

# The Importance of Human Inequalities and Health Care Quality in Life Expectancy of Countries

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Received: August 25, 2016

Accepted: September 10, 2016

Online Published: October 10, 2016

doi:10.5430/ijfr.v7n5p140

URL: <http://dx.doi.org/10.5430/ijfr.v7n5p140>

## Abstract

In Human Development Reports published by The United Nations Development Programme (UNDP), the development in the health dimension is measured by life expectancy at birth. In the context of this study, factors that affect life expectancy in 130 countries were analyzed with the help of established multiple regression model. The independent variables of the model, except the proportion of health expenditure in GDP, human inequality, gross national income per capita and satisfaction with health care quality are found to be statistically significant. This situation indicates that the quality of health services in the country in terms of life expectancy is more important than the amount of health care expenditures. The most influential variables on life expectancy at birth were found in order as; human inequality, gross national income per capita and satisfaction with health care quality.

**Keywords:** human development, life expectancy, health care quality, human inequalities, health expenditures

## 1. Introduction

Within the aim of ensuring the sustainable development of society, there are four important dimensions and these are economic development, which includes the elimination of extreme poverty, social inclusion, environmental sustainability and good governance. Health as a human right is critical to achieve these four objectives (SDSN (Note 1), 2014:8). Therefore, it is seen that the developed countries especially give attention to the health services. Successful health services will increase the human capital stock of the relevant country (Boyacıoğlu & Taşkın, 2012:18). The country that has increasing human capital stock will enter into much faster development process.

At present, the health dimension in human development index, which is taken as a measure of development, is measured by life expectancy at birth (UNDP, 2014a). As the life expectancy is a factor that affects the development, what can be the determinants of this period have been an important area of research. In this context, the main purpose of the study is to explain the duration of life with new markers such as human inequalities and health care quality in addition to the health expenditures and income variables commonly used in literature.

## 2. Literature Review

General thought is that there is a relationship between low income (and its result as poverty) and poor health conditions (Benzeval & Judge, 2001). The low level of income is closely connected with the lack of individual capacity. Because, low-income causes starvation and malnutrition as well as low literacy rate and lack of physical health. On the other hand, better education and health provide higher income (Sen, 2004:35). Therefore, there is a negative relationship between the level of income and the rate of mortality (Palme & Sandgren, 2008). Even, the relationship between the risk of death and the level of income is quite strong (Jusot, 2006; McDonough et al., 1997).

One of the variables used in the literature to explain the life expectancy at birth is health expenditures. Studies in this area, a significant and positive relationship between health expenditures and health consequences such as life expectancy of individuals in a country has been found in general (Kennelly et al., 2003; Jaba et al., 2014).

In addition to income level, distribution of the income in fair is a factor that affects the health dimension of development and therefore the life expectancy. In the studies in this area, it has generally been found that unfair income distribution has a negative effect on the health of community. For example, according to Marmot and Smith (1989), achieved economic successes have an effect on rapid healing in life expectancy in Japan. Not only the wealth in the country but also the reduction of income differences between rich and poor, which accompanied this wealth, had

positive effects on health. Rodgers (2002), added income and its distribution as an independent variable to explain the life expectancy at birth in countries in the model and found out these two variables highly significant in the results of the analysis. Similarly Tacke and Waldmann (2013), found a positive and significant relationship between infant mortality and income inequality. In another study to support this idea De Vogli et al. (2005), found out a negative correlation between the life expectancy at birth and income inequality.

Although Gini coefficient is used to measure inequality of income in the literature to explain the life expectancy as (Mayrhofer & Schmitz, 2014; De Vogli et al., 2005; Rodgers, 2002) did, in our study as a measure of social inequalities, the coefficient of human inequality in the UNDP's Human Development Report was used. Because, this coefficient measures not only at the level of income like Gini coefficient, but also measures inequalities that arise in other determinants of human development in health and education. The coefficient of human inequality in UNDP (2014a; 2014b) reports is calculated by taking unweighted arithmetic average of the inequality in income, education and health.

The variable of satisfaction with health care quality that is not commonly used in the literature has been added as the fourth and the last variable of the model to explain the life expectancy. The reason why we used this variable is as OECD (2011:16) expresses that the health status of the community is also affected by social, economic and physical environment of the people, individual lifestyle, behavioral factors and besides good performance of the health care system. The most important dimension in determining the performance of health care systems is accessing to these services and their quality.

The data of satisfaction with health care quality in countries in UNDP reports are determined through a survey in which whether the people of the country are satisfied with accessible current quality health care (UNDP, 2014c:223).

### 3. Methodology and Data

The life expectancy at birth that is a dependent variable in the study has been estimated with a multiple linear regression model, which has independent variables per capita income, human inequalities, satisfaction of health care quality and health expenditures rates in GDP. The established model is as follows;

$$LEAB = B_0 + B_1 INCOME + B_2 INEQUALITIES + B_3 HEALTHCAREQUALITY + B_4 HEALTHEXPENDITURE + \epsilon_i$$

*LEAB*: Life expectancy at birth of the countries (2013)

*INCOME*: The ratio of the gross national income per capita of the countries to the world average (2013) (Note 2)

*INEQUALITIES*: Coefficient of human inequality of the countries (2013)

*HEALTHCAREQUALITY*: Satisfaction with health care quality in countries (%) (2008-2012)

*HEALTHEXPENDITURE*: Total health expenditure (as % of GDP) (2011)

$\epsilon_i$ : It represents the term "error".

The data used in the model were taken from UNDP's 2014 Human Development Report Statistics (UNDP, 2014d). In the analysis, the data that belong to 130 countries (look at annex table 2) and related to variables in the model were used and the other countries, which don't have all variables in the model, were left out of the analysis.

### 4. Results

Established models with multiple connections can lead to incorrect evaluations. Whether the established models have multiple linear connection or not can be controlled by looking at VIF and tolerance values (Gujarati, 2006; Albayrak, 2005). In this context, when VIF and tolerance values in the table are examined, it can be seen that VIF values of all variables are smaller than 10, therefore, there is no multi-connection problem.

As seen in the table, the Durbin-Watson statistic in the model provides to test whether there is an auto-correlation or not and if it is around 1.5 to 2.5, it indicates that there is no auto-correlation (Kalaycı, 2009: 267). If the statistic of Durbin-Watson is 1.685, it indicates that there is no auto-correlation.

Table 1. Multiple regression results

$$LEAB = B_0 + B_1 INCOME + B_2 INEQUALITIES + B_3 HEALTHCAREQUALITY + B_4 HEALTHEXPENDITURE + \epsilon_i$$

<i>Variables</i>	<i>Unstandardized Coefficients</i>	<i>Standardized Coefficients</i>	<i>Significant</i>	<i>Tolerans</i>	<i>VIF</i>
	<b>B</b>	<b>Beta</b>			
<b>Constant</b>	75.753		0.000		
<b>INCOME</b>	1.704	0.188	0.02	0.342	2.922
<b>INEQUALITIES</b>	-0.536	-0.609	0.000	0.442	2.264
<b>HEALTHCAREQUALITY</b>	0.079	0.162	0.007	0.626	1.598
<b>HEALTHEXPENDITURE</b>	-0.087	-0.027	0.596	0.840	1.190
<b>R Square</b>	0.727				
<b>Adjusted R Square</b>	0.718				
<b>Anova-Sig.</b>	0.000	Durbin-Watson: 1.685			
In the analysis, SPSS was used.					

In multivariate regression analysis, the R-squared value is a measurement of how much the change in dependent variables is explained by the change in independent variables in the model (Altunışık et al., 2007:211). When the results of the analysis are examined, it is seen that independent variables explain nearly 73 percent of the change in dependent variables.

In the model, all the variables except health expenditures share of GDP and the model at 5% level are statistically significant. While there is a positive relationship between life expectancy at birth and either per capita gross national income or the satisfaction level of health care quality, there is a negative relationship between human inequalities and life expectancy at birth. Actually, this result is an expected state.

Standardized coefficients in the model shows the order of importance of the independent variables (Kalaycı, 2009:269). Therefore, the most influential variable on the dependent variable is as follow; Human inequalities ( $\beta$ :0.609) and per capita gross national income ( $\beta$ :0.188) and satisfaction with health care quality ( $\beta$ :0.162).

## 5. Conclusion

Multiple regression model was established to evaluate the elements that affect the life expectancy at birth, which is one of the most important determinants of human development. The feature of our study is adding two new variables as the satisfaction with health care quality and coefficient of human inequality besides commonly used variables as income and health expenditures in empirical studies related to the subject.

In the model established in the study, all the variables except health expenditures share of GDP were found to be statistically significant and independent variables explains approximately 73 per cent of dependent variable which is a life expectancy at birth. While the gross national income per capita and satisfaction from the health care quality in the countries increase, the life expectancy at birth gets longer, on the other hand, it also decreases if human inequalities increase.

As a result, to extend the average lifespan, it is not only enough to income growth, more importantly; to reduce the inequalities that arise in all areas of society. In addition to this, countries shouldn't only make an effort to increase the amount of money spent in the field of healthcare, but also they should use these expenditures efficiently and should work to improve the quality of health services.

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## Notes

Note 1. SDSN refers to The Sustainable Development Solutions Network in this study.

Note 2. In UNDP's 2014 Human Development Report, the world average of gross national income per capita for the year 2013 is \$13.723.

## Annex

No	Country	No	Country	No	Country
1	Norway	45	Trinidad and Tobago	89	Morocco
2	Australia	46	Lebanon	90	Nicaragua
3	Switzerland	47	Panama	91	Tajikistan
4	Netherlands	48	Venezuela (Bolivarian Republic of)	92	India
5	United States	49	Costa Rica	93	Cambodia
6	Germany	50	Turkey	94	Ghana
7	Canada	51	Kazakhstan	95	Lao People's Democratic Republic
8	Denmark	52	Mexico	96	Congo
9	Ireland	53	Sri Lanka	97	Zambia
10	Sweden	54	Iran (Islamic Republic of)	98	Bangladesh
11	Iceland	55	Azerbaijan	99	Nepal
12	United Kingdom	56	Jordan	100	Pakistan
13	Korea (Republic of)	57	Serbia	101	Kenya
14	Japan	58	Brazil	102	Swaziland
15	Israel	59	Georgia	103	Angola
16	France	60	Peru	104	Rwanda
17	Austria	61	Ukraine	105	Cameroon
18	Belgium	62	The former Yugoslav Republic of Macedonia	106	Nigeria
19	Luxembourg	63	Bosnia and Herzegovina	107	Yemen
20	Finland	64	Armenia	108	Madagascar
21	Slovenia	65	Thailand	109	Tanzania (United Republic of)
22	Italy	66	Albania	110	Mauritania
23	Spain	67	Jamaica	111	Lesotho
24	Czech Republic	68	Colombia	112	Senegal

<b>25</b>	Greece	<b>69</b>	Ecuador	<b>113</b>	Uganda
<b>26</b>	Cyprus	<b>70</b>	Suriname	<b>114</b>	Benin
<b>27</b>	Estonia	<b>71</b>	Dominican Republic	<b>115</b>	Togo
<b>28</b>	Lithuania	<b>72</b>	Mongolia	<b>116</b>	Haiti
<b>29</b>	Poland	<b>73</b>	Indonesia	<b>117</b>	Afghanistan
<b>30</b>	Slovakia	<b>74</b>	Botswana	<b>118</b>	Djibouti
<b>31</b>	Malta	<b>75</b>	Egypt	<b>119</b>	Côte d'Ivoire
<b>32</b>	Chile	<b>76</b>	Paraguay	<b>120</b>	Malawi
<b>33</b>	Portugal	<b>77</b>	Gabon	<b>121</b>	Liberia
<b>34</b>	Hungary	<b>78</b>	Bolivia (Plurinational State of)	<b>122</b>	Mozambique
<b>35</b>	Croatia	<b>79</b>	Moldova (Republic of)	<b>123</b>	Guinea
<b>36</b>	Latvia	<b>80</b>	El Salvador	<b>124</b>	Burundi
<b>37</b>	Argentina	<b>81</b>	Uzbekistan	<b>125</b>	Burkina Faso
<b>38</b>	Uruguay	<b>82</b>	Philippines	<b>126</b>	Sierra Leone
<b>39</b>	Montenegro	<b>83</b>	Syrian Arab Republic	<b>127</b>	Chad
<b>40</b>	Belarus	<b>84</b>	Iraq	<b>128</b>	Central African Republic
<b>41</b>	Romania	<b>85</b>	Viet Nam	<b>129</b>	Congo (Democratic Republic of the)
<b>42</b>	Russian Federation	<b>86</b>	Guatemala	<b>130</b>	Niger
<b>43</b>	Bulgaria	<b>87</b>	Kyrgyzstan		
<b>44</b>	Mauritius	<b>88</b>	Honduras		