**Economic and Social Factors in Shaping Jordan’s Life Expectancy:**

 **Empirical Analysis (1990-2014)**

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**Abstract**

The paper attempts to examine the socio-economic determinants of life expectancy in Jordan over the over the period from 1990 through 2014 using vector autoregression (VAR) framework

The explanatory variables concluded that the change in life expectancy comes from per capita GDP (LGDP) with 21% and unemployment (LUNPR) with 19%. This is followed by a small change in of 6%, 5% and 2% of government expenditure on health (LGHE), secondary school enrolment (LSEER) and urban population (LURBAN) respectively. This opens up new insights for policy making to consider economic stabilization policies with the aim of increasing productivity, economic growth, and reducing unemployment, while formulating comprehensive policy to increase health care expenditures and improve governorates development situations.

**JEL Classification Number:** D60,I10

**Keywords:** Life expectancy, VAR, Socio-economic factors, Jordan

**1 Introduction**

 According to World Bank life expectancy at birth (LEB) refers to the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life (The World Bank, 2017). Life expectancy at birth is an indicator of overall increased longevity and in this regard has resulted in important connotation at patient and societal level through its relationship with economic growth, quality of life, healthcare innovation, and investment in human capital, social security claims and fertility behavior (Gilligan and Skrepnek, 2015). Increases in national income resulted into gains in education, urbanization, and sanitation and are usually linked with the adoption of healthful behaviors and increased availability of health resources, both of which eventually enhance physical well-being and enhance quality of life (Austin and Mckinney, 2012).

 Life expectancy reflects the quality of life in a country and summarizes mortality rates at all ages, and is necessary for various actuarial measures (CIA, 2017). The health status of any country is difficult to measure directly as it requires various combinations of economic, social and environmental variables. The human development index published by United Nations as a proxy for human development among countries uses life expectancy at birth in addition to other factors such as literacy rate and income (Poudyal et al., 2009). Through the last two decades, life expectancy at birth has been recognized to be one of the most important indicators of economic development in both developed and developing countries, and reflects the degree for economic and social development of a country or a region (Delavari et al., 2016). In addition, health care has an effect on other health care related industries in terms of rising medical and insurance costs, pharmaceuticals drugs and elderly care services. Hence, checking determinants of life expectancy for a given country became a very important issue and considered to be one of the key policies for achieving a sustainable development in developing countries.

 Therefrom, the main aim of a public health care policy is to maintain and improve nation's health position. Hence, examining factors behind population health is crucial and the literature has illustrated that demographic and socioeconomic variables are responsible for LE, that is, age, gender, education and GDP per capita (Chan, 2015). Indications of socioeconomic, demographic, and health care expenditures effects on life expectancy have been proved in previous studies, yet examining empirically life expectancy in Jordan was not found.

 To that end, the current study contributes to the growing comparative literature on determinants of life expectancy. Data in the current analysis have been collected from World Bank database and the VAR analysis was incorporated in drawing conclusions about significance of the variables in the analysis. This study intends to understand main factors affecting life expectancy, which could help policymakers to gain an efficient view on appropriate policies needed to influence health, education and employment policy purposes. The next section provides a brief theoretical framework on the relationship between life expectancy and other determinants. In a following section we introduce data and methodology adopted. Section 4 delivers the results and in the final section we deliver conclusions and policy applications.

**2 Theoretical views**

 The studies on life expectancy have focused on countries as a unit of analysis. For example, Sede and Ohemeng (2015) utilized VAR and VECM technique and found that conventional economic variables used in studies of life expectancy such as income per capita, education and government expenditure on health are not significant in the Nigerian case. Gilligan and Skrepnek (2015) disclosed that no significant predictors existed for non-industrialized/least developed countries (as in Eastern Mediterranean Region) between domestic product, average of vaccines, urbanizationand life expectancy. They also illustrated that physician density on the other hand, GDP, literacy, health expenditures and vaccination in more industrialized countries gap of life expectancy between advantaged and disadvantaged areas in Québec(Canada) and concluded that it was driven by relatively few causes of death(for example heart disease, cancer, and un-intentional injuries. Kabir (2008) regressed life expectancy against economic and non- economic variables. Results from the study reports that relevant socio-economic factors like income per capita income, health expenditure, education, availability of safe water, and urbanization cannot always be considered to be influential in determining life expectancy in developing countries.

 Fang et al. (2010) pointed out that increase in health inequality is often accompanied with rapid economic growth and increase in life expectancy, and showed that primary health care has an influence more important role than hospital services in reducing regional inequalities in health. Rosero-Bixby et al. (2005) asserted the weak effect of socioeconomic status on life expectancy in Costa Rica. Other researchers studied life expectancy determinants and found a positive impact between life expectancy and the other variables. Blazquez-Fernández et al. (2017) acknowledged that income per capita, exchange rate and unemployment improve health outcomes (life expectancy) among OECD countries. Audi and Ali (2016) ended up that food availability, secondary school enrolment; CO2 emissions; per capita income and population growth in Lebanon have significant impact on life expectancy. However, Delavari et al. (2016) revealed that the significant positive effect of per capita GDP, literacy rate , number of doctors per 10,000 population and access to food have a significant statistically effect on Life expectancy at birth (LEB) in Iran, whilst inflation rate, urbanization quality and CO2 emission were not significant on LEB.

 Shahbaz et al. (2016) focused on determinants of life expectancy in Pakistan in the presence of economic misery and concluded that economic misery and rural–urban income inequality have a substantial negative impact on life expectancy at birth, and that urbanization support life expectancy while illiteracy declines it. Alam et al. (2016)noted that economic misery and rural–urban income inequality have a substantial negative effect**,** whileeducation expenditure and economic growth have a significant and positive impact on life expectancy. For countries like Malaysia, Singapore and Thailand, Chan and Devi (2015) found that availability of more health care resources and higher levels of socioeconomic advantages are more likely to increase life expectancy. The findings of Chan and Devi (2015) are coincidental with Chan (2015) findings, but for Vietnam Indonesia and Philippines.

 Heiman and Artiga (2015) concluded that in USA socioeconomic position, employment, education, physical environment and social support networking, as well as availability of health care are determinants for health outcomes such as life expectancy. According to Jalal and Khan (2015) with an increasing GNI per capita and GDP improvement in life expectancy was associated together; Keita (2013) revealed that GDP per capita adult literacy, having ability to acquire improved sanitation and safe water are strongly and positively correlated with life expectancy gain(considered as an proxy of global health improvement at country level). For East Mediterranean countries Bayati et al. (2013)declared thatemployment ratio, per capita income, education index, food availability level of urbanization and were specified as determinants of health status (as an indicator for life expectancy at birth). On another stride, Sufian (2013) concluded that infant mortality rate is the most influential variable in discriminating among countries with low values of life expectancy at birth (LEB); countries with medium values of life expectancy at birth (LEB); and countries with high values of life expectancy at birth (LEB), whilst poverty is the second affecting variable. Lin et al. (2012) pointed out to the small effect of democratic politics on increasing life expectancy in the short term when compared to the effects of other socioeconomic factors. Iacobuta and Cuza (2012) regressed life expectancy across per capita health expenditure, per capita GNI, good governance, education opportunities, gender equality and healthy environment and and confirmed the positive correlation while a negative correlation was found between life expectancy and population growth.

 Modernization is found to be another leading factor to determine life expectancy as in Austin and Mckinney (2012) across less-developed nations and HIV to be the strongest determinant of life expectancy in Sub-Saharan African countries. Halicioglu (2011) discussed that nutrition and food availability along with health expenditures are related in improving longevity, while Biggs et al. (2010) argued that wealthier are quite truly healthier. Khang et al. (2010) proved amelioration in life expectancy with an increased income.

 A number of studies have analyzed the health benefits of landscape quality and environmental resources on their effect on life expectancy. Poudyal et al. (2009) for example looked at the importance of the preservation and utilization of natural resources, environmental convenience and outdoor entertainment opportunities with longer expectancies at birth. Johansson et al. (1999) argued that personal preferences may be just as important for having a healthy diet as social status determinants. According to Shaw et al. (2005), decreasing tobacco intake consumption by about two cigarettes per day or increasing fruit and vegetable consumption by 30% increases life expectancy approximately one year for 40-year-old females in developed countries and pharmaceutical consumption has a positive effect on life expectancy at middle and advanced ages but is sensitive to the age distribution of a given country. However,for Polish women unemployment, educational level, living conditions, marital status, smoking and life style are strongly associated with a large difference in life expectancy across their working ages (Wroblewska, 2002).

 Other studies have focused on people’s own perceptions as a driver for LEB as in Popham et al. (2007), as for the lifetime Socio-Economic Position (SEP) appears to reflect something over and above current health status and smoking parctices. In the same vein, Swanson et al. (2009) concluded that high Socio-Economic Status (SES); populations in seven of the eight states in US have gained additional life expectancy over low SES populations between 1970 and 1990. In Beijing, ample availability of floor space per rural resident and GDP per capita are also found to be positively correlated with life expectancy according to Lei et al. (2009), whilst illiteracy rate and rural population proportion correlated negatively with life expectancy. Singh and Siahpush (2006) explored changes in the extent of inequalities in life expectancy at birth and other ages in the United States between 1980 through 2000 by gender and socioeconomic deprivation levels and concluded that those in less-deprived groups experienced a longer life expectancy at each age than their counterparts in more-deprived ones. The study concluded that between 1980 and 2000, those in higher socioeconomic class groups witnessed larger gains in life expectancy than those in more-deprived groups, eventually leading to widening the gap.

 A number of studies have analyzed social economic variables and found their negative impact on life expectancy. For example, in Ukraine the decrease in control rising from increasing political and economic environment uncertainties, in addition to deficiency in material wealth and the stress of change may all have contributed to the decline in life expectancy seen with transition countries as found by Gilmore et al. (2002). CRE´MIEUX et al. (1999) reported that health care spending is associated with a statistically significant increase in infant mortality and a decrease in life expectancy in Canada. Ali et al. (2015) confirmed that ratio of dependent population, infant mortality rate, births per 1,000 population and deaths per 1,000 population, all have negative relationship with life expectancy at birth in forty three countries of Asia and Sargolzaie et al. (2017) observed the association between low life expectancy and less developed conditions in Zahedan (Iran).

**3 Methodology and Data**

 The study in this paper will examine the socio-economic determinant of life expectancy in Jordan through a Vector Autoregression (VAR) framework. The VAR will offer information about the relationship between the socio-economic variables and life expectancy in Jordan. The VAR will contain several procedures for evaluating the causality between socio-economic variables and life expectancy. In this study five socio-economic variables will be considered. These variables are log of GDP per capita (LGDP), log of secondary school enrolment (LSEER), log of government expenditure on health per capita (LGHE), log of unemployment (LUNPR) and log of urban population (LURBAN). The log of life expectancy at birth (LLIFE) and the five socio-economic data are annually and gathered from the World Bank database over the period 1990 to 2014. The time series plots of all the variables are illustrated in Figure 1. While Table 1 display the descriptive statistics of these series. As seen in Figure 1, all the series except LUNPR and LSEER demonstrate upward trend throughout 1990 until 2014. It appears that LSEER start to move downward from 2009 before increase steadily in 2012. Meanwhile, LUNPR depicted fluctuation from 1990 until 2014. Overall from Table 1 all series have leptokurtic peak and lack of symmetry which show non-normality.

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Figure 1: Time Series Plot for the variables (LLIFE), (LGDP), (LSEER), (LGHE). (LUNPR) (LURBAN)

Table 1: Descriptive Statistics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **LLIFE** | **LGDP** | **LSEER** | **LGHE** | **LUNPR** | **LURBAN** |
|  Mean |  4.27 |  8.86 |  4.45 |  5.25 |  2.63 |  4.38 |
|  Std. Dev. |  0.01 |  0.31 |  0.05 |  0.46 |  0.15 |  0.03 |
|  Skewness | -0.11 | -0.001 | -0.41 | -0.001 |  0.56 | -0.90 |
|  Kurtosis |  1.82 |  1.52 |  2.60 |  1.85 |  2.42 |  3.12 |
|  Observations |  25 |  25 |  25 |  25 |  25 |  25 |

 Apart from non-normality checking whether the series is stationary or not is an important process while dealing with time series data. This is because non-stationary series may yield spurious results. According to Brooks (2014), it is better to jointly use stationary and unit root tests for stationary testing which is known as confirmatory data analysis. Thus, in this paper the ADF test by Dickey and Fuller (1981) with the null hypothesis of unit root while the KPSS test by Kwiatkowski et al. (1992) with the null hypothesis of stationary will be applied. Next, cointegration test is carried out to investigate whether all the series are cointegrated or not.

 Cointegration test helps to determine whether there is any long run relationship among the series. In this paper, the Johansen cointegration test going to be executed. The Johansen test is based on two test statistics, the Trace statistic and Maximum eigen statistic (Johansen, 1988; Johansen and Juselius, 1990). After that, both Vector Autoregression (VAR) model and Vector Error Correction Model (VECM) will be carried out at the level. However, VECM will be performed if cointegration among variables exists. In VAR model, each of the series is regressed on its own lag and the lags of other series. This system will allow each of the series to be affected by its own past and the past of other series which minimize the problem of simultaneity.

 Moreover, modelling VAR using level series will have significant insights on the nature of relationships between all the series. In addition, the VAR also contains two procedures to evaluate the relationship. Firstly, the Granger causality test which capture the direction of causal relationships or the direction of impact between life expectancy and the socio-economic variables. Secondly, variance decompositions offer a slightly different method which measures the relative magnitude of an impact in percentage. More precisely, it shows the percentage change of life expectancy that may be ascribed to the effect of expansion in socio-economic variables.

**4 Results**

 As mentioned in the previous section, non-stationary series will produce a spurious and inconsistent estimation. Thus, the results in Table 2 indicate that all the series are non-stationary at the level data where the null hypothesis is rejected for the KPSS test and accepted for the ADF test. However, both series became stationary after first differences where the null hypothesis is not rejected for the KPSS test and rejected for the ADF test. This result indicates that all series are stationary at the same level, which is 1st difference.

Table 2: Results of Stationary test

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Series** | **ADF**  | **Statistic** | **KPSS** | **Statistic** |
|  | **Level** | **1st Diff** | **Level** | **1st Diff** |
| LLIFE | -1.68 | -2.48\*\* | 0.19\*\* | 0.12 |
| LGDP | -3.21 | -2.11\*\* | 0.71\*\* | 0.16 |
| LSEER | -2.05 | -2.43\*\* | 0.16\*\* | 0.37 |
| LGHE | -1.09 | -2.42\*\* | 0.71\*\* | 0.12 |
| LUNPR | -2.46 | -4.76\*\* | 0.43\*\* | 0.05 |
| LURBAN | 5.02 | -3.52\*\* | 0.16\*\* | 0.47 |

Note: \*\*\*, \*\*, \* denotes significance at 1%, 5% and 10% levels respectively.

 For reasonable policy analysis, the relationship between all the series in the long run is very crucial. Based on the Johansen test of cointegration in Table 3, the Trace statistic and the Maximum Eigen statistic suggest two different results. In the case of conflicting results, the Maximum Eigen statistic is preferred. Enders (1995) states that Maximum Eigen statistics value should be preferred when deciding the number of cointegrating equations as it has a sharper alternative hypothesis than the Trace statistic. From Table 3, it can be concluded at least two cointegrating equations among the series. This confirms the presence of long run relationship between short-run dynamic and long-run equilibrium of the model.

Table 3: Johansen cointegration test

|  |
| --- |
| **Cointegrating Vector (LLIFE, LGDP, LSEER, LGHE, LUNPR, LURBAN)** |
| **Null Hypothesis** | **Trace Statistics** | **Maximum Eigen Statistics** |
| *r*=0 |  242.41\*\* |  144.02\*\* |
| *r*=1 |  98.39\*\* |  44.26\*\* |
| *r*=2 |  54.13\*\* |  24.90 |
| *r*=3 |  29.22 |  20.07 |
| *r*=4 |  9.15 |  7.27 |
| *r*=5 |  1.88 |  1.88 |

Note:\*\*\*, \*\*, \* denotes significance at 1%, 5% and 10% levels respectively.

 Since all the series are found to be stationary at the same level and are cointegrated, the analysis proceeds with VAR model. Table 4 tabulated the estimation VAR; while Table 5 presented several specification tests on the residuals. As seen in Table 4, the one period past of the life expectancy (LLIFE), the GDP, the secondary school enrolment (LSEER) and the urban population (LURBAN) affect current level of life expectancy. From the specification tests in Table 5, it can be concluded that the model is well-specified because all the tests are nonsignificant.

Table.4: VAR Estimation

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Coefficient** | **t-statistic** | **Others statistics** |
| Constant | -0.08 | -3.89\*\* | R2=0.99 |
| LLIFE(-1) | 1.042 | 167.33\*\* | F-stat.= 334483\*\* |
| LGDP(-1) | -0.001 | -5.40\*\* |  |
| LSEER(-1) | 0.001 | 4.53\*\* |  |
| LGHE(-1) | 0.0002 | 1.77 |  |
| LUNPR(-1) | 0.00002 | 0.263 |  |
| LURBAN(-1) | -0.02 | -13.90\*\* |  |

Table 5: The results of specification tests

|  |  |  |
| --- | --- | --- |
| **Hypothesis Testing** | **H0** | **Test Statistics**  |
| VAR Residual Serial Correlation LM Test  | No serial correlation  | 34.11 |
| VAR Residual Heteroskedasticity Test | Residuals are homoskedastic | 264.81 |
| VAR Residual Normality Test | Residuals are multivariate normal  | 7.04 |

Note: \*\*\*, \*\*, \* denotes significance at 1%, 5% and 10% levels respectively.

 Next the analysis continues by executing the pair wise Granger causality test to investigate the causality relationship between life expectancy and the five socio-economic variables. Results in Table 6 reveal that the null hypothesis that per capita GDP (LGDP), secondary school enrolment (LSEER), government expenditure on health (LGHE) and urban population (LURBAN) do not Granger cause life expectancy (LLIFE) were rejected at 5% and 1%. However, unemployment (LUNPR) appeared not to Granger cause LLIFE while LLIFE also not to Granger cause LUNPR. In addition, the test uncovered bi-directional causality between LGDP and LSEER.

Table 6 : Pair-wise Granger causality test results

|  |  |  |
| --- | --- | --- |
| **Direction of causation** | **Chi-square value** | **Remark** |
| LGDP🡪LLIFE | 29.21\*\* | Reject |
| LLIFE🡪LGDP | 11.51\*\* | Reject |
| LSEER🡪LLIFE | 20.56\*\* | Reject |
| LLIFE🡪LSEER | 9.20\*\* | Reject |
| LGHE🡪LLIFE | 3.151\* | Reject |
| LLIFE🡪LGHE | 1.99 | Do not reject |
| LUNPR🡪LLIFE | 0.07 | Do not reject |
| LLIFE🡪LUNPR | 0.373 | Do not reject |
| LURBAN🡪LLIFE | 193.31\*\* | Reject |
| LLIFE🡪LURBAN | 0.27 | Do not reject |

Note: \*\*\*, \*\*, \* denotes significance at 1%, 5% and 10% levels respectively.

 The principal of variance decomposition is to measure the proportion of shock or changes in one variable that are based on its own shocks, versus shocks on other variables. In this paper, only variance decomposition for life expectancy (LLIFE) is shown because it is the focus of the study. The finding denotes that apart from the share of 46% of shock from itself, the change in life expectancy comes from per capita GDP (LGDP) with 21% and unemployment (LUNPR) with 19%. This is followed by a small change in of 6%, 5% and 2% of government expenditure on health (LGHE), secondary school enrolment (LSEER) and urban population (LURBAN) respectively.

Table 7: Variance decompositions estimate (in percentages)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Period** | **LLIFE** | **LGDP** | **LSEER** | **LGHE** | **LUNPR** | **LURBAN** |
| 1 |  100.00 |  0.00 |  0.00 |  0.00 |  0.00 |  0.00 |
| 2 |  86.56 |  6.38 |  3.95 |  0.42 |  1.12 |  1.53 |
| 3 |  75.32 |  11.61 |  5.92 |  0.82 |  4.13 |  2.17 |
| 4 |  67.29 |  15.33 |  6.52 |  1.26 |  7.20 |  2.37 |
| 5 |  61.48 |  17.96 |  6.47 |  1.82 |  9.84 |  2.41 |
| 6 |  57.10 |  19.73 |  6.15 |  2.52 |  12.10 |  2.38 |
| 7 |  53.64 |  20.78 |  5.76 |  3.35 |  14.10 |  2.33 |
| 8 |  50.82 |  21.24 |  5.39 |  4.26 |  15.97 |  2.29 |
| 9 |  48.49 |  21.23 |  5.08 |  5.16 |  17.75 |  2.25 |
| 10 |  46.57 |  20.91 |  4.85 |  5.97 |  19.45 |  2.22 |

 Finally, it is clear from the results in Table 8 that in the long run the past one period of unemployment (LUNPR) and secondary school enrolment (LSEER) contribute in determining the life expectancy in Jordan.

Table 8. The VECM results

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Coefficient** | **t-statistic** | **Others statistics** |
| Constant | -0.001 | -2.65\*\* | R2=0.99 |
| LLIFE(-1) | 1.49 | 7.90\*\* | F-stat.= 245\*\* |
| LGDP(-1) | -0.0003 | -1.49 |  |
| LSEER(-1) | 0.001 | 2.48\*\* |  |
| LGHE(-1) | -0.000005 | -0.05 |  |
| LUNPR(-1) | 0.0001 | 2.34\*\* |  |
| LURBAN(-1) | -0.001 | -0.37 |  |
| ECM1 | -0.036 | -4.23\*\* |  |
| ECM2 | 0.0005 | 2.84\*\* |  |

Note: \*\*\*, \*\*, \* denotes significance at 1%, 5% and 10% levels respectively.

**5 Discussion and Policy Recommendations**

 The study specified a vector autoregression (VAR) framework and five variables have been used as regressors to examine their significance in determining life expectancy in Jordan over the period (1990-2014). To carry this analysis, we have used annual data about variables in the study from the World Bank. The main idea of variance decomposition is to measure the proportion of shock or changes in one variable that are based on its own shocks, versus shocks on other variables showed that GDP per capita have a positive effect on LE. Some of these results support results from previous studies as in Blazquez-Fernández et al, (2017); Alam,(2016); Sede (2015); Jia,(2009) and (Bayati, 2013). In fact, higher levels of income allow more access to consumption of high quality goods and services, better housing, and medical care services which affect the health status. In a second importance, unemployment showed a positive effect on LE. The findings about unemployment verified the results of the previous studies mentioned in Bayati (2013); Blazquez-Fernández et al. (2017); Sedee(2015) and Jia,(2009). From a policy perspective, our study suggests that Jordanian government should generate and pursue a vigorously employment opportunities, enabling environment in terms of stable macroeconomic. As if unemployment is likely to adversely affect life expectancy, a higher proportion of unemployed people would tend to increase the dependency ratio, widen income distribution and adversely affect the affordability of the unemployed to properly access medical care. Particularly, we argue that policy makers should formulate policies to enforce commercial banks to provide loans at cheaper cost for new young entrepreneurship projects, and generate investment activities for employment opportunities and human capital formation, which will eventually enhance domestic production.

 There is no assurance that improvements government expenditures on health, secondary school enrolment and urban population respectively may exert positive persistent effects on life expectancy of Jordanians. Nevertheless, this study suggests that life expectancy could be improved if attention is given to quality government health capital expenditure, i.e., expenditure on medical equipment and service deliverables. Usually people in urban regions have more access to medical care services and heath knowledge. In the end, empirical results from the VECM results suggest that in the long run the past one period of unemployment (LUNPR) and secondary school enrolment (LSEER) contribute in determining the life expectancy in Jordan. In general, people with higher levels of education had higher sensitivity and awareness about their health; therefore, they are more aware on ways to improve the quantity and quality of their health. Therefore, education quality can be used as an economic tool to improve health indicators by introducing new curricula and syllabuses among education sector and that require s that the Jordan should enhance secondary education spending.

 The main conclusion of the present study is that the economic stabilization policies, such as increasing the productivity as well as the economic growth and reduction of unemployment, play significant roles in the health status of the people. This imposes new challenges for sustainable development related to population health and providing attention to human development in line with Millennium Development Goals (MDGs).

**References**

[1] Adam-Smith Jessica; Sam Harper and Nathalie Auger, “Causes of Widening Life Expectancy Inequalities in Québec, Canada, ” [Can J Public Health,](https://www.ncbi.nlm.nih.gov/pubmed/22032105) vol.105, no.5, 2011, pp.1989-2004.

[2] Alam, Samsul, Shahbaz, Muhammad; Paramati, Sudharshan Reddy, “The Role of Financial Development and Economic Misery on Life Expectancy: Evidence from Post Financial Reforms in India,” Soc Indic Res, vol. 128, 2016, pp.481–497.

[3] Ali, Mehboob; Ali, Maqsood; Razzak, Humera, “Discriminant Analysis of Socioeconomic Factors of Life Expectancy at Birth in Asia,” Sci.Int. vol.27, no 5, 2015, pp. 3971-3975.

[4] Audi, Marc; Ali, Amjad,“Socio-Economic Status and Life Expectancy in Lebanon: An Empirical Analysis,” Munich Personal RePEc Archive. (2016), MPRA Paper No. 72900.

[5] Austin, Kelly F. and Mckinney, Laura A.,“Disease, War, Hunger, and Deprivation: A cross-National Investigation of the Determinants of Life Expectancy in Less-Developed and Sub-Saharan African Nations,” Sociological Perspectives, vol. 55, issue 3, 2012, pp.421–447.

[6] Bayati, Mohsen; Akbarian, Reza; Kavosi, Zahra,“Determinants of Life Expectancy in Eastern Mediterranean Region: A Health Production Function,” International Journal of Health Policy and Management, vol. 1, no.1, 2013, pp.57-61.

[7] Biggs, Brian ; King, Lawrence ; Basu, Sanjay ; Stuckler, David,“ Is wealthier always healthier? The impact of national income level, inequality, and poverty on public health in Latin America,” Social Science &Medicine, vol.71: 2010, pp.266-273.

[8] Blazquez-Fernández, Carla; Cantarero-Prieto, David; Pascual-Saez, Marta,“Health expenditure and socio-economic determinants of life expectancy in the OECD Asia/ Pacific area countries,” Applied Economics Letters, vol.24, no.3, 2017, pp.167-169.

[9] Brooks, C., “Introductory Econometrics for Finance,” Cambridge: Cambridge University Press. 2014.

[10] Central Intelligence Agency (CIA), “The World Fact Book”,2017.

<https://www.cia.gov/library/publications/resources/the-world-factbook/fields/2102.html#jo>

[11] Chan, Moon Fai, “The Impact of Health Care Resources, Socioeconomic Status, and Demographics on Life Expectancy: A Cross-Country Study in Three Southeast Asian Countries,” Asia-Pacific Journal of Public Health, vol. 27, no. 2, 2015: pp. NP972-NP983.

[12] Chan, Moon Fai; Devi, M. Kamala, “Factors Affecting Life Expectancy: Evidence From 1980-2009 Data in Singapore, Malaysia, and Thailand,” Asia-Pacific Journal of Public Health, vol. 27, no.2, 2015, pp.136–146.

[13] CRE´MIEUX, PIERRE-YVES; OUELLETTE, PIERRE; PILON, CAROLINE , “Health care Spending as determinants of Health Outcomes,” Health Econ, vol. 8,1999, pp.627–639.

[14] Delavari Somayeh; Zandian, Hamed; Rezaei, Satar; Moradinazar, Mehdi; Delavari, Sajad; Saber, Ali; Fallah, Razieh,“Life Expectancy and its Socioeconomic Determinants in Iran,” Electronic Physician, vol. 8, no. 10, 2016, pp. 3062-3068.

[15] Dickey, D. A.; Fuller. W. A.,“Likelihood Ratio Statistics for Autoregressive
Time Series with a Unit Root,” Econometrica, vol. 49, 1981, pp.1057-1072.

[16] Enders, W. , “Applied Econometric Time Series”, Hoboken, NJ: Wiley.1995.

[17] Fang, Pengqian; Dong, Siping; Xiao, Jingjing; Liu, Chaojie; Feng, Xianwei; Wang, Yiping “Regional inequality in health and its determinants: Evidence from China. Health Policy,” vol. 94, 2010, pp.14–25.

[18] Gilligan, Adrienne M and Skrepnek, Grant H., “Determinants of life expectancy in the Eastern Mediterranean Region,” Health Policy and Planning, vol.30, 2015, pp.624–637.

[19] Gilmore, Anna B. C. ; McKee, Martin ; Rose, Richard, “Determinants of and inequalities in self-perceived health in Ukraine,” Social Science & Medicine, vol. 55, 2002, pp.2177–2188.

[20] Halicioglu, Ferda, “Modeling life expectancy in Turkey,” Economic Modelling, vol. 28, 2011, pp.2075-2082.

[21] Heiman, Harry J. and Artiga, Samantha,“Beyond Health Care: The Role of Social Determinants in Promoting Health and Health Equity”. November 2015, Issue Brief. The Kaiser Commission on Medicaid and Uninsured.

[22] Iacobuta, Andreea-Oana,; Cuza , Alexandru Ioan,“Socio-economic determinants of life expectancy: a cross-country analysis,” Journal of Academy of Business and Economics, vol. 12, no. 2, 2012. <http://www.freepatentsonline.com/article/Journal-Academy-Business-Economics/293813056.html>

[23] Jalal, Sabeena; Khan, Najib Ullah,“Situational Analysis of the Impact of GNI on the Elderly Population,” Ageing Int, vol. 40, 2015, pp.70–79.

[24] Johansen, S., “Statistical analysis of cointegrating vectors,” Journal of Economic Dynamics & Control, vol. 12, 1988 , pp.231–254.

[25] Johansen, S. and Juselius, K., “Maximum likelihood estimation and inference on cointegration-with applications to the demand for money,” Oxford Bulletin of Economics and Statistics ,vol. 52, 1990, pp.169–210.

[26] Johansson, Lars; Thelle, Dag S.; Solvoll, Kari; Bjørneboe, Gunn-Elin Aa; Drevon, Christian A.,“Healthy dietary habits in relation to social determinants and lifestyle factors,” British Journal of Nutrition, vol.81, 1999, pp.211–220.

[27] Kabir, Mahfuz,“Determinants of Life Expectancy in Developing Countries,”The Journal of Developing Areas, vol. 41, no. 2, 2008, pp.185-204.

[28] Keita, Moussa, “Standards of living and health status: the socioeconomic determinants of life expectancy gain in sub-Saharan Africa,”Munich Personal RePEc Archive MPRA Paper No. 57553, 2013, pp.1-23

[29] Khang, Young-Ho; Yang, Seungmi; Cho, Hong-Jun; Jung-Choi, Kyunghee; Yun, Sung-Cheol “Decomposition of socio-economic differences in life expectancy at birth by age and cause of death among 4 million South Korean public servants and their dependents,” International Journal of Epidemiology, vol. 39, 2010, pp.1656–1666.

[30] Kwiatkowski, Denis; Phillips, Peter. C. B.; Schmidt, P. and Shin, Y., “Testing the null hypothesis of stationarity against the alternative of a unit root,” Journal of Econometrics, vol. 54,1992, pp. 159–78.

[31] Lei, Haichao; Li, Liqiu ; Liu, Xiuying; Ayan, Mao, “Quantitative study on socioeconomic determinants of life expectancy in Beijing, China,” Journal of Evidence-Based Medicine JEBM, vol. 2, 2009, pp.92–98.

[32] Lin, Ro-Ting; Chen, Ya-Mei; Chien, Lung-Chang; Chan, Chang-Chuan “Political and social determinants of life expectancy in less developed countries: a longitudinal study,” BMC Public Health, vol.12, no. 85, 2012, pp.1-8.

[33] Popham, Frank; Mitchell, Richard,“Self-rated life expectancy and lifetime socio-economic position: cross-sectional analysis of the British household panel survey,” International Journal of Epidemiology, vol. 36, 2007, pp.58–65.

[34] Poudyal, Neelam C. ; Hodges, Donald G. ; Bowker, J. M. ; Cordell, H. K., “Evaluating natural resource amenities in a human life expectancy production function,” Forest Policy and Economics, vol.11, 2009, pp.253-59.

[35] Rosero-Bixby, Luis; Dow, William H.; Lacle, Adriana, “Insurance and Other Socioeconomic Determinants of Elderly Longevity in A Costa Rican Panel,” J. biosoc. Sci, vol.37, 2005, pp.705-720.

[36] Sargolzaie, Narjes; Kiani, Malek; Salari ,Mohamad; Khosravi, Morteza “Top Ten Causes of Death and Life Expectancy in Zahedan (South-East Iran) in 2014”, Global Journal of Health Science; vol. 9, no. 6, 2017, pp. 135-144.

[37] Sede, Peter, Ohemeng, Williams,“Socio-economic determinants of life expectancy in Nigeria (1980-2011),” Health Economics Review,vol.5 , no. 2, 2015, pp.1-11

[38] Shahbaz, Muhammad; Loganathan, Nanthakumar; Mujahid , Nooreen; Ali , Amjad; Nawaz, Ahmed, “Determinants of Life Expectancy and its Prospects Under the Role of Economic Misery: A Case of Pakistan,” Soc Indic Res, vol. 126, 2016, pp.1299–1316.

[39] Shaw, James W.; Horrace, William C.; Vogel, Ronald J.,“The Determinants of Life Expectancy: An Analysis of the OECD Health Data,” Southern Economic Journal, vol. 71, no.4, 2005, pp.768-783.

[40] Singh, Gopal K; Siahpush, Mohammad, “Widening socioeconomic inequalities in US life expectancy, 1980–2000,” International Journal of Epidemiology, vol. 35, 2006, pp.969–979.

[41] Sufian, Abu Jafar Mohammad, “Life Expectancy and its Socioeconomic Determinants -A Discriminant Analysis of National Level Data,” International Journal of Humanities and Social Science, vol. 3, no. 12, 2013, pp.303-312.

[42] Swanson, David A.; McGehee, Mary A.; Hoque, Nazrul , “Socio-Economic Status and Life Expectancy in the United States, 1970–1990,” Population Review, vol. 48, no. 1, 2009, pp.41-65.

[43] The World Bank Group, “Data,” 2017. [http://data.worldbank.org/country/jordan accessed 20.04.2017](http://data.worldbank.org/country/jordan%20accessed%2020.04.2017)

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