, the compatibility of the human capital of people participating in the survey with their expected wage confirmed the economic constant at 8%.

The data for determining the parameters of the model are derived from Table 2. The variables (age, years of education, and expected pay (W)) contain the results from the Volodarsk-Volynskii Employment Centre survey. Multiple regression was used to analyse the variables (Sobczyk 2010), and this allowed the level of employees' wages to be predicted better. The dependent variable in this example is the variable *expected wage* (W), and the independent variables (predictors) are *age* and *years of education*.

In accordance with the principles of gradual regression, the variable *years of education* better describes *expected pay* (W). So the regression equation is:

$$Y = B_2 X_1 + B_1 X_2 + B_0.$$

Table 2. Age, Number of Years of Education and the Expected Pay (W) of Persons Registered in The Volodarsk-Volynskii Employment Centre (2010)

No.	Age	Years of education	W, UAH	No.	Age	Years of education	W, UAH	No.	Age	Years of education	W, UAH	No.	Age	Years of education	W, UAH
1	33	1	2750.0	35	40	1	3000.0	69	49	1	3000.0	103	38	1	1500.0
2	50	4	3000.0	36	48	1	3000.0	70	47	1	1500.0	104	32	4	2500.0
3	17	0	1500.0	37	28	0	2000.0	71	42	1	3000.0	105	28	1.5	2500.0
4	38	3.5	3500.0	38	30	0	1500.0	72	23	0	800.0	106	30	1	3000.0
5	36	1	3000.0	39	37	0	1000.0	73	29	1	800.0	107	34	3	2000.0
6	50	0	2000.0	40	43	0	2500.0	74	47	5	3000.0	108	28	2	1500.0
7	28	0	1500.0	41	20	3	2000.0	75	36	5	3500.0	109	49	1	2500.0
8	27	0	1000.0	42	36	3	2500.0	76	36	6	4000.0	110	38	1	1000.0
9	39	1	2500.0	43	24	1	2000.0	77	28	1	3000.0	111	52	1	2500.0
10	59	2.5	3000.0	44	45	2	3000.0	78	34	1	1500.0	112	27	1	1000.0
11	18	2	3000.0	45	54	1	1500.0	79	30	4	2500.0	113	45	3	2000.0
12	17	0	800.0	46	25	1	3500.0	80	36	1	2600.0	114	23	5	1500.0
13	17	0	800.0	47	42	2.5	3000.0	81	52	1	2000.0	115	36	2.5	2000.0
14	20	1.5	1200.0	48	54	3	4000.0	82	20	3	3500.0	116	18	1	1500.0
15	31	2	3500.0	49	43	1	4000.0	83	41	5	3000.0	117	50	2.5	1600.0
16	59	0	2000.0	50	45	5	4000.0	84	35	3	2000.0	118	28	2	3000.0
17	30	3	2000.0	51	43	3	1500.0	85	55	0	1000.0	119	47	6	3000.0
18	44	0	1500.0	52	25	1	1500.0	86	36	3	2000.0	120	43	4	2000.0
19	36	0	1500.0	53	20	4	3000.0	87	59	1	3000.0	121	26	1	1500.0
20	51	0	1000.0	54	39	3	2000.0	88	25	1	2000.0	122	54	4.5	2000.0
21	36	0	1000.0	55	20	3	4000.0	89	44	1	4000.0	123	21	1	1500.0

22	50	0	2000.0	56	52	2	1500.0	90	45	1	3000.0	124	50	3	1500.0
23	38	3	3000.0	57	23	0	1500.0	91	44	1.5	1500.0	125	42	4	3000.0
24	33	1	2000.0	58	53	2	2500.0	92	37	1	1500.0	126	53	3	4000.0
25	22	7	3500.0	59	51	2	3000.0	93	48	1	3200.0	127	34	4	2000.0
26	30	0	1000.0	60	59	2	2500.0	94	18	1	1500.0	128	50	6	2000.0
27	29	0	1000.0	61	49	2	3500.0	95	48	1	2500.0	129	23	2.5	1500.0
28	37	4	3000.0	62	24	0	1500.0	96	39	1.5	3000.0	130	24	4	1500.0
29	19	4	2500.0	63	48	1	1200.0	97	57	1	2500.0	131	52	1	1500.0
30	22	1	2000.0	64	54	1	3000.0	98	43	4	1500.0	132	46	1	3000.0
31	21	1	2500.0	65	43	1	2500.0	99	32	3	2000.0	133	33	5	2000.0
32	34	1	2000.0	66	24	0	1500.0	100	50	1	2500.0	134	30	1	1500.0
33	54	2	1500.0	67	45	1	2500.0	101	54	1	1500.0	135	32	5	3000.0
34	38	1	3000.0	68	21	3	1500.0	102	52	2	3000.0				

Source: author's own research.

The regression coefficients (B_0, B_1, B_2) can be found in Table 3, which contains a summary of the regression. If there is no linear relationship among the variables X_1, X_2 and Y, then the directional coefficients of the regression in the population (the parameters b_1 and b_2) are equal to zero. Therefore, we confirm that the existence of this relationship is not direct. We test the hypothesis that the true values of the coefficients b_i are equal to zero (H_0: $b = 0$), contrary to the alternative hypothesis (H_1: $b \neq 0$). If during verification of the hypotheses we reject the null hypothesis in favour of the alternative one (H_1), this means that we can use statistical methods to confirm the impact of the variables X_1 and X_2 on variable Y, and we can call it an important evaluation parameter. This means that variable X has a significant impact on the dependent variable Y. To verify the hypotheses, we use the Student's t-test. This test is as follows:

$$t = \frac{b_i}{s(b_i)},$$

where b_i – the coefficient of the regression line, and $s(b_i)$ – the standard error of the estimator b_i.

Table 3. Summary of the Regression of the Dependent Variable *expected wage* (W)

$N = 135$	B^*	The standard error of B^*	B	The standard error of B	t (132)	The level of p
Free term	–	–	1320.739	226.9345	5.819913	0.000000
Variable 2	0.421248	0.077139	217.394	39.8092	5.460903	0.000000
Variable 1	0.185028	0.077139	13.181	5.4952	2.398636	0.017854

Source: author's own calculations.

In the last three columns of Table 3, the standard error evaluation values, t-test, and the level of significance are provided. The level of p is the level of statistical significance for the regression coefficients. Using the calculated values from Table 3, we can suggest that for the data in Table 1, there are statistical bases for recognising that there is a linear relation between the variables, because two variables (*age* and *years of education*) are highly significant. As the value of probability p in all cases is less than assumed $\alpha = 0.05$, which rejects the null hypothesis H_0, we can conclude that the

observed relations between *age* and *years of education* and *expected wage* are not a coincidence.

The level of beta coefficients allows us to compare the relative contribution that each independent variable makes to predicting the dependent variable. As one can see from Table 3, the most important predictor (statistically significant) is the variable *years of education* (variable 2). The coefficient is positive for the variable *years of education*. This means the greater the number of *years of education*, the higher the wage level.

Finally, our econometric model defines the level of the expected wage as follows:

$$Y = 13.18\,X_1 + 217.39\,X_2 + 1320.74,$$

where Y – the employee's wage, X_1 – the employee's age, X_2 – the number of years of education.

Using the above formula, we can calculate the level of the minimum wage in Ukraine. Every person who is 18 years old and has a basic professional education deserves the minimum wage in Ukraine. For our model, let us substitute X_1 by the number 18, and X_2 by the number 1 (one year of vocational education). Then the result is: $Y = 1775.4$ UAH.

4. The Minimum Wage Comparison and Its Assessment

The main method of testing the human capital measurement model empirically is based on the calculation of wages and their comparison with expected or actual wages. The research is particularly efficient in regard to the minimum wage, since the minimum wage is usually defined by state law. The use of econometric modelling creates additional value for comparison.

Part of the human capital of an employee is the capitalised costs of living (K) until the age of consent. According to human capital theory, a wage solely calculated on the basis of cost K should be equal to the minimum wage. Table 4 shows the level of the minimum wage in Ukraine, calculated on the basis of human capital theory for several periods in 2010–2011.

According to the above data about the level of the minimum wage determined on the basis of human capital theory as on 1 October 2011, we can compare this value to the level of the minimum wage determined on the basis of the econometric model.

Table 5 compares the statutory minimum wage in Ukraine with minimum wages based on human capital theory (as 8% of the human capital of an employee) and the econometric model.

Table 4. Estimation of the Minimum Wage in Ukraine on the Basis of the Human Capital Theory

Period	Average value of the monthly cost of living (UAH/m.)	Value of human capital $H(T)$, UAH	Monthly labour costs ($8\% \cdot H(T)/12$), UAH	Social security contributions, %	Monthly wage (MLC/1.372), UAH	Statutory minimum wage, UAH	Percentage of compatibility
01.01.2010	852.3	383 026.1[a]	2 553.5	37.2	1 861.0	869.0	46.7
01.04.2010	867.0	389 632.3	2 597.6	37.2	1 893.0	884.0	46.7
01.07.2010	871.0	391 430.0	2 609.5	37.2	1 902.0	888.0	46.7
01.10.2010	889.7	399 833.8	2 665.6	37.2	1 944.0	907.0	46.7
01.01.2011	923.3	414 934.0	2 766.2	37.2	2 016.2	941.0	46.7
01.04.2011	942.0	423 338.0	2 822.3	37.2	2 057.1	960.0	46.7
01.10.2011	965.7	433 988.0	2 893.3	37.2	2 108.8	985.0	46.7
01.12.2011	984.7	442 527.0	2 950.2	37.2	2 150.3	1004.0	46.7

[a] Human capital is calculated on the basis of the monthly cost of living (Zakon Ukrainy 2009): $K = 852.3 \cdot 12 \frac{(1 + 0.08)^{18} - 1}{0.08} = 383\,026.1$.

Source: author's own calculations.

Table 5. Comparison of the Statutory Minimum Wage in Ukraine to Minimum Wages Based on Human Capital Theory and the Econometric Model (2010–2011)

Specification	Statutory minimum wage		Minimum wage determined on the basis of human capital theory		Minimum wage determined on the basis of the econometric model
	01.10.2010	01.10.2011	01.10.2010	01.10.2011	01.10.2010
Amount in UAH	907.0	985.0	1 944.0	2 108.8	1 775.4
Percentage of compatibility	46.7	46.7	100.0	100.0	91.3

Source: author's own calculations.

As can be seen in Table 5, the level of the minimum wage calculated using the above formula is close to the level of the minimum wage calculated on the basis of human capital theory as 8% of the human capital of each employee. Moreover, the calculation of the minimum wage based on human capital theory was made using the social minimum, which was equal to 889.7 UAH on 1 October 2010. The social minimum is an indicator for determining the cost of maintaining household expenses based on the "basket of goods", the components of which are needed to sustain life (the subsistence minimum) and raise children as well as to maintain a minimum of social bonds. Since the analysis was done on job seekers, who are under pressure of unemployment, their expectations did not relate to the social minimum but rather to the minimum for living or intermediate values. This explains the cause of the minor difference between the minimum wage determined on the basis of human capital theory and the minimum wage determined on the basis of the econometric model. The social minimum was applied in direct calculation of the minimum wage.

5. Conclusions

As we can see, nowadays there are enough reasons to conclude that the original research programme in the field of the human capital was formed as a result of economic research that began in the 1990s. The programme is gradual as issues in this area of research become more studied year by year and a wider range of problems finds its theoretical explanation.

The empirical study conducted in the Volodarsk-Volynskii Employment Centre in October 2010 indicates the compatibility of the level of payment for labour, as determined by human capital theory, with the level of wages

for work of the people interviewed. The level of the minimum wage in Ukraine (according to state law) in comparison to the level of the minimum wage determined on the basis of human capital theory on 1 October 2010 shows large variation, since the percentage of compatibility is only 46.7%. This suggests that the statutory minimum wage does not allow the human capital of an employee to be maintained, let alone increased.

However, the level of the minimum wage based on the econometric model is close to the level of the minimum wage calculated on the basis of human capital theory as 8% of an employee's human capital. This gives us the opportunity to recap that this econometric model confirms the accuracy of the calculation of the level of basic wages according to human capital theory (wages at this level meet the behaviour of human capital) and can be used to calculate employees' wages.

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Abstract

Oczekiwania płacowe w świetle teorii pomiaru kapitału ludzkiego

Celem pracy jest zbadanie zgodności płacy oczekiwanej z płacą ustaloną na podstawie stałej ekonomicznej potencjalnego wzrostu. Przeprowadzone badanie umożliwia porównanie ustawowej płacy minimalnej z płacą obliczoną na podstawie teorii kapitału ludzkiego. W tym celu wprowadza się model ekonometryczny zawierający dwie zmienne. Ponadto, dla przejrzystości wywodu, modele pomiaru indywidualnego kapitału ludzkiego są prezentowane wraz z modelami wynagrodzeń godziwych. Uzyskane

wyniki dowodzą, że przedstawiony w opracowaniu model kapitału ludzkiego może być używany do ustalania płacy godziwej. Wyniki te wnoszą znaczący wkład do dyskusji na temat prawidłowego sposobu pomiaru kapitału ludzkiego i wynagrodzenia godziwego.

Słowa kluczowe: model kapitału ludzkiego, stała ekonomiczna potencjalnego wzrostu, płaca stała, płaca minimalna, oczekiwania płacowe.