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DOES URBANIZATION INDUCE THE HEALTH EXPENDITURES? A DYNAMIC MACRO-PANEL ANALYSIS FOR DEVELOPING COUNTRIES

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Abstract

Fast growing urban population brings some opportunities while it can also causes significant health costs, especially in developing countries. This study aims to investigate the possible impact of urbanization on health expenditures in 89 developing countries during the period 2006-2015 by using both static and dynamic panel data techniques. Fixed Effects (FE) estimator results showed that the health expenditures per capita has a positive relationship with income per capita, the share of government expenditures, out-of-pocket payments per capita, the share of population ages 65 and above. Furthermore, FE findings revealed that the increased urbanization also induces the healthcare expenditures in developing countries. In addition, dynamic panel estimation method is also applied in the empirical analysis to avoid the possible endogeneity problem and to consider the dynamic properties. Thus, Generalised Methods of Moments (GMM) findings showed that the urbanization leads healthcare expenditures in developing countries. Thereby, GMM results are coherence with the FE findings. Consequently, the empirical results indicate the importance of urbanization as a determinant of healthcare expenditures. Therefore, developing countries' policy makers should re-consider their urban development policies to prevent from the negative externalities of rapid urbanization.

Keywords: Urbanization, Health Expenditures, Fixed Effects, GMM, Developing Countries.
JEL Codes: E00; I10; I15.

KENTLEŞME SAĞLIK HARCAMALARINI ARTTIRIR MI? GELİŞMEKTE OLAN ÜLKELER İÇİN BİR DİNAMİK MAKRO-PANEL ANALİZİ

Öz

Hızla artan kentsel nüfus çeşitli fırsatları beraberinde getirdiği gibi, özellikle gelişmekte olan ülkelerde, önemli sağlık maliyetlerine de neden olabilmektedir. Bu çalışma, 89 gelişmekte olan ülke için 2006-2015 yılları arasında kentleşmenin sağlık harcamaları üzerindeki olası etkisini statik ve dinamik panel veri teknikleri ile incelemeyi amaçlamaktadır. Sabit Etkiler (FE) tahminci sonuçları kişi başına düşen sağlık harcamalarının, kişi başına düşen gelir, kamu harcamaları, sağlık harcamaları için gerçekleştirilen kişi başına nakit ödemeler ve 65 yaş ve üstü nüfus ile doğru yönlü bir ilişki içinde olduğunu göstermiştir. Ayrıca, FE bulguları gelişmekte olan ülkelerde kentleşmede yaşanan artışın sağlık harcamalarını arttırdığını ortaya çıkarmıştır. Buna ek olarak, bu çalışmada, olası içsellik sorunlarından kaçınmak ve dinamik özellikleri göz önünde bulundurmak için dinamik panel tahmin yöntemleri de uygulanmıştır. Bu bağlamda gerçekleştirilen Genelleştirilmiş Momentler Yöntemi (GMM) bulguları kentleşme oranındaki artışın sağlık harcamalarını arttırıcı bir etkisi olduğunu göstermiştir. Dolayısıyla, GMM sonuçları FE bulguları ile uyumludur. Çalışmanın ampirik bulguları, kentleşmenin, gelişmekte olan ülkelerde sağlık harcamalarının önemli bir belirleyicisi olduğunu ortaya koymuştur. Bu nedenle, gelişmekte olan ülkelerin politika yapıcıları, hızlı kentleşmenin negatif dışsallıklarını önlemek için kentsel gelişim politikalarını yeniden gözden geçirmelidir.

Anahtar Kelimeler: Kentleşme, Sağlık Harcamaları, Sabit Etkiler, GMM, Gelişmekte Olan Ülkeler.
JEL Kodları: E00; I10; I15.

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Introduction

The World Health Organization [WHO], in 2014, announced that 30% of the world population was living in urban areas in 1950 while that rate has reached 54% in 2015 and it is expected to increase to 60% by 2030. Certainly, this rapid urban population growth brings some significant economic, health and environmental consequences especially for developing world compared to developed countries. As Henderson (2002) indicated, developed countries urbanized at a comparatively reasonable and gradual pace. Also, the increase in world urban population particularly happens in low and middle income countries (Leon, 2008). The United Nations [UN] Human Settlements Programme's report in 2016 showed that the average annual change rate of urban population calculated by 2.16% for worldwide during 1995-2015. But, during the same period, this rate determined as 0.88% for high-income countries, 2.63% for middle-income countries and 3.68% for low-income countries. As a consequence of this rapid growth, developing countries faced with health related issues which is one of the most important socio-economic challenges. According to the WHO, that challenges are mainly related to water, environment, violence and injury, noncommunicable diseases (such as cancers, diabetes etc.), unhealthy diets and physical inactivity, overuse of alcohol (The WHO, 2010). Regarding this, the world development indicators of the World Bank presents that current health expenditures per capita of low and middle income countries was aproximately 170 dollars in 2000 while it has reached to 510 dollars in 2015. This statistics may imply the stimulating effect of urbanization on healthcare costs.

All of these facts leaded researchers to investigate the possible healthcare costs of urbanization especially in developing countries. In this regard, Moore et al. (2003) stated that the cities in developing countries usually face with environmental problems due to the unorganized and over increased urban growth. Illegal and insufficient housing, overpopulation, risky levels of air and water pollution, inadequacies in reaching health services, inadequacies in solid waste collection and recycling systems, intense traffic and possible injuries related to traffic accidents could be given as examples of these problems. Thus, many health issues usually arise from these environmental issues in developing countries (Godfrey & Julien, 2005). Harpham and Molyneux (2001) indicated that developing countries generally suffers from both communicable and noncommunicable diseases due to the rapid growth of their low-income urban population. This implication shows the possible interlinkage between the urban population and health conditions in developing world. Mendez et al. (2005) mentioned that urbanization can cause an increase in the level of non-communicable diseases such as obesity by increasing both the risk of type II diabetes and the cardiovascular disease in low and middle income countries. This fact reveals that urbanization is an important driver for the structural changes in social and economic life of developing countries. Likewise, Addo et al. (2007) expressed that generally the prevalence of hypertension rate consistently gets higher level in urban population of Sub-Saharan African countries, compared to rural population. This finding actually points the possible daily lifestyle differences between urban and rural populations. For instance, unhealthy nutrition due to over-consuming of processed foods, thereby increasing salt and fat gains, higher level of obesity, limited physical activity because of the long working hours, may be stated as the reasons for high level of hypertension in urban areas. In addition, Wang et al. (2007) also found similar results for China. Their results showed that the obesity levels got higher in urban areas compared to rural lands. Besides, Eckert and Kohler (2014) referred that crowded cities in developing world induces the air pollution which can cause serious health effects such as asthma, lead and beryllium poisoning, chronic obstructive pulmonary disease. On the other hand, Harpham (1994), Bhugra and Mastrogianni (2004), Thomas (2006) asserted that mental disorders rate increases in developing countries because of the pressure which induced by social and physical changes due to urbanization. Furthermore, McDade and Adair (2001) indicated that the transformation in

infrastructure due to urbanization process in developing world may present a better education and private health services and healthier water supply. However, Henderson (2002) asserted that quite rapid urban population growth in developing countries prevents the societal transformations of rural institutions. Because, higher urbanization in a short time period leave a little opportunity for experimentation and adjustments process which needed for adaptation to urban life. Thereby, it is proper to expect that urban population growth can cause an increase in both private and public health expenditures in developing countries by stimulating health costs.

There are many studies in the literature that investigates the health expenditures determinants of developed countries. However, the same can not be mentioned for developing world. Even though many health expenditures indicators have been examined by researchers in the existing literature, the studies that investigate the possible impacts of urbanization on health expenditures for developing countries are still quite scarce. All studies above and in the literature review imply that rapid and unplanned urban growth' disruptive effect can be directly observed especially in developing countries. Therefore, this study examines the relationship between urbanization and total health expenditures per capita during 2006-2015 for 89 developing countries by using both static and dynamic panel data techniques, to fulfil this deficiency in the existing literature. This study aims to provide two contributions to the existing literature. The first one is to reveal the possible effects of urbanization on health expenditures per capita in a large developing countries panel and extend the Xu and Saksena (2011)'s empirical model with urbanization. The second one is to analyse the empirical model by updated the time period and by using the dynamic panel data method which considers the possible endogeneity problem in the estimations.

This study organized as follows. First section gives a brief summary of the literature review that related to health expenditures determinants and the relationship between health expenditures and urbanization. Second section describes the data and the econometric methodology. Section three provides empirical results and implications. The last section includes concluding remarks and policy suggestions.

1. Related Empirical Literature Review

Such reasons like increased environmental pollution, spreaded diseases, over-crowded cities, income level differences among developed and developing world, attracts academicians and policy makers' attentions to the possible healthcare expenditures determinants. In his earlier study, Newhouse (1977) investigated the main indicator of the medicalcare spendings of 13 developed countries. He reached that real GDP per capita has a strong impact on real healthcare expenditures per capita. Parkin et al. (1987)'s findings also confirmed this results. The empirical studies that examines the possible determinants of healthcare expenditure rapidly increased since the 1990's (e.g. Hitiris & Posnett, 1992; Hansen & King, 1996; Blomqvist & Carter, 1997; Barros, 1998; Roberts, 1999; Gerdtham & Löthgren, 2000,2002; Devlin & Hansen, 2001; Okunade & Karakus, 2001; Bac & Le Pen, 2002; Musgrove et al., 2002; Herwartz & Theilen, 2003; Sen, 2005; Dormont et al., 2006; Nixon & Ulmann, 2006; Esteve & Martinez-Zahonero, 2007; Erdil & Yetkiner, 2009; Cantarero & Lago-Penas, 2010; Moscone & Tosetti, 2010; Sülkü & Caner, 2011; Wang, 2011; French, 2012; Lago-Penas et al., 2013; Bedir, 2016; Howdon & Rice, 2018, Lee et al., 2018). In many of these studies income level suggested as a main indicator of healthcare expenditure. In addition, many other indicators (such as proportion of the population aged 65 and above/ under the age of 15, total government expenditure, incidence of tuberculosis to indentify the disease pattern, out of pocket health expenditures, dependency rate of both old and young population, mortality rate, the relative price of healthcare, number of physicians per capita, life expectancy, population growth, private and government spending for healthcare, wages and salaries per employee, labor productivity, foreign aid etc.) also identified as the health expenditures determinants by many researchers (Hitiris & Posnett, 1992; Hansen & King, 1996; Blomqvist & Carter, 1997; Di Matteo, 2004,2005; Okunade et al., 2004; Dreger & Reimers, 2005; Kiymaz et

al., 2006; Hartwig, 2008; Murthy & Okunade, 2009; Baltagi & Moscone, 2010; Cantarero-Prieto & Lago-Penas, 2012; Xu & Saksena, 2011).

Existing literature shows that very few studies investigate the possible impacts of urbanization on healthcare expenditures. Table 1 presents a brief summary of the literature review that examines the relationship among these two variables.

Table 1: *Summary of the Empirical Literature that Investigates the Relationship between Urbanization and Health Expenditures*

Study	Methodology	Period	Country	Findings
Kleiman (1974)	Cross-sections analysis	1968-1969	16 selected countries	High level of urbanization has a negative impact on health expenditures.
Gbesemete and Gerdtham (1992)	Cross-section analysis	1984	30 African countries	High level of urbanization has a positive impact on health expenditures.
Gerdtham et al. (1992a)	Cross-section analysis	1987	19 OECD countries	High level of urbanization has a negative impact on health expenditures.
Gerdtham et al. (1992b)	Pooled cross-section analysis	1974, 1980,1987	19 OECD countries	High level of urbanization has a negative impact on health expenditures.
Siddiqui et al. (1995)	Multivariate regression analysis	1974-1993	Pakistan	High level of urbanization has a negative impact on non-development health expenditures.
Toor and Butt (2005)	Time series error correction model (ECM)	-	Pakistan	High level of urbanization has a positive impact on health expenditures.
Crivelli et al. (2006)	Fixed effects (FE) and random effects (RE) estimators	1996-2002	26 Switzerland cantons	High level of urbanization has a positive impact on health expenditures.
Thornton and Rice (2008)	Ordinary least square (OLS) and three-stage least squares (3SLS) estimations	1998	50 states of USA	High level of urbanization has a negative impact on health expenditures.
Wang (2009)	Weighted panel regression analysis	1999-2003	US- States-level	High level of urbanization has a negative impact on health expenditures.
Magazzino and Mele (2012)	FE estimators, Generalized Method of Moments (GMM) Difference, GMM-System estimators	1980-2009	Italian regions	High level of urbanization has a positive impact on health expenditures.
Pan and Liu (2012)	FE and RE estimators	2002-2006	China	High level of urbanization has a negative impact on public health expenditures.
Abbas and Hiemenz (2013)	Time series vector error correction model (VECM)	1972-2009	Pakistan	High level of urbanization has a negative impact on public health expenditures.
Samadi and Rad (2013)	Continuous-updated fully modified (CUP-FM) estimator and FE estimator.	1995-2009	Economic Cooperation Organization (ECO) countries	High level of urbanization has a positive impact on health expenditures.
Boachie et al. (2014)	Fully Modified OLS analysis	1970-2008	Ghana	High level of urbanization has a negative impact on public health expenditures.
Fattahi (2015)	Generalized Method of Moments (GMM) analysis	1995-2011	Developing countries	High level of urbanization has a positive impact on private health expenditures.
Kouassi et al. (2018)	FE estimator and common correlated effects (CCE) analysis	1995-2012	14 Southern African Development Community (SADC) countries	High level of urbanization has a positive impact on health expenditures.

As it is seen from the literature review, three types of health expenditures data preferred in the existing literature. Some researchers used public, some of them used private and some others used

both public and private or total health expenditures in their analysis. According to the empirical results of the studies in Table 1, some researchers have found that urbanization has a positive impact on healthcare spendings (e.g. Gbesemete & Gerdtham, 1992; Toor & Butt, 2005; Crivelli et al., 2006; Magazzino & Mele, 2012; Samadi & Rad, 2013; Fattahi, 2015; Kouassi et al., 2018), while some others have reached an opposite correlation between urbanization and healthcare expenditures (e.g. Kleiman, 1974; Gerdtham et al., 1992a,b; Siddique et al., 1995; Thornton & Rice, 2008; Wang, 2009; Pan & Liu, 2012; Abbas & Hiemenz, 2013; Boachie et al., 2014). These findings imply that urbanization can either influence positively or negatively to healthcare expenditures. Because, especially in developing countries, the rapidly increasing population in large urban cities can accelerate the spread of contagious diseases and insufficient sanitation facilities would be fail to prevent the possible health cost of this spread. Besides, pollution level could also be increase in order to satisfy the increasing energy needs of urban population. Therefore, it is natural to expect that the healthcare expenditures may increase in developing countries (Toor & Butt, 2005; Gbesemete & Gerdtham, 1992). On the other hand, urbanization also might improve the health quality of citizens in some points. For instance, well-developed urban settlements may provide better education and private health services, ensure healthier water supply and social service. Also, urbanization might lowered the transportation costs due to well-developed industrial infrastructure and thus to availability of citizens to get more advanced health services could get easier and hence health costs may decrease (McDade & Adair, 2001; Wang, 2009).

2. Data and Methodology

2.1. Data

The annual data covers the period from 2006 to 2015 for 89 developing economies. The country classification is based on the World Economic Situation and Expectations (2014) report prepared by UN. By following this report, Algeria, Angola, Argentina, Bahrain, Bangladesh, Barbados, Benin, Bolivia, Botswana, Brazil, Brunei Darussalam, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Costa Rica, Cote d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Gabon, Gambia, Ghana, Guetamala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran, Israel, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Lesotho, Liberia, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Qatar, Republic of Korea, Rwanda, Saudi Arabia, Senegal, Sierra Leone, Singapore, South Africa, Sri Lanka, Sudan, Thailand, Togo, Tunusia, Turkey, Uganda, United Arab Emirates, Uruguay, Venezuela, Vietnam and Yemen, are included in to the empirical analysis. Unfortunately, Cuba, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Hong Kong SAR, Iraq, Libya, Myanmar, Papua New Guinea, Sao Tome and Prinicipe, Somalia, Syrian Arab Republic, Taiwan Province of China, Trinidad and Tobago, United Republic of Tanzania, Zambia and Zimbabwe could not involved in to the analysis because of data availability problem. Current health expenditures per capita (Power Purchasing Parity (PPP), current international $) data obtained from global health observatory indicator of the WHO. GDP per capita (PPP, current international $), general government final consumption expenditure (% of GDP), out-of-pocket expenditures per capita (PPP, current international $),incidence of tuberculosis (per 100,000 people), population ages 65 and above (% of the total population) data are gathered from world development indicators of the World Bank. Following the studies of Al-Mulali et al. (2013), Wang et al. (2016), Bilgili et al. (2017), urban population preferred as a proxy for urbanization. Urban population at mid-Year (thousands) is collected from the UN dataset. All variables are expressed in their natural logarithm forms.

Table 2 presents the descriptive statistics. As it is seen, in developing countries, the average health expenditures per capita is 595$ while the average GDP per capita is 13.639$. These statistics show

that the average health expenditures per capita keeps increasing since 2000 as it is underlined in the introduction section. Besides, income per capita in these countries is quite low and this fact is coherence with the UN's country classification. On the other hand, average urban population of these countries is 27.136.000 people and it is reasonable to expect that this crowded population in urban areas could cause important health costs and economic burdens.

Table 2: *Descriptive Statistics (before transformed to logarithm)*

Variable	Variable	Obs.	Mean	Std. Dev.	Min.	Max.
he	Health expenditures per capita	890	595.95	645.89	27.17	3900.28
Y	GDP per capita	889	13639.74	20293.22	572.71	129349.9
gfe	Government final consumption (%)	885	184.59	178.95	3.80	1161.47
op	Out-of-pocket expenditures per capita	890	14.68	7.51	3.11	88.98
pop65	Population ages 65 and above (%)	890	4.90	2.63	0.75	14.43
tb	Incidence of tuberculosis	890	164.02	198.24	0	1280
urban	Urban population	890	27136.19	84365.83	89	775353

Table 3 shows the pairwise correlation coefficients of all data. As it is expected, GDP per capita and out-of-pocket expenditures per capita has a positive correlation with health expenditures per capita. Besides, other socio-economic indicators correlation signs mostly indicates expected results except the incidence of tuberculosis which has a negative correlation with health expenditures per capita. Moreover, the correlation between urbanization and health expenditures per capita presents a positive sign.

Table 3: *Pairwise Correlation Matrix*

	lnhe	lnY	lngfe	lnop	lnpop65	lntb	lnurban
lnhe	1.000	-	-	-	-	-	-
lnY	0.939	1.000	-	-	-	-	-
lngfe	0.194	0.114	1.000	-	-	-	-
lnop	0.831	0.800	-0.051	1.000	-	-	-
lnpop65	0.388	0.289	0.008	0.433	1.000	-	-
lntb	-0.602	-0.539	-0.072	-0.623	-0.236	1.000	-
lnurban	0.112	0.125	-0.219	0.204	0.225	0.024	1.000

Even though descriptive statistics and pairwise correlations coefficients shows lead informations about the data, more advanced and complex statistical methods should be apply to investigate the relationship among the series. For that reason, static and dynamic panel data estimations are used in the empirical analysis of this study.

2.2. Methodology

This study aims to investigate the relationship between health expenditures per capita and urbanization for developing economies during the period 2006 to 2015 by applying both static and dynamic panel data estimations. At first, pooled ordinary least squares (POLS), standart fixed effects (FE) and random effects (RE) models are employed to investigate the possible relationship among the variables. While the static empirical model is determining, Xu and Saksena (2011)'s model is extended by urbanization data. In this regard, static model is constituted as below:

$$\ln he_{(t,t+n),i} = \beta_1 \ln Y_{t,i} + \beta_2 \ln urban_{t,i} + \beta_3 \ln gfe_{t,i} + \beta_4 \ln op_{t,i} + \beta_5 \ln pop65_{t,i} + \beta_6 \ln tb_{t,i} + a_i + \eta_t + \varepsilon_{t,i} \quad (1)$$

where $\ln he_{(t,t+n),i}$ states the total health expenditures per capita from period t to period $t+n$, $\ln Y_{t,i}$ expresses income per capita, $\ln urban_{t,i}$ denotes the explanatory variable which is urban population. Control variables indicated as government final consumption ($\ln gfe_{t,i}$),out-of-pocket expenditures per capita ($\ln op_{t,i}$), population ages 65 and above ($\ln pop65_{t,i}$), incidence of tuberculosis ($\ln tb_{t,i}$). Also, a_i is the country-specific effects, η_t is the time period effects and $\varepsilon_{t,i}$ is the error term in equation 1.

The basic estimation methodology (POLS) can provide biased results caused from time-invariant unobservables. The fixed and random effects estimations eliminate these possible biases by within transformation process (treating fixed or random). In this regard, Breusch and Pagan (1980) developed a Lagrange multiplier (LM) test to choose the favored estimator to overcome the possible heterogeneity problem. If the null hypothesis of LM test (H_0: individual-specific or time-specific error variance components are zero) is rejected, this implies RE is a proper estimator for panel. On the other hand, in an economic view, because all countries included in the empirical model of this study stated as developing economies by UN, it is rational to treat a_i as fixed. Yet still, the general specification test which proposed by Hausman (1978) is applied to decide whether fixed or random effects are valid for current country group. If the null hypothesis of this test (H_0: difference in coefficients not systematic) is rejected, this indicates the validity of the fixed effects (Park, 2011).

Even though observable variables assumed strictly exogenous in fixed effects model (Allison, 2009), some variables (for instance GDP per capita in equation 1) actually has an endogenous nature by economically as stated by Xu and Saksena (2011). On the other hand, if the lagged dependent variable involved as a regressor, the possible correlations between the lagged dependent variables and country-specific effects may constitutes biased coefficient results. Therefore, fixed effects estimator can be implemented if T is large because this correlation problem disappears in large T panels (Nickell, 1981). According to this information, generalised methods of moments (GMM) approach is used as a dynamic panel data estimator in this study. Arrelano and Bond (1991) developed a GMM technique that aims to resolve joint endogeneity by using lags of endogenous variables as intruments for small T and large N panels. The dynamic panel data regression is specified as below:

$$\Delta \ln he_{t,i} = \beta_1 \Delta \ln he_{t-1,i} + \beta_2 \Delta \ln Y_{t-2,i} + \beta_3 \Delta \ln urban_{t,i} + \beta_4 \Delta \ln gfe_{t,i} + \beta_5 \Delta \ln op_{t,i} + \beta_6 \Delta \ln pop65_{t,i} + \beta_7 \Delta \ln tb_{t,i} + a_i + \Delta \varepsilon_{t,i} \quad (2)$$

where $\Delta \ln he_{t,i}$ denotes the first difference of health expenditures per capita for country i during t time period, $\Delta \ln he_{t-1,i}$ represents the lagged difference of the dependent variable, $\Delta \ln Y_{t-2,i}$ indicates the lagged level and differenced endogeneous variable (income per capita), $\Delta \ln urban_{t,i}$ states the first difference of the explanatory variable (urban population), $\Delta \ln gfe_{t,i}, \Delta \ln op_{t,i}, \Delta \ln pop65_{t,i}, \Delta \ln tb_{t,i}$ specifies the first differences of exogenous control variables which are indicated in equation 1.

GMM estimator consistency relies on two important assumptions. The first one is the lack of second order serial correlation of error term; the second is the validness of instruments. These two assumptions investigated with two specification test in this study. AR2 test for the second-order serial correlation of differenced residuals while Sargan-Hansen is the over-identifying restrictions test (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998).On the other hand, Arellano and Bond (1991) suggest two different steps for GMM analysis. In the first-step GMM estimaton, the assumption of $\varepsilon_{t,i}$ is independent and homoscedastic across cross-sections during t period. However, in the second step of GMM estimation, $\varepsilon_{t,i}$ obtained from first step estimations are used to determine a consistent variance-covariance matrix estimations. In this way, the

independence and homoscedasticity assumptions get loosen. Therefore, the second step estimation is asymptotically more efficient compared to first step (Beck & Levine, 2004).

3. Empirical Results and Discussions

This study aims to investigate the possible impacts of urbanization on healthcare expenditures for developing countries by using panel data techniques. In this regard, Table 4 shows the static and dynamic panel data estimator results of equation 1 and 2.

Table 4: *Static and Dynamic Panel Estimations Results*

	Static Estimations			**Dynamic Estimation**
Independent variables	*POLS*	*FE*	*RE*	*GMM - Robust (two-step estimator)*
$(lnhe)_{t-1}$				0.138 *
				(1.72)
$(lnY)_t$	0.665***	0.406***	0.613***	
	(44.23)	(8.65)	(21.88)	
$(lnY)_{t-2}$				0.208**
				(2.18)
$(lngfe)_t$	0.327***	0.171***	0.225***	0.155***
	(11.42)	(8.62)	(11.50)	(2.90)
$(lnop)_t$	0.192***	0.411***	0.353***	0.491***
	(9.74)	(18.48)	(16.70)	(11.05)
$(lnpop65)_t$	0.183***	0.592***	0.260***	0.332**
	(7.90)	(7.16)	(4.84)	(1.93)
$(lntb)_t$	-0.061***	-0.003	-0.044**	-0.024
	(-5.94)	(-0.12)	(-2.15)	(-0.99)
$(lnurban)_t$	-0.004	0.353***	0.032*	0.384***
	(-0.66)	(7.38)	(1.78)	(3.84)
Constant	-1.754***	-4.076***	-2.310***	-3.367***
	(-12.08)	(-10.08)	(-8.42)	(-5.79)
Wald x^2 statistics			3084.38	
			[0.00]	
R-squared	0.92	0.63	0.90	
Breusch-Pagan LM test statistics	3108.06			
	[0.00]			
Hausman test statistics			149.14	
			[0.00]	
AR(1) test statistics				-2.182
				[0.02]
AR(2) test statistics				-0.388
				[0.69]
Sargan test statistics				48.830
				[0.52]
Observations	833	883	883	705
Number of countries	89	89	89	89

*Note: Values in paranthesis are t-statistics. Values in brackets are estimated p-values. Breusch–Pagan LM test for random effects. Hausman test is the Hausman specification test. AR(1) and AR(2) are tests for autocorrelation. Sargan test refers to the over-identification test for the restrictions in GMM estimation. *,** and *** denotes %1, %5 and % 10 level of significancy.*

POLS, RE and FE estimators' coefficient findings showed similar way results for some variables and differentiating for some others. However, as mentioned in previous section, POLS estimations could present biased results. Therefore, FE and RE methods are preferred to reach more reliable coefficients. As stated by Park (2011), LM test and Hausman test needs to be implemented to choose appropriate model for panel. Initially, LM test findings indicate that RE estimator results needs to be addressed instead of POLS. After that, Hausman specification test is employed to decide whether fixed or random effects valid for developing countries panel. These test findings

imply that FE estimator results should be preferred for current country sample. Therefore, FE estimator findings should be favored as the consistent static panel estimator. According to FE findings, lnY, lngfe, lnop, lnpop65 has a positive and statistically significant impact on lnhe. Besides, any statistically significant relationship could not been detected among lntb and lnhe in the FE analysis. On the other hand, FE results imply that urbanization induces the healthcare expenditures in developing countries. As seen in Table 4, 1% increase in urban population increased health expenditures by 0.35%. Even though FE is found as a proper estimator in the static model, dynamic panel estimation method is employed to consider the dynamic properties among the variables and dealed with the endogeneity problem in the empirical model. In this regard, GMM analysis results are also given in Table 4. Initially, AR2 test results do not reject the null hypothesis of no serial correlation in the first differences residual terms. In addition, Sargan test result states that over-identifying restrictions accepts the validity of instruments. This finding supports the chosen instruments are proper.

On the other hand, dynamic panel estimator results revealed that lagged dependent variable stimulates the health expenditures per capita. This result implies that the previous time periods health expenditures per capita increases the demand of current health expenditures. Besides, as stated by Xu and Saksena (2011), income has an endogenous nature in the empirical model. Therefore, lnY included as an endogenous variable in to the GMM analysis. According to the GMM findings, as it is expected, lagged endogenous variable has a significant and positive impact on healthcare expenditures per capita in developing countries. This means income is an important determinant of the total health expenditures per capita for developing countries. These results coherence with the findings of Erdil and Yetkiner (2009), Xu and Saksena (2011) and Fattahi (2015). In addition, dynamic panel estimation results indicated that lngfe has a promoting impact on lnhe.

Because, an increase in the share of general government final consumption also gives a clue about the government fiscal stance. Therefore, an increase in government expenditure share refers a possible rise in government health expenditures and therefore in total health expenditures. Also, GMM results state that lnop is an important trigger for lnhe. This means the organization and financing variations of healthcare system could have a significant impact on health expenditures due to increasing the ability to reach improved healthcare services. Thus, out-of-pocket payments could increase the healthcare expenditures per capita by contributing the development in healthcare system. On the other hand, GMM findings remark that an increase in lnpop65 enhances lnhe. Even though developing countries has less elderly population share than high or middle income world, their aging population still face with the serious health problems. This fact could stimulate the healthcare expenditures in developing economies. Because, eventually aging population needs for medical healthcare services intensely. Thereby, an increase in the share of population ages 65 and above could rise the healthcare spendings in developing countries. Besides, any statistically significant relationship could not be detected between lntb and lnhe. Finally, GMM estimator showed that health expenditures per capita increases 0.38% with a 1% increase in urban population. These results revealed that urbanization promotes healthcare spendings in developing economies, as it is expected.

4. Conclusions

Relatively fast growing urban population causes developing countries faced with healthcare challenges in each passing day. The cronical problems like lack of infrastructure, insufficiencies in social transformation, unplanned urbanization, difficulties in delivering health services etc. loads significant economic costs to especially developing countries. Although the determinants of healthcare expenditures has been investigated by researchers and academics for many different country samples since 1970's, the studies that focus on the possible effects of urbanization on

health spending is quite scarce. Therefore, this study aims to examine the relationship between healthcare expenditures and urbanization in developing countries by employing both static and dynamic panel data techniques.

The static models specification tests revealed that FE model is the proper estimator for developing countries panel. In this regard, FE results showed that the socio-economic indicators such as income per capita, the share of government expenditures, out-of-pocket payments per capita, the share of population ages 65 and above has a positive impact on healthcare spendings. Moreover, static panel estimator findings expressed that urbanization also play an important role in healthcare expenditures of developing countries. However, to avoid from the endogeneity problem and to consider the possible dynamic properties in the model, dynamic panel data methods also employed to test the empirical model, in this study. GMM estimator findings actually coherence with the FE results. The same socio-economic factors in the static model effect the healthcare expenditures in a same direction. In addition, GMM results also support the view that urbanization is one of the important drivers of healthcare spendings of developing countries.

According to the empirical findings of this study, several policy suggestions could be proposed. At first, policy makers in developing countries should re-consider their urbanization policies to avoid from the possible negative externalities of rapid urban population growth. Therefore, governments should increase their investments for sustainable transformation of current infrastructure of their urban areas. In addition, policy makers should adopt fiscal policies that consider the possible impacts of urban sprawl. Secondly, policy makers should assert new legal regulations such as investment subsidies, tax concession etc., to prevent from excessive migration from rural areas to urban cities.

On the other hand, the empirical analysis of this study constitutes some limitations. For instance, only 89 developing countries are included in to the analysis and the time span relatively covers a short time period. Considering these facts, future studies could increase both time period and cross-sections to determine the possible impacts of urbanization on healthcare expenditures for developing countries. In addition, limited number of control variables preferred in the empirical model of this study. Therefore, future researchers could extend the empirical model by including other determinants of health expenditures, like environmental pollution level, energy consumption etc.

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