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Abstract: This paper has investigated the impact of food production, school enrollment, inflation, population growth, per capita income and CO2 emissions on life expectancy for Sultanate of Oman. Time series data is used from 1970 to 2012. For examining the cointegration among the variables Autoregressive distributed (ARDL) lag approach is used. The estimated results reveal that food production, school enrollment has positive and significant relationship with life expectancy for Sultanate of Oman. On the other hand inflation and per capita income has negative but insignificant relationship with life expectancy for Sultanate of Oman. The results show population growth has negative and significant relationship with life expectancy of Sultanate of Oman. In long run CO2 emissions has positive and insignificant relationship with life expectancy but in short run it has negative and significant relationship with life expectancy. The findings suggest that government of Sultanate of Oman should seriously check these socio-economic factors for increasing life expectancy.

Keywords: life expectancy, inflation, per capita income, CO2 emissions, food production
JEL CODE: N3, P24, Q53 and L66

INTRODUCTION

Long life represents the well-being or better living standard of a nation, as life expectancy has direct link with social welfare, human health and economic development (Lomborg, 2002) . In recent years, life expectancy shows increasing trends at world level although its rate is different to countries. This improvement in life expectancy is because of better working and living environments, preventative as well as maternal care, increasing education and rising per capita income. Life expectancy also gives the details of health measures of a nation which is affected by many socio-economic and environmental factors. While studying the determinants of life

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expectancy much focus on given on income inequality, economic growth and health care's (Preston, 1976). Historically, the improvement in life expectancy is an important topic of population studies but there are many study Preston (1976,1980) Grosse and Aufiey (1989) and Kakwani (1993) which focus that socioeconomic factors plays important role in determine the life expectancy. Empirics shows that developed countries make a huge amount of investment in their social sector like health, education, sanitation, environmental management and other social safety nets. With increasing per capita income and changing the expenditure structure of developing countries reducing poverty rate, high adult literacy rate, improved sanitation, easy access of drinking water and better nutrition putting positive impact on life expectancy. Navarro et al. (2006) mention that increased public health expenditures and medical care improve quality of life of population. According to Moser et al. (2005) and Vagero (2007) although life expectancy show the pattern of growth of the long span of time but there is variability exists on the countries of the world and developing countries are still lagging behind.

Macroeconomic factors have very strong impact on life expectancy as rising inflation decreased purchasing power of the households and in the long run life expectancy of the household show negative trend. Forbes and McGregor (1984) pointed out that the literature on unemployment and mortality is very controversial. The empirical results of their study show that there is positive association with unemployment and mortality in case of Scotland. This show that unemployment reduces overall life expectancy in both developed as well as developing countries. A number of policy issues regarding life expectancy which impact fertility, intergenerational transfers, economic growth, social security and human capital investment. One of the main objective of welfare state is that to provide healthy environment, required food to it masses with stable macroeconomic conditions, so the study of life expectancy is very important for governments and policy makers. This study will investigate the impact on CO2 emissions, food availability, education, inflation, population growth and economic growth on life expectancy in case of Sultanate of Oman. This type of exercise is hardly done in case of Sultanate of Oman and be a healthy contribution in respective literature.

LITERATURE REVIEW

There are many studies which investigated the determinants of life expectancy and mortality in developing and developed countries. Grossman (1972) investigates that inflation has negative relationship with life expectancy, and household welfare is largely disturbed with rising prices. Rogers (1979) first time gave conceptual framework for life expectancy and income. Davies and Kuhn (1992) found health intake and availability of food determine the health outcomes. They conclude that investment in health sector, social security programs decide the mortality rate or life expectancy. Barro and Sala-i-Martin (1995) investigate the impact of economic growth on life expectancy, they found that economic growth has positive impact on life expectancy and vice-versa. William and Boehmer (1997) examine the impact of health cares on mortality rate, moreover they conclude that behavior and availability have detrimental impact on life

expectancy. Ehrlich and Lui (1991) investigate that investment in human capital causes the longevity of life. Zhang et al. (2001) found that economic growth has negative relationship with mortality.

Rogers and Wofford (1989) investigated the six main determinants of life expectancy for 95 developing nations. They found that urbanization, agriculture related population, illiteracy rate, access for drinking water, average calorie per person and doctor per population play an important role in the determination of life expectancy for developing nations.

Mahfuz (2008) focused that primary health care program is an important determinant of life expectancy. On the base of his study he concluded that there is positive relationship between primary health care spending and health status. Rogot et al. (1992) investigated the main determinants of life expectancy of white female and male of US by family income, education, employment status. They concluded that life expectancy varies with mean years of schooling. On the base of cross-country analysis Hitiris and Posnet (1992) found that there is negative association between primary health care spending and child mortality rates.

World Bank (1997) pointed out that there is strong positive relationship between life expectancy and per capita income in case of developing countries. Guralnik et al. (1993) pointed out that although race plays an important role in life expectancy. He found that the life expectancy of black men is less than the white men but it is the education attainments which change the results. Anand and Ravallion (1993) investigated that there is positive and significant relationship between life expectancy and per capita GNP, but it work through national income and public expenditures on health. They mentioned that when public expenditures on health and poverty used as independent variables with per capita GNP the results are inverse to the first model. Grubaugh and Santerre (1994) investigated that there is positive association with certain health inputs (doctors per population, hospital per population) and mortality rates. Collins and Klein (1980) and Elola et al. (1995) found there is positive relationship between primary health spending and health status. On the base of European empirics, by increase the primary health inputs the health outcomes also increase which is the shape of higher life expectancy. Wilkinson (1996) explained that after achieving a threshold level of per capita income, the relationship between life expectancy and standard of living disappear and further increase in income is not attached to life expectancy gains. He mentioned that there is direct relationship between health and income of the people at threshold level and there is no consistent relationship between them.

Hill and King (1995) and Gulis (2000) investigated that education especially female education paly important role in improving the overall life expectancy. Williamson and Boehmer (1997) studied that educational status improve the female life expectancy significantly, their study is based on 97 cross sections. Sen (1999) pointed out that education is an important determinant of life expectancy; he used Indian state Kerala as case study. He mentioned that education impacts

health both direct and indirect ways, education enhance the productivity of labor which increase income and attainments for female and this further effects the health of child. Education improves the health awareness of the people which directly affect the life expectancy of people. He found that rising education improves the health of women inside and outside of the home which help them for improving the health of their family and child survival.

Cemieux et al. (1999) investigated that public health spending has significant influence on life expectancy in case of Canada. They concluded that lower health spending is associated with low life expectancy and high infant mortality rate in case of Canada. Gulis (2000) studied the determinants of life expectancy of 156 countries of the world. He concluded that income per capita, public health spending, safe drinking water; calorie intake and literacy are the main determinants of life expectancy. Kalediene and Petrauskiene (2000) investigated that urbanization is one of the important indicators of life expectancy for both developed and developing nations. They claimed that the population of urban areas has better medical cares, better education opportunities and improved socio-economic infrastructure which have positive impact on the health. Macfarlane et al. (2000) investigated that safe drinking water is an important determinants of life expectancy in case of developing nations. On the base of empirical data of Africa and Asian they found that those parts where safe drinking water is in easy access the life expectancy is high rather than where safe drinking water is not easily available. Veugelers et al. (2001) found that education plays important role in improving the life expectancy in case of Canada. He used multi-level logistic regressions for his analysis.

Hussain (2002) investigated the determinants of life expectancy by using the cross-sectional data of 91 developing countries of the world, with the help of multiple OLS. He used fertility rate, per capita GNP, adult literacy rate and per capita calorie intake; he studied this relationship both in linear as well as log linear model. Starfield and Shi (2002) concluded that Costa Rica has achieved highest level of life expectancy which is comparable to developed countries. This is possible due to strong social and political infrastructure and focus on primary health care program.

THEORETICAL FRAMEWORK OF THE STUDY

The health status of nation can be derived with the help of health production function which is consisted on some inputs and outputs. The output of health production function is life expectancy or morbidity whereas inputs are health cares, education, environment, life style, medical and health expenditures and genetic factors. Grossman (1972) mentions that people are the producers of health as they have choice for food and health cares. Moreover, he also mentions that people are the constrained in health, as they have occupancy of financial resources, natural resources. So following the methodology of Grossman (1972) and Fayissa and Gutema (2005) the model of the study is as:

$$LE = f(CO2, FI, ED, INF, POPG, PCG) \qquad (1)$$

$LE =$ Life expectancy at birth, total (years)

$FI =$ Food production index (2004-2006 = 100)

$ED =$ School enrollment, primary (% gross)

$INF =$ Inflation, GDP deflator (annual %)

$POPG =$ Population growth (annual %)

$PCG =$ GDP per capita growth (annual %)

$CO2 =$ CO2 emissions (kg per 2005 US$ of GDP)

Taking the natural log of equation (1) we get

$$\ln LE_t = \alpha + \beta_2 \ln FI_t + \beta_3 \ln ED_t + \beta_4 \ln INF_t + \beta_5 \ln POPG_t + \beta_6 \ln PCG_t + \beta_7 \ln CO2_t + \varepsilon_t \quad (2)$$

The data for the study is taken from World Development Indicator (WDI) over the period of 1970 to 2012.

ECONOMETRIC METHODOLOGY

Nelson and Ploser (1982) claimed that the unit root is the problem of nearly all time series data, they pointed out that the absence or presence of the unit root in the data helps to identify some of the main problems which occurred in the process of data generation. If the data is stationary then the series has constant mean with finite variance which does not rely on time period. But on the other hand, if the data is non-stationary then the mean of the error is not constant and the variance of the series is infinite. In previous years lot of work is done for removing the unit root problem in the data. Dickey-Fuller (1979), Augmented Dickey-Fuller (1981), Perron (1990) and Perron (1997) presented their unit root tests but their tests do not highlighted the importance of breaks in the data. We use ADF unit root test because of its simple properties.

For finding the cointegration autoregressive distributive lag (ARDL) bound testing approach is used which is developed by Pesaran et al. (2001). This approach is used as it has many advantages over other co-integration techniques as it is applied on mix order of integration. Moreover, a dynamic unrestricted error correction model (UECM) can be derived from the ARDL bound testing through a simple linear transformation. The UECM integrates the short run dynamics with the long run equilibrium without losing any long run information.

EMPIRICAL RESULTS AND DISCUSSION

In this section we have presented the empirical results of the study. The table 1 presents the unit root results for the variables of the model. We use Augmented Dickey-Fuller (ADF) unit root test for examining the stationarity level of the variables. The results show that life expectancy, inflation and per capita income are stationary at I(0) whereas CO2 emissions, food production, population growth and school enrollment are not stationary at 1(0). But at first difference all the variables become stationary. The overall results of ADF unit root test show that there is mixed order of integration. Thus we use ARDL cointegration which is best for mixed order of integration.

Table 1: Unit Root Test

Variables	ADF At level		ADF Ist difference	
LE	-4.273**	(3)	-6.25**	(5)
FI	0.495	(4)	-7.813***	(3)
INF	-5.622**	(1)	-7.361***	(1)
POPg	-1.523	(4)	-3.631**	(6)
Ee	-0.636	(6)	-3.521**	(1)
PCg	-5.280**	(1)	-7.281***	(1)
CO2	0.372	(6)	-5.466**	(5)
Note: The asterisks *** and ** denote the significant at %1 and 5% levels, respectively.				

For finding the cointegration among the variables of the model ARDL bound testing approach to cointegration is used. The results of the ARDL bound testing approach are presented in table 2. The results show that calculated F-statistic is greater the upper bound value of Pesaran et al. (2001) at 5 percent level. This confirms there is cointegration among the variables of the model. There is an alternative statistic available in ARDL bound testing approach that is W-statisic. The results show that calculated W-statistic is greater than the upper bound value at 5 percent. On the W-statistic there is cointegration among the variables of the model. After finding cointegation among the variables of the model now we find the long run and short relationship among the variables of the model. For lag selection Schwarz Bayesian criterion is used and maximum 1 lag length is selected.

Table 2: ARDL Bounds Testing Approach

Dependent Variable LE				
Critical Value	F-Statistics 127.8097		W-statistic 894.6682	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
95%	2.8056	4.1397	19.6392	28.9781
90%	2.3470	3.5622	16.4291	24.9352

The long run results of the study are presented in the table 3. The results show that food production has positive and significant relationship with life expectancy in Sultanate of Oman. The results show that increase of 1 percent food production increase life expectancy by 0.115652 percent in Sultanate of Oman and this relationship has 1 percent level of significance. The results highlight that inflation which is key indicator of macroeconomic situation of a nation has negative and insignificant relationship with life expectancy in Sultanate of Oman. The results show that 1 percent increase in inflation life expectancy decrease by 0.005085 percent. Population growth has negative and significant relationship with life expectancy in Sultanate of Oman. The results show that 1 percent increase in population growth decrease the life expectancy by 0.245641 percent and this relationship is significant at 5 percent. Primary school enrollment has positive and significant impact on life expectancy in Sultanate of Oman. The result show that 1 percent increase in primary school enrollment increase life expectancy by 0.154537 percent and this relationship has 1 percent level of significance. The growth in per capita income has negative and insignificant relationship with life expectancy in Sultanate of Oman. Whereas CO2 emissions has positive and insignificant relationship with life expectancy in Sultanate of Oman. The overall results show that food production, primary school enrollment has positive and significant impact on life expectancy in case of Sultanate of Oman. But inflation and population growth has negative and significant relationship with life expectancy in Sultanate of Oman. Whereas growth in per capita income and inflation has insignificant relationship with life expectancy.

Table 3: Long Run Coefficient

Dependent Variable = LE			
Variables	Coefficient	Standard Error	Ratio[Prob]
Constant	48.64774	0.756365	64.31[0.000]
FI	0.115652	0.011965	9.665 [0.000]
INF	-0.005085	0.004970	-1.023[0.133]
POPg	-0.245641	0.106093	-2.315[0.027]
Ee	0.154537	0.013031	11.85 [0.000]
PCg	-0.001035	0.024407	-0.042[0.961]
Co2	0.216793	0.638441	0.339[0.736]

After finding the long run result among the variables of the model, now we can find the short run dynamic among the variables of the model. The short run results are presented in table 4. The results show that food production has positive and significant relationship with life expectancy in Sultanate of Oman in short run span of time and this relationship has same type of relationship as it is in long run. Inflation has positive and insignificant relationship with life expectancy in short run. Population growth has negative and insignificant relationship with life expectancy in

Sultanate of Oman. Primary school enrollment has positive and significant relationship with life expectancy and this relationship is same as it is in long run. Population growth impact life expectancy negative and insignificant in short run. But CO2 emission has negative and significant relationship with life expectancy in Sultanate of Oman. Unlike the log run CO2 emission plays important role in determining life expectancy in Sultanate of Oman. The value of ECM is negative and statistically significant. The negative value of ECM is theoretically correct which shows the speed of convergence of the short run to the long run. The value of ECM shows that short run needs 17 year and 2 month to converge in the long run in case of Sultanate of Oman. The coefficient of ECM shows that short run deviations in the last period are corrected by 5.7300 percent in future in case of Sultanate of Oman.

Table 4: Short Run Coefficient

Dependent Variable = LE			
Variables	Coefficient	Standard Error	Ratio[Prob]
dFI	0.0049041	.0016887	2.9040[.008]
dINF	0.2409E	.2030E	1.1865[.247]
dPOPg	-0.014820	.014660	-1.0109[.322]
dEe	0.0060935	.0019402	3.1407[.004]
dPCg	0.7654E-3	.9474E-	.80788[.427]
dCO2	-.010024	.04585	2.1860[.039]
ECM $_{t-1}$	-0.057300	.00980	-5.8433[.000]
R-Squared .977 R-Bar-Squared .971 DW-statistic .96342 F-Stat. 150.6395[.000] AIC = 4.124 SBC = 3.621			

Diagnostic tests results are presented in table 5. The results show that there is no serial correction in data series. The results highlight that model has correct functional form and data is normally distributed. Moreover there is no problem of Heteroscedasticiy in our data series of variables of the model.

Table 5: Diagnostic Tests

Test Statistics	LM Version	F Version
A.Serial Correlation	1.7735[0.1901]	32.6492[.000]
B.Functional Form	.62605[.731]	118.9906[.000]
C.Normality	1.6330[.442]	Not applicable
D.Heteroscedasticiy	.49977[.480]	.12992[.720]

A:Lagrange multiplier test of residual serial correlation
B:Ramsey's RESET test using the square of the fitted values
C:Based on a test of skewness and kurtosis of residuals
D:Based on the regression of squared residuals on squared fitted values

The stability of the long and short run parameters of the model is very necessary and measuring stability Brown et al. (1975) proposed the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq). The cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq) are presented in figure1 and figure 2. The plot of the CUSUM is within the line and significant at 5 percent and the plot of the CUSUMsq is within the line and significant at 5 percent. This ensures the stability of long run and short run coefficients.

Figure 1

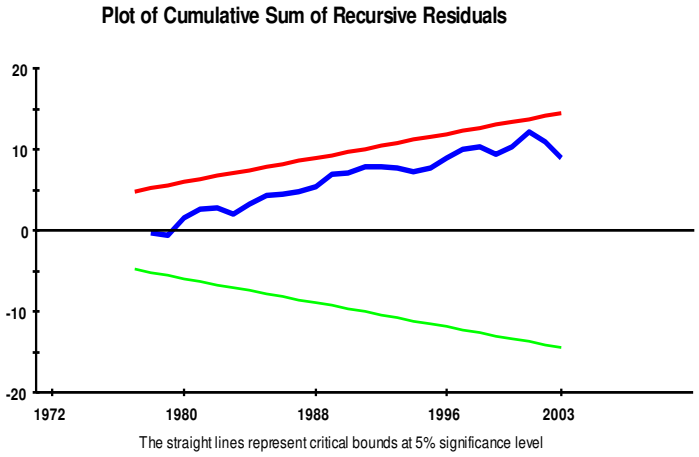
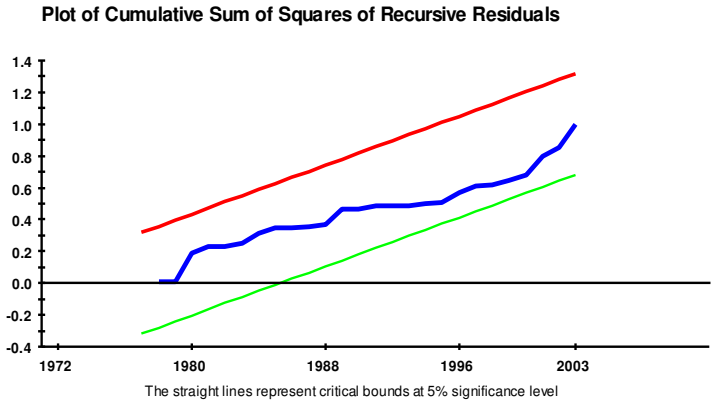


Figure-2



Conclusions and Policy implications

The objective of this study is to find the main factors which are affecting the life expectancy over the period of 1971 to 2012 in case of Sultanate of Oman. The long run results show that food production has positive and significant relationship with life expectancy in Sultanate of Oman. Inflation has negative and insignificant relationship with life expectancy. Population growth has negative and significant impact on life expectancy. Primary school enrollment has positive and significant relationship with life expectancy. Whereas per capita income has negative and CO2 emissions has positive but both have insignificant impact on life expectancy. The short run dynamic shows that most of the independent variables have same relationships to dependent variables but only CO2 emissions has different from long run results. The results show that CO2 emission has negative and significant impact on life expectancy in Sultanate of Oman.

On the bases of empirical results and discussion for increasing the life expectancy following policy implications are suggested for Sultanate of Oman. A specific amount of Food is necessity of human beings so for increasing the life expectancy, should increase production of food for future life security. Growing Population is main disadvantages it decreases the life expectancy. Government should try to control its population growth of improving life expectancy. Primary school enrollment has dual effect on life expectancy as increases in educated population it improves the health conditions as well as production of food. Government of Oman should increase school enrollment and use tight monetary policy for increasing life expectancy.

REFERENCES

Anand, S., and Ravallion, M. (1993). Human development in poor countries: on the role of private incomes and public services. *The Journal of Economic Perspectives*, *7*(1), 133-150.

Barro, R. J., and Sala-I-Martin, X. I. (1995). Economic Growth. McGraw-Hill, New York.

Collins, E., and Klein, R. (1980). Equity and the NHS: self-reported morbidity, access, and primary care. *Br Med J*, *281*(6248), 1111-1115.

Crémieux, P. Y., Ouellette, P., and Pilon, C. (1999). Health care spending as determinants of health outcomes. *Health Economics*, *8*(7), 627-639.

Davies, J. B., and Kuhn, P. (1992). Social security, longevity, and moral hazard. *Journal of Public Economics*, *49*(1), 91-106.

Dickey, D. A., and Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, *74*(366a), 427-431.

Dickey, D. A., and Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: Journal of the Econometric Society*, 49, 1057-1072.

Ehrlich, I., and Lui, F. T. (1991). Intergenerational trade, longevity, and economic growth. *Journal of Political Economy*, 99, 1029-1059.

Elola, J., Daponte, A., and Navarro, V. (1995). Health indicators and the organization of health care systems in western Europe. *American Journal of Public Health*, *85*(10), 1397-1401.

Fayissa*, B., and Gutema, P. (2005). Estimating a health production function for Sub-Saharan Africa (SSA). *Applied Economics*, *37*(2), 155-164.

Forbes, J. F., and McGregor, A. (1984). Unemployment and mortality in post-war Scotland. *Journal of Health Economics*, *3*(3), 239-257.

Grosse, R. N., and Auffrey, C. (1989). Literacy and health status in developing countries. *Annual Review of Public Health*, *10*(1), 281-297.

Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political economy*, *80*(2), 223-255.

Grubaugh, S. G., and Santerre, R. E. (1994). Comparing the performance of health care systems: an alternative approach. *Southern Economic Journal*, 1030-1042.

Gulis, G. (2000). Life expectancy as an indicator of environmental health.*European journal of epidemiology*, *16*(2), 161-165.

Guralnik, J. M., Land, K. C., Blazer, D., Fillenbaum, G. G., and Branch, L. G. (1993). Educational status and active life expectancy among older blacks and whites. *New England Journal of Medicine*, *329*(2), 110-116.

Hill, M. A., and King, E. (1995). Women's education and economic well-being.*Feminist Economics*, *1*(2), 21-46.

Hitiris, T., and Posnett, J. (1992). The determinants and effects of health expenditure in developed countries. *Journal of health economics*, *11*(2), 173-181.

Husain, A. R. (2002). Life expectancy in developing countries: a cross-section analysis. *The Bangladesh Development Studies*, *28*(1/2), 161-178.

Kabir, M. (2008). Determinants of life expectancy in developing countries.*The journal of Developing areas*, *41*(2), 185-204.

Kakwani, N. (1993). Performance in living standards: an international comparison. *Journal of development economics*, *41*(2), 307-336.

Kalediene, R., and Petrauskiene, J. (2000). Regional life expectancy patterns in Lithuania. *The European Journal of Public Health*, *10*(2), 101-104.

Lomborg, B. (2002). How healthy is the world?. *BMJ: British Medical Journal*,*325*(7378), 1461.

Macfarlane, S., Racelis, M., and Muli-Muslime, F. (2000). Public health in developing countries. *The Lancet*, *356*(9232), 841-846.

Moser, K., Shkolnikov, V., and Leon, D. A. (2005). World mortality 1950-2000: divergence replaces convergence from the late 1980s. *Bulletin of the World Health Organization*, *83*(3), 202-209.

Navarro, V., Muntaner, C., Borrell, C., Benach, J., Quiroga, Á., Rodríguez-Sanz, M., ... and Pasarín, M. I. (2006). Politics and health outcomes. *The Lancet*, *368*(9540), 1033-1037.

Nelson, C. R., and Plosser, C. R. (1982). Trends and random walks in macroeconomic time series: some evidence and implications. *Journal of monetary economics*, 10(2): 139-162.

Perron, P., (1990). Testing for a unit root in a time series with a changing mean. *Journal of Business and Economic Statistics*, 8(2), 153-162.

Perron, P., (1997). Further evidence on breaking trend functions in macroeconomic variables. *Journal of econometrics*, 80(2), 355-385.

Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.

Preston, S. H., (1976). Mortality Patterns in National Populations. Academic Press, New York.

Preston, S. H. (1980). Causes and consequences of mortality declines in less developed countries during the twentieth century. In *Population and economic change in developing countries* (pp. 289-360). University of Chicago Press.

Rodgers, G. B. (1979). Income and inequality as determinants of mortality: an international cross-section analysis. *Population studies*, *33*(2), 343-351.

Rogers, R. G., and Wofford, S. (1989). Life expectancy in less developed countries: socio-economic development or public health? *Journal of Bio sociological Science*, 21(2), 245-252.

Rogot, E., Sorlie, P. D., and Johnson, N. J. (1992). Life expectancy by employment status, income, and education in the National Longitudinal Mortality Study. *Public health reports*, *107*(4), 457.

Sen, A., (1999). Economic policy and equity: an overview. In: Tanzi, V., Chu, K., Gupta, S. (Eds.), Economic Policy and Equity. International Monetary Fund, Washington, DC, 28– 42.

Starfield Husain, A., B., and Shi, L. (2002). Policy relevant determinants of health: an international perspective. *Health Policy*, *60*(3), 201-218.

Vagero. D., (2007). Health inequalities across the globe demand new global policies. *Scotland J Public Health*, 35(2), 113–115.

Veugelers, P. J., Yip, A. M., and Kephart, G. (2001). Proximate and contextual socioeconomic determinants of mortality: multilevel approaches in a setting with universal health care coverage. *American Journal of Epidemiology*,*154*(8), 725-732.

Williamson, J. B., and Boehmer, U. (1997). Female life expectancy, gender stratification, and level of economic development: a cross national study of less developed countries. *Social Science and Medicine*, 45(2), 305-317.

Wilkinson, R.G., 1996. Unhealthy Societies: The Afflictions of Inequality. Routledge, London.

World Bank, (1997). World Development Indicators. 1997, Washington D.C.

Zhang, J., Zhang, J., and Lee, R. (2001). Mortality decline and long-run economic growth. *Journal of Public Economics*, *80*(3), 485-507.