INVESTIGATING THE EFFECT OF HEALTH STATUS ON UNEMPLOYMENT

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ABSTRACT

According to the economic literature, Human capital can be considered as essential factor for economic development of countries such as labour force, capital, land and management. So that economists have known it as the motor of development. In the existing studies, education and health are introduced as two main aspects of human capital. In addition to the direct effect of education and health on economic growth, these factors can reduce the unemployment by improving the labour productivity, a subject which has been considered in few studies especially about health. In this study we focus on the effects of these factors on unemployment in 117 countries over the period 2005–2013 using panel data method. To do this, the life expectancy and education index are selected as proxies for human capital. The results show that there is a negative relationship between life expectancy and unemployment but, the effect of expected years of schooling as well as increase in mean years of schooling on unemployment is positively significant. In addition, the impacts of inflation and per capita gross national income on unemployment are negative and significant as well.

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Contribution/ Originality

In this study we focus on the effects of health status on unemployment in 117 countries over the period of 2005–2013 using panel data method. In addition to the direct effect of health on economic growth, this factor can reduces the unemployment by improving the labor productivity. In this viewpoint, this study is different from previous literature.

1. INTRODUCTION

Especially, in the start of 1990s, the practice of indentifying of the factors which could contribute to economic growth has been focused on the role of human capital. For instance, Barro (1991) argued that the relationship between initial human capital and growth rate of real per capita GDP is positive. Also, Mankiw *et al.* (1992) indicated that higher income leads to a higher level of human capital and then raises total factor productivity.

Based on the existent literature, two effects could be considered for human capital on economic growth: direct and indirect effect. Queiros and Teixeira (2014) mentioned that human capital has direct impact on economic growth

because of the innovation leading to the creation of new products in labor forces with more education is more than other workers. Also, human capital helps to neighbor countries in order to enhance their technology adoption through the absorption of ideas and equipment imports. On the other hand, Silva and Teixeira (2012) explained that Human capital has indirect effects on the economic growth. The specialization process enhances the productivity structure as well as technology advancement.

Although, according to the most economics, Education is one of the main aspects of human capital, but, in comparison, the role of health in human capital formation process has been neglected in the vast body of studies on human capital domain as well. So that, Bloom *et al.* (2004) as mentioned before, most cross country empirical studies indicated human capital with education. They noted that healthier workers are more energetic and robust in term of physically and mentally. Their productivity is higher than others, but, the probability of to be absent from work because of illness or illness in their family between them is likely lesser as well.

In general, human capital, in both education and health aspects, also increases the workforce productivity and this can leads to reduce of unemployment rate. This study is concerned with understanding the impacts of human capital on unemployment using 117 countries data for the period 2005-2013. Accordingly, we organize this paper as bellow: After the introduction, the methodology and the research model is presented in Section 2. Also, the major finding is reported in section3. Finally, the conclusions of this study are presented in Section 4.

2. METHODOLOGY

2.1. The Panel Data Method

In this study in order to indicate the effect of human capital on unemployment, the panel data method is used. Panel data usually contain a large number of cross sectional units (individuals, households, companies, regions or countries), which are repeated observed over time. The advantages of panel data compared with cross sectional data on the one hand and time series data on the other hand are the following: firstly, the large number of observations gives more informative data, less multi-collinearity, more degrees of freedom and a higher efficiency of econometric estimates. Secondly, it is possible to separate between cohort, period and age effects. Thirdly, the analysis can determine intra and inter-individual effects. Fourthly, panel data is a proper instrument for researchers to identify unobserved heterogeneity, a problem that is popular in pure time series and pure cross sectional data. Fifthly, longitudinal observations improve the possibilities of evaluating the effects of policy interventions and it is possible to determine under which conditions the effects can be interpreted as causal effects (Hubler, 2005). Most panel data applications have been limited to a simple regression with error components disturbances as bellow:

$$y_{it} = x'_{it}\beta + \mu_i + \lambda_t + \nu_{it} = x'_{it}\beta + \alpha_i + \nu_{it} \quad , \alpha_i = \mu_i + \lambda_t \qquad (1)$$

Where, i = 1, 2, …, N denotes individuals and t=1,2, …, T denotes time. Also, x'_{it} is a vector of observations on k explanatory variables, β is a k vector of unknown coefficients, μ_i is an unobserved individual specific effect, λ_t is an unobserved time specific effect and ν_{it} is a zero mean random disturbance with variance σ^2_t. The first step in using panel data, after determining stationary of selected variables, is selecting the best method (fixed effect or random effect) to estimate equation (1). If μ_i and λ_t denote fixed parameters to be estimated, this model is known as the fixed effects model. The x_{it}'s are assumed independent of the ν_{it}'s for all i and t. But, if μ_i and λ_t are random variables with zero means and constant variances σ^2_μ and σ^2_λ, this model is known as the random effects model. The preceding moments are conditional on the x_{it}'s. In addition, μ_i, λ_t and ν_{it} are assumed to be conditionally independent (Baltagi, 2008). Indeed, the term "fixed effects" is due to the fact that, although the intercept may differ across individuals (here, 117 countries), each individual's intercept does not vary over time; that is time invariant (Gujarati, 2004). To select fixed effect or random effect, the F-Limer test can be examined. The statistics of F- Limer test is presented as follow:

$$F\ (n\text{-}1, nt\text{-}n\text{-}k) = \frac{(RSS_R - RSS_{UR}\ /(n-1)}{RSS_{UR}/(nt-n-k)}$$

Where, RSS_R denotes the restricted R^2 and the RSS_{UR} is unrestricted R^2 value. H_0 hypothesis is homogeneity of intercept (Esmaeilzadeh and Alipanahi, 2015). Also, in addition to F-Limer test, the Hausman test is useful to select between fixed effect and random effect method. The random and fixed effect models yield different estimation results, especially if T is small and N is large. Hausman (1978) presented a specification test based on the difference between these estimates.

The null hypothesis is that the individual and time-effects are not correlated with the x_{it}'s. The basic idea behind this test is that the fixed effects estimator $_{FE}$ is consistent whether the effects are or are not correlated with the x_{it}'s (Baltagi, 2008).

2.2. The Model

In this study, to investigate the impact of human capital on unemployment in selected countries the model (2) is presented as bellow:

$$UNE_{i,t} = a_i + \beta_1 LE_{i,t} + \beta_2 INF_{i,t} + \beta_3 GCF_{i,t} + \beta_4 GNI_{i,t} + \beta_5 EDI_{i,t} + \varepsilon_{i,t} \qquad (2)$$

Where, UNE denotes unemployment rates, LE is life expectancy at birth as a proxy for health status; INF and GCF indicate the inflation and gross capital formation (% of GDP of selected countries) respectively. GNI indicates gross national per capita income. Finally, EDI is education index (Calculated using Mean Years of Schooling and Expected Years of Schooling). The needed data has been provided by World Bank as well. In this study we use the STATA software to estimate the model (2).

3. RESULTS

In this section the effect of human capital on unemployment 117 countries is investigated by using panel data method. This relationship is performed in three stages. The First is checking the variables stationary. The unit roots tests is a standard procedure in time series analyzes. Although, Levin and Lin (1992); Im *et al.* (1997); Harris and Tzavalis (1999); Maddala and Wu (1999); Choi (1999) and Levin *et al.* (2002) have proposed panel unit root tests to indicate the stationary of the intended variables, in this paper we use the Levin, Lin and Chu (LLC) test to examine the stationary of variables. The results of using LLC test show that all intended variables are stationary 1%, 5% and 10% confidence level. The second challenge in panel data analysis is the answer to this question that which the Fixed Effect Model (FEM) or Random Effect Model (REM) is better? To solve this problem the Hausman test is used to select FEM or ECM (Gujarati, 2004). Therefore, the result of Hausman test is presented in table 1 as bellow:

Table-1. The estimated results of Hausman test

Chi2 (4)	Prob.
11.60	0.00

Source: Calculated by Authors

According to table 1, the fixed effect method can be selected to evaluation the model 2. Despite there are some additional problems, such as heteroscedasticity and cross correlation in countries units at the same point in time. So, we use the Likelihood ratio (LR) test to test heteroscedasticity. The results are provided in table 2 as follow:

Table-2. The estimated results of Likelihood Ratio (LR) test

Likelihood-Ratio (LR Chi2 (116))	Prob.
1891.50	0.00

Source: Calculated by Authors

According to the presented Likelihood-ratio and calculated prob. in the table 2, there is the problem of heteroscedasticity. Therefore, the model 2 is evaluated by GLS to solve the heteroscedasticity. The final results of estimation are provided in table 3 as bellow:

Table-3. The results of estimation of model (2) by GLS

Coef.	Value	z	P>|z|
β_1	- 0.120	-4.14	0.000
β_2	- 0.102	-3.43	0.000
β_3	-0.029	-1.35	0.176
β_4	-0.0001	-7.22	0.000
β_5	12.30	7.67	0.000
Cons.	11.44	7.18	0.000

Source: Calculated by Authors

According to the table 3, the results of the panel data estimations based on the GLS method show that all of variables are statistically significant at the 1%, 5% level except GCF. As can be seen, the coefficient of life expectancy rate (LE) is equal to -0.12. This shows that when the life expectancy in selected countries rise by on year so the unemployment rate decrease by 0.12. But, the coefficient of inflation rate is equal to - 0.102 and less than life expectancy indicating that the unemployment rate has been affected by life expectancy more than inflation rate negatively. Also, the estimated value for GNI is equal to -0.0001 that is not considerable. The coefficient of education index is equal to 11.44. This result indicates that unemployment rate also will increase significantly with increase in mean years of schooling and expected years of schooling.

4. CONCLUSION

The review of the economic literature that focused on the determinants of economic growth nation's shows that a wide range of studies have examined the influences of human capital on economic growth. A considerable body of these studies showed the positive effects of human capital (including education and health) on productivity of workforce. Although, the increase of workforce productivity levels could be lead to the decrease of unemployment However, there are few studies that study these contributions of both aspects of human capital on unemployment. Accordingly, this study attempts to examine this practice in 117 countries by using panel data method during 2005-2013. The needed date has been provided by World Bank. To do so, the education index and the life expectancy (as a proxy for health status which has been used by many researchers) are used in order to indicate the health status. In addition to human capital, the impacts of inflation, capital formation and gross national income per capita on unemployment have been taken into consideration as well. The results show that with increase of life expectancy the unemployment decrease. Also, the effects of inflation and GNI on life expectancy are negative. The results indicate that with increase in education index, the unemployment increases as well. To sum up, the human capital can be affect the unemployment rate by health and education. Therefore, and in terms of policy, Given the importance of the impact of human capital on unemployment, the improvement of health status and education quality can be increases the employment rate.

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