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Economic Misery, Urbanization and Life Expectancy in MENA Nations: An Empirical Analysis

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ABSTRACT

This paper has examined the effect of urbanization and economic misery on average life expectancy in selected MENA nations from 2001 to 2016. Panel ARDL has been used for reviewing the co-integration among the selected indicators. The causality of the variables has been analyzed by impulse response function and variance decomposition. The outcomes reveal that food availability has significant and positive relation with an average life expectancy. The outcomes show that environmental standards put significant and positive impact on average life expectancy. The outcomes reveal that economic misery has a significant and negative influence on average life expectancy in MENA nations. The findings reveal that urbanization puts significant and positive influence on average life expectancy. So, for improving the average life expectancy in MENA nations availability of food, household final consumption and the level of urbanization must be enhanced, whereas at the same time economic misery should be reduced.

Keywords: Economic Misery, Urbanization, Life Expectancy
JEL Classifications: E24, E31, P25, J17

1. INTRODUCTION

For the last few years, socioeconomic development is measured with the help of life expectancy (UNDP, 1991). In classical development economics, the central focus is on how much command you have on resources and goods (Anand and Ravallion, 1993). Whereas the modern development economics do not agree on this point of view, as Sen (1983) points out that control of resources and goods is not development, actual development comprises of capabilities decrease hunger, morbidity and mortality. Humans are continuously trying to improve the level of health for long life (Colantonio et al., 2010). Long life expectancy or less mortality rate is considered the best indicator to judge a nation's health status, as it is the output of many environmental, social and economic factors. It has been witnessed that life expectancy is rising among different parts of the world. There are a number of factors responsible for this rise such as technological advancement, literacy rate, better sanitation, improved water and health facilities (WHO, 2005). Although developed countries have increased life expectancy at desired level, but developing countries still struggling for a reasonable level of life expectancy. In the past, previous literature considers life expectancy a theme related to demographic, but studies of Kakwani (1993), Grosse and Aufiey (1989) and Preston (1976; 1980) highlight its importance as part of economics. Currently, numerous studies have investigated the socioeconomic and political aspects of life expectancy (Ali and Khalil, 2014; Navarro et al., 2006; Gerring et al., 2005; Franco et al., 2004; Lake and Baum, 2001; Mahfuz, 2008; and Shen and Williamson, 1997).

The rising life expectancy throughout the world is attributed to higher income per capita income, higher level of education, better maternal health cares, improved living environment and improved working condition. Average life expectancy represents the overall health conditions of a nation because it is the combination of many environmental and socioeconomic factors (Navarro et al., 2006; Lake and Baum, 2001; Hertz et al., 1994; Poikolainen and Eskola, 1988; Wolfe, 1986; and Cumper 1984). While studying the determinants of life expectancy much focus is given to health care, income inequality and economic growth (Preston, 1976). But a number of other important indicators which have close link to low life expectancy i.e. social security benefits, intergenerational transfers, human capital investment and fertility. Halicioglu (2010) highlight the importance of cost of medical facilities as an indicator of life expectancy.

Preston (1976; 1980) and Kakwani (1993) focus on socioeconomic factors which play a vital part in determining the life expectancy of a country. An extensive amount of resources is allotted to health sector by the developed countries and much importance is given to social safety nets, environmental management, sanitation and education.A number of studies highlight that better nutrition, clean drinking water, improved sanitation, higher literacy rate and reduced poverty rate are deciding life expectancy (Ali and Khalil, 2014; Navarro et al., 2006; Gerring et al., 2005; Franco et al., 2004; Lake and Baum, 2001; Mahfuz, 2008; and Shen and Williamson, 1997). Navarro et al. (2006) highlight that rising health expenditure by the masses and improved medical care increases overall life expectancy. This study is going to examine the impact of economic misery and urbanization on average life expectancy in the case of selected MENA nations. The selected MENA nations are: Algeria, Bahrain, Egypt, Iraq, Iran, Islamic Rep., Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, United Arab Emirates and Yemen Rep. This type of study is hardly available in previous studies. So, the current study will be a healthy input in respective literature and provides policy options for MENA nations to improve average life expectancy.

2. LITERATURE REVIEW

There are a number of theoretical and empirical studies, here the most relevant studies are selected as a literature review. Williamson and Boehmer (1997) examine the relationship of female life expectancy, gender stratification, health status and level of economic development in the case of 40 developed and 97 less developed countries. The study mentions that reproductive autonomy, economic status and educational status have a positive impact on overall life expectancy of the selected countries and female life expectancy is also increased in LDCs. Cockerham (1997) analyses the rise of adult mortality in Russia and selected Eastern European countries during the late 20th century. This study suggests that poor health lifestyles reflect especially in heavy alcohol consumption, and also in smoking, lack of exercise, and high-fat diets are the major social determinant of the upturn in deaths. Shaw et al. (2005) explore the factors impacting on expected average life in the case of some selected developed countries. The study points out that if age distribution is ignored in the process of estimation, then pharmaceutical consumption has a positive relationship with life expectancy in OECD countries. Lin et al. (2005) analysis the impact of social and political indicators on expected average life in developing countries. On the basis of the estimated results, the authors suggest that developing countries have to encourage a democratic environment for enhancing overall life expectancy. Yavari and Mehrnoosh (2006) analyze the impact of socioeconomic aspects on life expectancy in the case of 89 countries. The results describe that expenditure on human development indicators affect the level of life expectancy. The findings suggest that human development requires an increasing investment in the socioeconomic sectors.

Bergh and Nilsson (2010) analyze the relationship among three dimensions (economic, social, and political) of globalization and life expectancy in the case of 92 countries. The estimated results of the study explain that social and political globalization has an insignificant impact on expected average life in selected LDCs. Halicioglu (2010) investigates the main indicator Turkish life expectancy from 1965 to 2005. The estimated outcomes of the study reveal that for long life in Turkey socioeconomic factors play a vital role. Balan and Jaba (2011) investigate the determinants of life expectancy in the case of 42 Romanian counties for the year 2008. The estimated results of the study show that libraries subscribers, number of doctors, hospital beds and wage rate have a positive and significant impact on life expectancy whereas the illiteracy rate and population growth rate have a negative impact on life expectancy. Oney (2012) analyses the relationship between health expenditure and health outcomes with the inclusion of lifestyle variables in the case of OECD member countries. The findings of this study describe that education has a negative association with both infant mortality and PYL while alcohol consumption has a positive association with infant mortality. The results also show that tobacco is negatively associated with life expectancy and positively associated with PYLL. Singariya (2013) explores several socioeconomic factors associated with life expectancy at birth and the influencing factors in major states of India. The results suggest that an increase in per capita income, monthly per capita consumption expenditure, housing facility, electrification, telephone accessibility would have more positive influence on life expectancy than per capita public expenditure on health and literacy rate. Mahumud et al. (2013) empirically review the impact of health care expenditures and economic growth in life expectancy in the case of Bangladesh from 1995 to 2011. This study suggests for Bangladesh should improve economic growth for achieving the desired level of life expectancy. Bayati et al. (2013) estimate production function based on health indicator in the case of the East Mediterranean Region (EMR) with the help of Grossman model. The results of the study highlight that for improving life expectancy in EMR countries, these countries should improve their health care system and at the same time improve economic conditions as well.

Ali and Ahmad (2014) investigate the impact of CO_2 emissions, income per capita, population growth, inflation rate, school enrollment rate and availability of food on expected average life in the case of Sultanate of Oman from 1970 to 2012. The results of the study suggest that the Omani government should improve its socioeconomic conditions for improving levels of life expectancy. Monsef and Mehriardi (2015) explore the determinants of expected average life in the case of 136 developed and developing countries from 2002 to 2010. The study explains that inflation and unemployment have negative and significant impact on expected average life, whereas income has a positive impact on expected average life. Murwirapachena and Mlambo (2015) analysis the effect of socioeconomic factors on life expectancy in the case of Zimbabwe from 1970 to 2012. The estimated findings of the study show that population growth, inflation rate and economic growth have a positive impact on life expectancy in Zimbabwe. Dependency ratio and agricultural land have negative impact on life expectancy in Zimbabwe. Shahbaz et al. (2015) investigate the determinants of life expectancy in the presence of economic misery in Pakistan. The authors point out that the government of Pakistan should reduce economic misery for getting desired level of life expectancy. Razzak et al. (2015) analyze the influence of some health indicators on expected average life in Asia. The results show that life expectancy at birth is statistically significant and have positive associations with four factors extracted from PCA. However, infant mortality, crude death rate and crude birth rate negative impact on expected average life in Asia. Audi and Ali (2016) analyze the impact of socioeconomic environment on life expectancy in Lebanon from 1971 to 2014. The findings explain that all independent factors have significant impact on life expectancy in Lebanon. The projected results suggest that if the government of Lebanon wants to increase expected average life, it has to improve its socioeconomic status of its population.

Ahmad et al. (2018) explore the impact of environmental quality on human health in the case of China over the period of 1960 to 2014. For the empirical analysis ARDL method has been applied. The results of the study show that environmental factor have negative impact on human health over the selected time period in the case of China. The results of the study suggest that by reducing the level of environmental degradation the quality of life can be improved in China. Erdogan et al. (2019) study the role of environmental degradation on health outcomes in the case of Turkey for the period of 1971 to 2016. This study has compared the average life expectancy and infant mortality rate as health outcomes. The results of the study show that environmental factors are reducing the level of life expectancy and infant mortality rate in Turkey.

Wang et al. (2019) investigate the impact of climate change and greenhouse gasses on human health in the case of Pakistan over the period of 1995 to 2017. The study has used autoregressive distributed lag method for empirical analysis. The causality of the variables has been checked with the help of Granger causality test. The outcomes of the study show that economic growth, environmental gasses and gross fixed capital formation have significant impact on health structure in the case of Pakistan. The results show bidirectional causality is running between health outcomes and greenhouse gases, between expenditures on health and economic growth, between economic growth and greenhouse gases. The study recommends that by controlling pollution, particularly CO_2 emissions and health outcomes can be improved.

Cavusoglu and Gimba (2021) examine the short run and long run determinants of life expectancy in the case of Sub-Saharan countries. This study has used health expenditure, human capital, food production, CO_2 emission, income per capita and rate of inflation as explanatory variables. Pedroni panel cointegration has been used for empirical analysis. The results of the study show that CO_2 emissions and rate of inflation have negative long run impact on life expectancy of African countries. The estimated results explain that health expenditure, human capital, food production and income per capita have positive and significant long run impact on life expectancy of selected African countries. The outcomes of the study suggest that African countries should enhance public health spending and good availability and discourage environmental degradation for health and long life.

3. ECONOMIC MODEL AND DATA SOURCES

This study explores the impact of availability of food, environmental standard, economic misery, urbanization and household final consumption on average life expectancy in the case of selected MENA nations from 2001 to 2016. Data of selected indicator has been collected from the World Bank. Following the theoretical framework of Ali and Audi (2016), Ali (2015), Ali and Khalil (2014), Fayissa and Gutema (2005), Yavari and Mehrnoosh (2006) and Grossman (1972), our model becomes as:

$$LIFE = f\,(ENS, MISERY, FOOD, URB, FCON) \tag{1}$$

Where
LIFE = Average life expectancy
ENS = Environmental standards (CO_2 Emission)
MISERY = Economic misery (inflation + unemployment)
FOOD = Availability of food (food index)
URB = Urbanization (population in urban areas)
FCON = Household final consumption

The econometric functional form of the model becomes as:

$$\begin{aligned} LIFEit &= \alpha + \beta_1 FOODit + \beta_2 ENSit + \beta_3 MISERYit \\ &+ \beta_4 URBit + \beta_5 FCONit + \varepsilon_t \end{aligned} \tag{2}$$

Where
i = for i[th] country
ε = stochastic error term
t = time period.

3.1. Econometric Methodology

Application of econometric methods on macro-economic variables is an imperative feature within numerical economic inquiry. Plosser (1982) discusses that frequency time-series data of macro-economic variables have unit-root issue. Nemours unit root tests are available in applied econometric literature. For examining the stationarity of the data LLC, IPS and ADF-FC unit root tests. Levin et al. (2002) have developed panel unit root with the help of unique specifications. After fixing the issue of unit in the data, and if there is a mixed order of integration, then long run and short run relationship of the variables can be examined with the help of panel analysis (Pesaran et al., 1999; Durlauf, et al., 2005; Canova, 2011). This study has used the panel method of cointegration developed by Pesaran et al., (1999). Simply panel test uses average and amalgamates of the coefficients (Peraran et al., 1999). The general equation of panel cointegration is as follow:

$$y_{it} = \sum_{j-1}^{p} \lambda_{ii} y_{i,t-j} + \sum_{j-0}^{q} \delta_{ij} X_{i,t-j} + u_t + \varepsilon_{it} \quad (3)$$

Here, $i = 1,2,3,4,5\ldots N$ are selected cross section and $t = 1,2,3,4,5\ldots T$ for time period. X_{it} is a vector of selected independent variables K×1, λ_{ij} is a scalar, μ_i is group specific impact, If the selected indicators are I(1) integrated then residual is an I(0) integrated. The main quality of co-integrated indicators is that they rejoinder any point in long run equilibrium path. This shows that error correction dynamics is existed for selected model. Error correction model is written as:

$$y_{it} = \phi_i y_{i,t-j} - \theta_i X_{i,t-j} \sum_{j-1}^{p-1} \lambda_{ii} \Delta y_{i,t-j} + \sum_{j-0}^{q-1} \delta_{ij} \Delta X_{i,t-j} + u_t + \varepsilon_{it} \quad (4)$$

Here φ_i error correction parameter, which explains adjustment speed from short run to long run equilibrium. If $\varphi_i = 0$, this reveals the presence of long run relation among variables. For reviewing the convergence between short and long run, φ_i must be negative and significant, this is the necessary and sufficient condition.

3.2. Innovative Accounting Technique

In Applied Econometrics, nemours methods are available which examine the causal relationship among variables. Granger causality and vector error correction method (VECM) are most widely used for this purpose. There are some demerits with these traditional methods such as: these methods provide only information about the strength of causal relationship with the selected time period and do not provide information out of time span. Moreover, these methods are incompetent to explain the correct degree of response from one variable to another (Shan, 2005). The method of simple Granger causality test cannot provide information about the strength of causal relationship between variables outside of the given time period (Shan, 2005); it also does not provide information about the correct impact of one variable to the other. Under these demerits, the estimated results cannot provide exact information. So, this study has employed the innovative accounting approach (IAA) to analysis the causal relationship between each and every pair of the selected variables of the model. The IAA can decompose predicted variance of error, for this purpose, it can use the impulse response function (IRF). Following the methodology of innovative accounting technique, variance decomposition method (VDM) has been developed for examining the causal relationship between variables, VEM provides the correct quantity of shocks which are created by the innovative shocks other variable following different time points.

Variance decomposition uses the variation in the series by its own shocks and shocks from other variables and this provides the strength of the impact of the series (Enders, 1995).A unique set of formulation is applied for analyzing the effect of a single standard deviation shock due to another factor and this also provides the forthcoming shock trend in data (Shan, 2005). For example, if the shock in economic uncertainty impacts money demand significantly, but vice versa is minimal. So, it is concluded that unidirectional causality exists from economic uncertainty in money demand. If economic uncertainty provides information about the error of money demand, then we can conclude that economic uncertainty causes money demand in Pakistan. The bidirectional causal relationship exists if both variables explain each other. But on the other hand, if both variables contribute less in explaining the shocks of each other than there exists no-causal relationship among indicators.

Impulse response function provides information about the time path while impacts one variable to another. On these bases, a person can easily understand the response of economic uncertainty due to its own shocks and money demand. Economic uncertainty causes money demand if the impulse response function shows substantial reaction of money demand to shocks in economic uncertainty.A robust and substantial response of economic uncertainty to shocks in money demand suggests that money demand Granger cause economic uncertainty.

A var. system takes the following form:

$$V_t = \sum_{i=0}^{k} \delta_i V_{t-1} + \eta_t \quad (5)$$

Where

$V_t = (E_t, F_t, Y_t, A_t, M_t)$

$\eta_t = (\eta_C, \eta_F, \eta_Y, \eta_E, \eta_{EX})$

$\delta-\delta_{\square}$ are four by four matrices of coefficients, and η is a vector of error terms.

4. EMPIRICAL RESULTS AND DISCUSSIONS

This article has tried to examine the elements of expected average life in case of MENA nations from 2001 to 2016. For this purpose, availability of food, environmental standards, economic misery, urbanization and household final consumption are selected explanatory variables whereas average life expectancy is dependent variable. This is necessary that variables of the selected model should be stationary, if your ultimate objective is to examine cointegration among the variables. The results of unit root tests are given in the Table 1. The overall results of unit root tests reveal that there is a mixed order of integration among the selected variables of the model. This is the best situation for applying panel ARDL (Pesaran et al., 1999; Durlauf, et al., 2005; Canova, 2011).

This study examines the impact of availability of food, environmental standards, economic misery, urbanization and household final consumption on average life expectancy in case of MENA nations i.e. Algeria, Bahrain, Egypt, Iraq, Iran, Islamic Rep., Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, United Arab Emirates and Yemen Rep., over the period of 2011 to 2016. Normally, LR, FPE, AIC, SC and HQ methods are used for lag order selection. The results of VAR are presented in Table 2. On the basis of LR, FPE, AIC and HQ maximum 8 lag length are selected for the model of this study.

The long run outcomes of panel ARDL bound testing method are given in the Table 3. The long run outcomes reveal that availability of food has positive and significant relation with an

Table 1: Unit root tests results

Variables	Test	Statistic	Prob**	Cross-Section	Obs.
Life I(0)	Levin, Lin and Chu t*	−2.81566	0.0024	16	195
	Im, Pesaran and Shin W-stat	0.95288	0.8297	16	195
	ADF - Fisher Chi-square	63.3841	0.0008	16	195
	PP - Fisher Chi-square	131.466	0.0000	16	224
FOOD I(0)	Levin, Lin and Chu t*	−2.63466	0.0042	16	208
	Im, Pesaran and Shin W-stat	0.15638	0.5621	16	208
	ADF - Fisher Chi-square	34.1684	0.3639	16	208
	PP - Fisher Chi-square	53.3845	0.0102	16	224
ENS I(0)	Levin, Lin and Chu t*	−3.28720	0.0005	16	208
	Im, Pesaran and Shin W-stat	0.55527	0.7106	16	208
	ADF - Fisher Chi-square	24.3740	0.8306	16	208
	PP - Fisher Chi-square	23.2238	0.8711	16	224
MISERY I(0)	Levin, Lin and Chu t*	−2.13043	0.0166	16	208
	Im, Pesaran and Shin W-stat	−1.44269	0.0746	16	208
	ADF - Fisher Chi-square	38.4614	0.2002	16	208
	PP - Fisher Chi-square	91.9843	0.0000	16	224
URB I(0)	Levin, Lin and Chu t*	10.6938	1.0000	16	203
	Im, Pesaran and Shin W-stat	7.02980	1.0000	16	203
	ADF - Fisher Chi-square	25.5125	0.7848	16	203
	PP - Fisher Chi-square	115.623	0.0000	16	224
CON I(0)	Levin, Lin and Chu t*	−6.10953	0.0000	16	208
	Im, Pesaran and Shin W-stat	−1.15313	0.1244	16	208
	ADF - Fisher Chi-square	37.8982	0.2181	16	208
	PP - Fisher Chi-square	62.2179	0.0011	16	224
dLife I(1)	Levin, Lin and Chu t*	−14.4133	0.0000	16	188
	Im, Pesaran and Shin W-stat	−16.0795	0.0000	16	188
	ADF - Fisher Chi-square	219.005	0.0000	16	188
	PP - Fisher Chi-square	58.3226	0.0030	16	208
dFOOD I(1)	Levin, Lin and Chu t*	−4.53308	0.0000	16	192
	Im, Pesaran and Shin W-stat	−4.53483	0.0000	16	192
	ADF - Fisher Chi-square	80.0543	0.0000	16	192
	PP - Fisher Chi-square	203.952	0.0000	16	208
dENS I(1)	Levin, Lin and Chu t*	−5.93637	0.0000	16	192
	Im, Pesaran and Shin W-stat	−4.22236	0.0000	16	192
	ADF - Fisher Chi-square	81.9956	0.0000	16	192
	PP - Fisher Chi-square	146.411	0.0000	16	208
dMISERY I(1)	Levin, Lin and Chu t*	−10.3425	0.0000	16	192
	Im, Pesaran and Shin W-stat	−8.46705	0.0000	16	192
	ADF - Fisher Chi-square	128.555	0.0000	16	192
	PP - Fisher Chi-square	300.442	0.0000	16	208
dURB I(1)	Levin, Lin and Chu t*	−8.72109	0.0000	16	201
	Im, Pesaran and Shin W-stat	−2.20149	0.0139	16	201
	ADF - Fisher Chi-square	60.9108	0.0015	16	201
	PP - Fisher Chi-square	37.7873	0.0218	16	208
dCON I(1)	Levin, Lin and Chu t*	−2.37453	0.0088	16	192
	Im, Pesaran and Shin W-stat	−2.70522	0.0034	16	192
	ADF - Fisher Chi-square	54.5181	0.0078	16	192
	PP - Fisher Chi-square	74.5390	0.0000	16	208

average life expectancy in MENA nations. The estimates reveal that 1% rise of availability of food permits (3.972581) % rise in average life expectancy. The outcomes show that environmental standards put significant and positive impact on average life expectancy in MENA nations. The results reveal that 1 % rise in environmental standard permits (4.739078) % rise in average life expectancy in MENA nations. The outcomes reveal that economic misery has a significant and negative influence on average life expectancy in MENA nations. This estimate reveals that 1% rise in economic misery brings (−0.016073) % fall average life expectancy in MENA nations. The outcomes reveal that urbanization puts significant and positive influence on average life expectancy in MENA nations. The outcomes show that 1% rise in urbanization brings (0.404022) a % rise in average life expectancy in MENA nations. The estimated findings of the long run show that household final consumption has a positive and significant impact on average life expectancy in MENA nations. The results show that 1% increase in household final consumption increases the average life expectancy by (0.939400) % in average life expectancy in MEAN nations. The overall long run outcomes reveal that availability of food, environmental standards, urbanization and household final consumption are enhancing average life expectancy in MENA nations (Algeria, Bahrain, Egypt, Iraq, Iran, Islamic Rep., Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, United Arab Emirates, Yemen Rep.) over the selected time period. But economic misery is reducing average life expectancy in MENA nations.

Table 2: VAR lag order selection criteria

Endogenous variables: LIFE FOOD ENS MISERY URB CON						
Exogenous variables: C						
Sample: 2001 2016						
Included observations: 112						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	−1087.407	NA	12.15651	19.52512	19.67076	19.58421
1	341.4493	2679.106	1.92e-10	−5.347310	−4.327872	−4.933692
2	825.1832	855.1723	6.51e-14	−13.34256	−11.44932*	−12.57441
3	898.6367	121.9853	3.38e-14	−14.01137	−11.24433	−12.88869
4	936.1091	58.21611	3.38e-14	−14.03766	−10.39682	−12.56046
5	982.1958	66.66102	2.94e-14	−14.21778	−9.703132	−12.38604
6	1057.700	101.1218	1.55e-14	−14.92322	−9.534762	−12.73695
7	1110.561	65.13242	1.26e-14	−15.22431	−8.962050	−12.68351
8	1204.076	105.2041*	5.15e-15*	−16.25136*	−9.115296	−13.35603*

*Indicates lag order selected by the criterion. LR: Sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

Table 3: Long run results

Dependent variable: LIFE				
Method: ARDL				
Sample: 2001 2016				
Dynamic regressors (1 lag, automatic): FOOD ENS MISERY URB CON				
Selected Model: ARDL(1, 1, 1, 1, 1, 1)				
Variable	Coefficient	SE	t-Statistic	Prob.*
FOOD	3.972581	0.280604	14.15724	0.0000
ENS	4.739078	0.375337	12.62619	0.0000
MISERY	-0.016073	0.001787	-8.992430	0.0000
URB	0.404022	0.012356	32.69884	0.0000
CON	0.939400	0.148614	6.321073	0.0000

After exploring the long run relationship among the variables of the model, now with the help of ECT, the short run dynamic of the variables can be examined. The outcomes of short run dynamic are presented in Table 4. The outcomes of the short run dynamic reveal that availability of food and household final consumption have a positive and significant impact on average life expectancy. The results reveal that environmental standards have a negative, but an insignificant relationship with an average life expectancy in the short run. Economic misery has negative and significant relationship with an average life expectancy in the short run. Urbanization has a positive, but insignificant impact on average life expectancy in the case of the selected panel (Algeria, Bahrain, Egypt, Iraq, Iran, Islamic Rep., Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, United Arab Emirates, Yemen Rep.) over the selected time period. ECT show the convergence from short run towards long run. The outcomes reveal that the coefficient of ECT is theoretically correct. This certifies that long run relation of the variables. ECT result reveals that 15% short deviation are corrected towards the equilibrium path in the very next year. The results show that short run needs six years and six months for complete convergence in the long.

There are number of causality tests available and they examine the causal relationship among variable. But in this paper impulse response function and variance decomposition analysis are used for this purpose. The results of the impulse response function are

Table 4: Short run dynamics

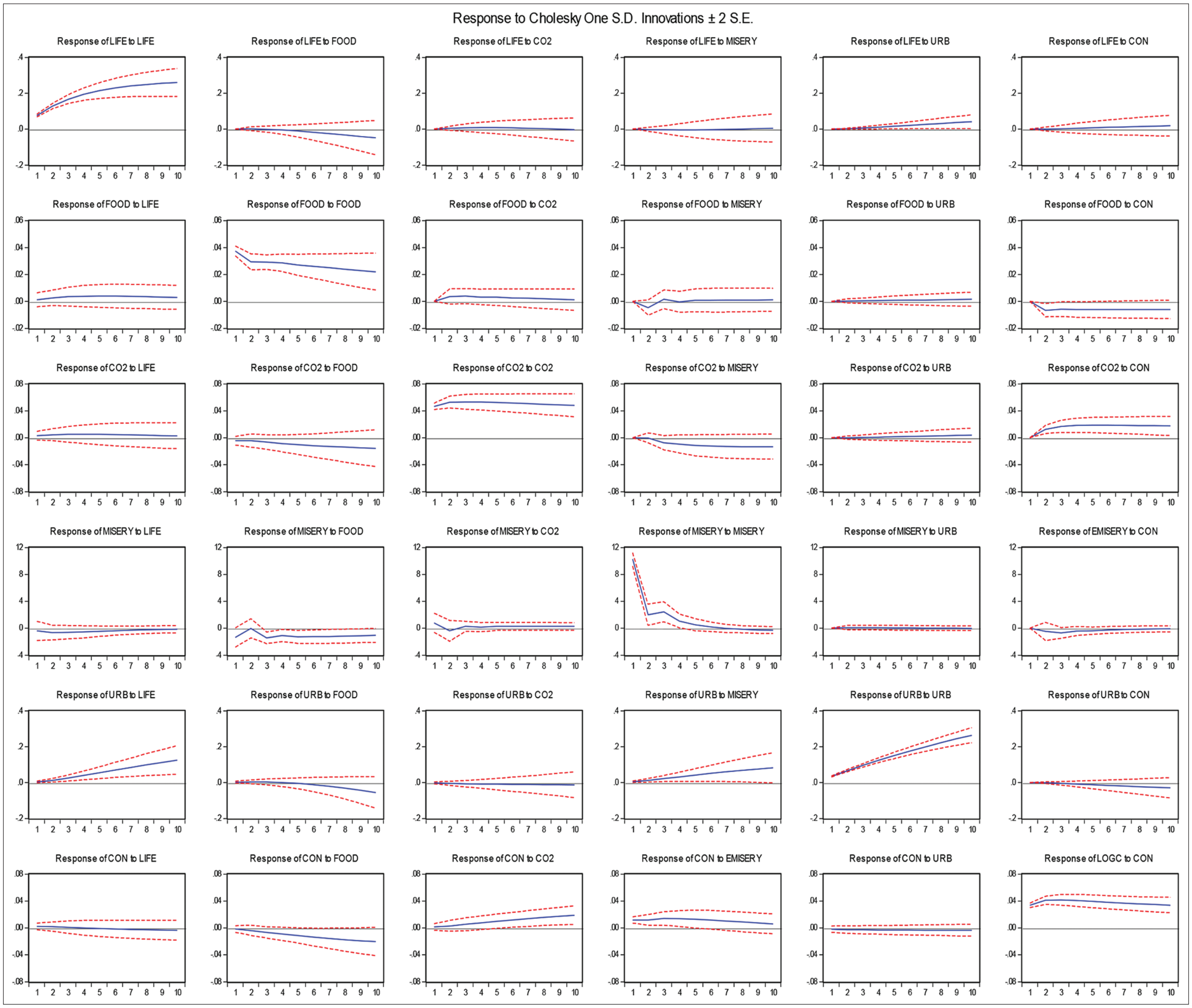
COINTEQ01	−0.151470	0.026244	−5.770160	0.0063
D(FOOD)	0.423706	0.200779	2.110780	0.0473
D(ENS)	−0.079184	0.123643	−0.640423	0.5230
D(MISERY)	−0.102470	0.012853	−7.972457	0.0081
D(URB)	0.093885	1.520128	0.061762	0.9508
D(CON)	0.197125	0.086432	2.280694	0.0400

Mean dependent var 0.209933 S.D. dependent var 0.130835, S.E. of regression 0.057213 Akaike info criterion −4.378460, Sum squared resid 0.454990 Schwarz criterion −2.913692, Log likelihood 626.4153 Hannan-Quinn criter. −3.788266

given in Figure 1. The results indicate that the response of average life expectancy due to forecast error stemming in availability of food is negative throughout the whole time period. The results show that the response of average life expectancy due to forecast error stemming in environmental standards and economic misery is neutral but positive during the selected time horizons. The results reveal that the response of average life expectancy due to forecast error stemming in urbanization initially it is neutral, but after a 4th time horizon it starts rising and remains positive till end. The results indicate that the response of average life expectancy due to forecast error stemming in household final consumption, till the 6th time horizon, it is neutral, afterward it is positive and stable till end. The results show that the response of availability of food due to forecast error stemming in average life expectancy, it is positive and stable during the whole selected time horizons. The results show that the response of availability of food due to forecast error stemming in environmental standards, initially it is neutral, after 2nd time horizon it is positive and stable till end. The response of availability of food due to forecast error stemming of economic misery, initially it is negative, but after 2nd time horizon, it is neutral and positive during the whole time period. The response of availability of food due to forecast error stemming of urbanization, initially it is neutral, but after a 5th time horizon it becomes positive till end. The response of availability of food due to household final consumption is negative and stable during the whole time period. The response of environmental standards due to average life expectancy is positive and stable during the selected time period.

The environmental standards due to availability of food and economic misery is negative and stable during the entire time

Figure 1: Impulse response function



range. The response of environmental standards due to error stemming of urbanization, initially it is neutral, but after a 4th time horizon it becomes positive and stable. The results show that the reaction of environmental standards due to household final consumption, initially it is neutral, but after 2nd time horizon it is positive and stable during whole time period. The results indicate that the response of economic misery due to forecast error stemming in average life expectancy, initially it is negative, but after a 5th time horizon it is neutral during whole time period. The results reveal that the response of economic misery due to forecast error stemming in availability of food, it is negative and more or less stable during the whole-time range. The response of economic misery due to forecast error stemming of environmental standards, urbanization and household final consumption is neutral during the selected time horizon. The response to urbanization due to error stemming of average life expectancy initially it is neutral, but after 2nd time horizon it is rising positively till end. The results reveal that the response of urbanization due to error stemming in availability of food, initially it is neutral, but after a 5th time horizon it becomes negative and decreasing till end. The results show that the response of urbanization due to error stemming of environmental standards is neutral throughout the selected time horizon. The results indicate that the response of urbanization due to error stemming of household final consumption, initially it is neutral, but after a 5th time horizon it becomes negative till end. The result shows that the response of household final consumption due to error stemming of average life expectancy and urbanization, it is neutral throughout the selected time horizon. The results show that household final consumption responses to the availability of food, initially neutral, but after a 5th time horizon, it becomes negative and remains stable negative till end. The results show that household final consumption responses to environmental standards, initially it is neutral, but over the 22nd time horizon it becomes positive and rising till the end. The results indicate that household final consumption response to error stemming in economic misery, it is positive, but fluctuates throughout the whole time period. The overall impulse response function

Table 5: Variance decomposition

Period	S.E.	LIFE	FOOD	ENS	MISERY	URB	CON
Variance Decomposition of LIFE							
1	0.075184	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.148986	99.84991	0.010353	0.090047	0.025325	0.024141	0.000226
3	0.223820	99.70969	0.006002	0.159909	0.032801	0.083827	0.007773
4	0.296782	99.55091	0.029909	0.180025	0.034075	0.176579	0.028499
5	0.366757	99.34029	0.099086	0.171386	0.031118	0.299851	0.058268
6	0.433470	99.05856	0.222329	0.149653	0.025496	0.450232	0.093728
7	0.497038	98.69452	0.404896	0.124439	0.019768	0.623805	0.132573
8	0.557746	98.24274	0.650188	0.101278	0.015973	0.816342	0.173482
9	0.615940	97.70218	0.959935	0.083057	0.015546	1.023549	0.215731
10	0.671965	97.07485	1.334694	0.071046	0.019254	1.241235	0.258916
Variance Decomposition of FOOD							
1	0.037521	0.097816	99.90218	0.000000	0.000000	0.000000	0.000000
2	0.048490	0.347068	96.32850	0.543944	0.934162	0.004321	1.842003
3	0.057149	0.620306	95.40849	0.859641	0.743725	0.007669	2.360173
4	0.064393	0.844822	94.89828	0.926081	0.588918	0.014130	2.727766
5	0.070312	1.029975	94.42576	0.971155	0.507082	0.023330	3.042702
6	0.075424	1.165983	94.08711	0.967668	0.451198	0.035525	3.292518
7	0.079827	1.262292	93.79761	0.948075	0.416802	0.050730	3.524487
8	0.083677	1.324693	93.55660	0.917112	0.394902	0.068711	3.737982
9	0.087068	1.360036	93.34765	0.880694	0.380964	0.089214	3.941447
10	0.090076	1.374168	93.16134	0.842250	0.372880	0.111895	4.137468
Variance Decomposition of ENS							
1	0.046911	0.394739	0.874144	98.73112	0.000000	0.000000	0.000000
2	0.072092	0.545519	0.713949	95.81025	0.001234	1.35E-05	2.929038
3	0.091812	0.626807	0.922543	92.65542	0.651211	0.002494	5.141529
4	0.108472	0.668662	1.314947	90.27570	1.187124	0.009391	6.544177
5	0.122916	0.683314	1.709910	88.38078	1.767342	0.021410	7.437246
6	0.135744	0.679351	2.137327	86.87995	2.264040	0.038425	8.000903
7	0.147289	0.662205	2.571100	85.64996	2.682930	0.060137	8.373668
8	0.157798	0.635895	3.012027	84.61239	3.030665	0.086220	8.622802
9	0.167444	0.603679	3.457271	83.71545	3.316601	0.116324	8.790678
10	0.176362	0.568225	3.905431	82.92190	3.552127	0.150109	8.902207
Variance Decomposition of MISERY							
1	10.37138	0.144188	1.758576	0.604017	97.49322	0.000000	0.000000
2	10.60383	0.517606	1.682406	0.713770	96.88174	0.009506	0.194969
3	11.01689	0.779044	3.270357	0.730520	94.61003	0.016900	0.593145
4	11.14507	1.000772	4.158165	0.735112	93.35487	0.022351	0.728734
5	11.25190	1.146875	5.414993	0.776381	91.80987	0.025566	0.826318
6	11.33663	1.239260	6.568195	0.825293	90.47306	0.026932	0.867262
7	11.41271	1.293376	7.643479	0.877389	89.27238	0.027226	0.886151
8	11.48222	1.322435	8.612911	0.929531	88.21578	0.027008	0.892339
9	11.54519	1.336134	9.465621	0.977967	87.30143	0.026721	0.892126
10	11.60194	1.340656	10.21189	1.022043	86.50995	0.026665	0.888796
Variance Decomposition of URB:							
1	0.034482	0.883270	0.478695	0.429714	1.755324	96.45300	0.000000
2	0.076221	2.797271	0.308290	0.499278	2.830894	93.50424	0.060024
3	0.126585	4.862097	0.159081	0.469240	3.939442	90.39947	0.170666
4	0.184036	6.823740	0.075295	0.420425	4.830029	87.56160	0.288907
5	0.247408	8.579841	0.076741	0.371735	5.508403	85.06418	0.399097
6	0.315764	10.10121	0.176845	0.329395	6.001727	82.89487	0.495951
7	0.388345	11.39224	0.382221	0.294381	6.344549	81.00750	0.579107
8	0.464536	12.47133	0.694269	0.266098	6.569162	79.34947	0.649668
9	0.543837	13.36159	1.110732	0.243561	6.702208	77.87278	0.709132
10	0.625839	14.08652	1.626845	0.225792	6.764943	76.53695	0.758948
Variance Decomposition of CON:							
1	0.035728	0.380211	0.224627	0.158025	10.94861	0.293975	87.99455
2	0.055821	0.263781	0.550175	0.326604	8.845492	0.334313	89.67964
3	0.071604	0.177211	1.238053	0.757766	9.222044	0.367470	88.23746
4	0.084357	0.127715	2.027626	1.330635	9.279933	0.398719	86.83537
5	0.095222	0.109414	3.030469	2.079277	9.142275	0.427220	85.21134
6	0.104830	0.114663	4.178383	2.972263	8.805872	0.452822	83.47600
7	0.113578	0.136235	5.443828	3.987689	8.330669	0.475188	81.62639
8	0.121724	0.168219	6.784898	5.098399	7.779258	0.494084	79.67514
9	0.129434	0.206149	8.163764	6.277449	7.198664	0.509404	77.64457
10	0.136820	0.246817	9.547850	7.500123	6.623889	0.521150	75.56017

Cholesky Ordering: LIFE FOOD ENS MISERY URB CON results reveal that most of the variables are causing average life expectancy in case of MENA nations during the selected time.

The results of variance decomposition are presented in Table 5. The estimated results point out that 97.07% variation in average life expectancy is described by its personal innovative shocks while innovative shocks of availability of food contribute to average life expectancy by 1.33%. The role of environmental standards, economic misery and household final consumption is minimal. These factors by their shocks contribute to average life expectancy in MENA nations by 0.071%, 0.019% and 0.258% respectively. The involvement of urbanization to average life expectancy variations is 1.241%. The estimated results explain that average life expectancy contributes to the availability of by 1.37%. The estimates show that 93.16%, shocks in availability of food are explained by its own innovative shocks while 4.13%, shocks in availability of food are explained by household final consumption. The role of environmental standards, economic misery, and urbanization is very minimal. These factors by their shocks contributes to the availability of food in MENA nations by 0.84%, 0.37%, 0.111% respectively.

The estimated results reveal that 0.56% variation in environmental standards is explained by average life expectancy. The results show that 3.90%, shocks in environmental standards are explained by the availability of food. The results show that 82.92%, shocks in environmental standards are explained by its own innovative shocks. The results show that economic misery contributes to 3.55% in explaining environmental standards, whereas urbanization contributes only 0.15% in explaining environmental standards. The results show that 8.90% variation in environmental standards is explained by household final consumption in MENA nations during the selected time period. The estimates reveal that 1.34%, shocks in economic misery are explained by average life expectancy. Availability of food is playing a significant role in shocks of economic misery and it contributes 10.1%. The results show that 86.50%, shocks in economic misery are explained by itself. The estimated results reveal that environmental standards, urbanization and household final consumption have a minimal contribution in explaining economic misery. They contribute 1.02%, 0.02% and 0.88% respectively. Average life expectancy is explaining 14.08%, shocks of urbanization. The results show that 1.62%, shocks in urbanization are explained by the availability of food. The estimates highlight that 6.76% shocks in urbanization are explained by economic misery. The results reveal that 76.53%, shocks in urbanization are explained by its own innovative shocks. The role of environmental standards and household final consumption is very minimal in explaining shocks of urbanization. They contribute 0.2% and 0.75% respectively.

The results show that availability of food, environmental standards and economic misery are significantly contributing in shocks of household final consumption. They contribute to 9.54%, 7.50% and 6.62% respectively. The results reveal that average life expectancy and urbanization contribute very minimal in explaining household final consumption. The estimated show that 75.56%, shocks in household final consumption are explained by its own innovative shocks.

The overall of the results of the impulse response function and variance decomposition reveal that there is a feedback effect between average life expectancy and availability of food, there is bidirectional causality is running average life expectancy and availability of food. The results reveal that there is no causal relationship between average life expectancy and environmental standards in case of MENA nations. There is unidirectional causality is running from an average life expectancy to economic misery and from an average life expectancy to urbanization. There is no causal relationship between household final consumption. Unidirectional causality is running from availability of food to environmental standards, from availability of food to economic misery and from the availability of food to urbanization in MENA nations. The bidirectional causal relationship is existed between household final consumption and availability of food. There is unidirectional causality is running from economic misery to environmental standards. There is no causal relationship between urbanization and environmental standards, but bidirectional causality is running between environmental standards and household final consumption in MENA nations. Unidirectional causality is running from economic misery to urbanization and from economic misery to household final consumption. There is no causal relationship between urbanization and household final consumption in MENA nations.

5. CONCLUSIONS

This article has explored the effect of economic misery and urbanization on average life expectancy in selected MENA nations from 2001 to 2016. Food Availability, environmental standards, urbanization and household final consumption are selected explanatory variables, whereas average life expectancy is used as the dependent variable. The selected MENA nations are: Algeria, Bahrain, Egypt, Iraq, Iran, Islamic Rep., Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, United Arab Emirates and Yemen Rep. Panel ARDL has been used for co-integration. Causality has been checked with the help of the impulse response function and variance decomposition.

The outcomes reveal that food availability has significant and positive relation with an average life expectancy. The outcomes show that environmental standards put significant and positive impact on average life expectancy. The outcomes reveal that economic misery has a significant and negative influence on average life expectancy in MENA nations. The findings reveal that urbanization puts significant and positive influence on average life expectancy. The estimated findings show that household final consumption has a positive and significant impact on average life expectancy. The results show that bidirectional causality is running average life expectancy and availability of food. There is unidirectional causality is running from an average life expectancy to economic misery and from an average life expectancy to urbanization. Unidirectional causality is running from availability of food to environmental standards, from availability of food to economic misery and from the availability of food to urbanization in MENA nations. The bidirectional causal relationship is existed between household final consumption and availability of food. There is unidirectional causality is running from economic misery to environmental standards. Bidirectional causality is running between environmental standards and household final consumption in MENA nations. Unidirectional causality is running from economic misery to urbanization and from economic misery to household final consumption.

The outcomes reveal that availability of food, environmental standards, urbanization and household final consumption are enhancing average life expectancy in MENA nations over the selected time period. But economic misery is reducing average life expectancy in MENA nations. So, for improving the average life expectancy in MENA nations availability of food, household final consumption and the level of urbanization must be enhanced. Whereas at the time economic misery will be reduced.

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