Urbanization and Human Development Index: Cross-country evidence

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Abstract:

The present study assesses the impact of urbanization on the value of country-level Human Development Index (HDI), using random effect Tobit panel data estimation from 1990 to 2017. Urbanization is measured by the total urban population, percentage of the urban population, urban population growth rate, percentage of the population living in million-plus agglomeration, and the largest city of the country. Analyses are also separated by high income, upper middle income, lower middle income, and low-income countries. We find that, overall; the total urban population, percentage of the urban population, and percentage of urban population living in the million-plus agglomerations have a positive effect on the value of HDI with controlling for other important determinants of the HDI. On the other hand, urban population growth rate and percentage of the population residing in the largest cities have a negative effect on the value of HDI. Finally, we suggest that the promotion of urbanization is essential to achieving a higher level of HDI. The improvement of the percentage of urbanization is most important than other measures of urbanization. Developing countries need to promote balanced urbanization with the improvement of basic urban services for improving the HDI rank.

JEL Classification: R11, R13, 015

Keywords: Urbanization, human development index, cross country

1. Introduction

No country has developed without sustainable urbanization. Urbanization has a potentially positive effect on economic activity, higher provision to employment opportunities, and enhances access to basic services. Cities switch low-productivity agriculture into high productive industry and service sector-led economy. In developing countries, cities are the engine of economic growth. Cities account for about 70 percent of global GDP (World Bank, 2009). Several studies (Williamson, 1965; Martin and Ottaviano, 1999; Fujita and Thisse, 2002; Baldwin and Martin, 2004; Henderson, 2003; Brülhart and Sbergami, 2009; Tripathi, 2013) found that urbanization has a positive link with economic growth.

However, it is important to know, whether urbanization has led to improvement in a person's capabilities and wellbeing. It is well known to all of us that the Human Development Index (HDI) is far more crucial than a gross domestic product (GDP) in capturing the progress that has been achieved. HDI captures not only GDP but also the other two important aspects such as life expectancy and education. Therefore, whether a higher rate of urbanization has any effect on HDI is very important to assess the success of urbanization for a country.

Very few studies attempted to establish a link between urbanization and HDI. Anisujjaman's (2015) district-level analysis found that there is a positive relationship between the level of urbanization and the HDI in West Bengal, India. Huang and Jiang (2017) conducted a partial correlation analysis between the HDI and urbanization rate whilst controlling for the effects of the GDP for Mongolia. They found that urbanization rates are positively correlated with the HDI even when they controlled the effects of the GDP ($p < 0.001$). Maiti (2017) argued that China was able to create a greater intensity of sustainable development from urbanization than India. The author also found that HDI has a negative and statistically significant effect on the urban population growth rate for China and India. Malik (2014) argued that the relationship between urbanization HDI is not direct and is dependent on how urbanization is managed. Though urbanization offers many opportunities, it can also drive places of deprivation, inequality, and exclusion. For example, though Sub-Saharan Africa has a higher level of urbanization compared to South Asia, but its human development performance is lower than South Asia. Overall, an increasing level of urbanizations is associated with a higher level of HDI.

The study by the United Nations Human Settlements Programme (UN-Habitat, 2016) examined the relationship between the degree of urbanization and HDI by considering countries from Asia,

Africa, and Latin America. The analysis suggested that there are huge variations among continents, although the association is positive for all countries except the Philippines and Sri Lanka. Among the African countries, Botswana and Ethiopia have reached a threshold level of the HDI where the index becomes inelastic to the urban population growth. Only in Thailand, among all other Asian countries, HDI reached a threshold level of 0.72 and became inelastic to the degree of urbanization at the level of 44.08 percent of the urban population. Except for Bolivia, all countries in Latin America, the HDI reached a threshold level at some point from 2005 to 2013. On the other hand, in the rest of the Latin American countries, the HDI became inelastic to the urban population as they have reached a saturation level in terms of the urban population.

However, the HDI not only depends on only urbanization but also many other factors. A cross country study by Shah (2016) found that GDP, life expectancy rate, literacy rate have a positive effect on the HDI, while the Gini index, fertility rate, and Co2 emissions have a negative effect on it. Arisman (2018) found that for the ASEAN countries population and per capita income growth rate affects the HDI, while inflation rates and unemployment rate do not have an impact on it. Bhowmik (2019) argues that there were significant long-run causalities from education expenditure, health expenditure and GDP per capita to the HDI of SAARC but they had no short-run causalities. Khan et al. (2019) find that in the case of Pakistan, information and communication technology and economic growth promote the HDI. On the other hand, urbanization, trade, and foreign direct investment discourage it. Sangaji (2016) found that life expectancy at birth and gross domestic per capita had a positive effect, while the variables of inflation and the fertility rate had negative effects on the HDI in several Buddhist countries in the world. Binder and Georgiadis (2011) argued that macroeconomic policies affect development with less delay than suggested by conventional econometric frameworks, yet impact HDI with longer delay and overall less strongly than GDP.

A brief review of the literature indicates that the relationship between urbanization and economic growth is well established. Higher income which is generated by a higher level of urbanization does not guarantee that quality of life has improved. Therefore, it is pivotal important to assess the impact of urbanization on the HDI from cross country perspectives. In this context, the present study assesses the impact of urbanization on the HDI. We consider 187 countries for the analysis. We find evidence that urbanization has a positive impact on HDI. We also analyze by

considering high, upper-middle, lower-middle, and low-income countries separately. We estimate the random effect of Tobit panel data models for the period of 1990-2017. We start with 1990 as this is the year when Pakistani economist Mahbub ul Haq created HDI. The results are very important for the promotion of urbanization in the world mostly from developing countries perspectives.

The paper adopts the following structure. The next section presents the empirical framework. Regression results are given in section 3. Discussions based on the estimated results are highlighted in section 4.The major conclusions and policy implications are made in section 5.

2. Empirical framework

The Tobit model or censored regression model is used to estimate the linear relationship between the HDI and urbanization as we find the evidence of the right-censoring in the dependent variable of HDI. Histogram in the Appendix of Figures A1 confirms that HDI is right-censoring. A Tobit model with random effects is used as it is capable of accounting both serial correlations and censoring effects. The random effect Tobit model is efficient to account for correlations across observations in addition to unobserved heterogeneity.

The Tobit model for panel data is defined as follows

$$y_{it}^{*} = x_{it}\beta + \epsilon_{it} \quad (1)$$

$$y_{it} = \begin{cases} 0 \text{ if } y_{it}^{*} \leq 0 \\ 1 \text{ if } y_{it}^{*} \geq 1 \\ y_{it}^{*} \text{ if } 0 < y_{it}^{*} < 1 \end{cases} \quad (2)$$

Where y_{it}^{*} is an unobservable latent variable, ϵ_{it} is normally, identically, and independently distributed with zero mean and variance σ_u^2. x_{it} is a vector of explanatory variables and β, a vector of unknown coefficients.

Following, Sangaji (2016), who investigated relevant determinants of HDI in several counties, we also consider random effect model for the estimation. The rationale behind using random effect model is that the variation across countries is assumed to be random and uncorrelated with the independent variables included in the model.

The following equation is specified to assess the impact of urbanization on HDI.

$$\text{HDI} = \upsilon_i + \beta_1 \text{urbanization}_{it} + \beta_2 \text{literacy rate}_{it} + \beta_3 \text{Co2}_{it} + \beta_4 FDI_{it} + \beta_5 fertility\ rate_{it} + \beta_6 gdp\ growth\ rate_{it} + \beta_7 \text{gdp}_{it} + \beta_8 Gini_{it} + \beta_9 inflation\ rate_{it} + \beta_{10} \text{life expectancy}_{it} + \epsilon_{it} \quad (3)$$

where i and t represent country and time, respectively, while, υ_i is the random effects term which follows normal distribution with mean 0 and variance σ_u^2, and ϵ_{it} is the disturbance term which follows normal distribution with mean 0 and variance σ_u^2. Our data set contains up to 187 countries, over the period 1990-2017. The HDI data is sourced from the United Nations Development Programme and other data are from World Development Indicators (WDI) provided by the World Bank.

Based on Henderson (2003), Brülhart and Sbergami (2009) and Tripathi (2013), we measure urbanization in five different ways: percentage of urban population, total urban population, annual urban population growth, population in urban agglomerations of more than 1 million to total population, and population in the largest city to urban population. Five different measures of urbanization have very important implications for capturing various patterns of urbanization in different countries. Some countries/cities are over urbanized and some of them are under urbanized. Therefore, these five measurements of urbanization are very crucial to capture the urbanization dynamics. Overall, a positive effect of urbanization on the HDI is expected, as urbanization is associated with higher employment, GDP, availability of infrastructure, provision of basic services, and lower poverty (Li et al., 2012; Khan et al., 2018). Thus, urbanization contributes to socio-economic development by promoting the state economy and increase the value of the HDI [Khan et al., 2019].

On the other hand, based on review of literature on determinant of the HDI (Arisman, 2018; Khan et al. 2019; Sangaji, 2016; Bhowmik, 2019), we expect that literacy rate, GDP growth rate, GDP per capita, and life expectancy at birth have a positive effect on the HDI. On the other hand, higher CO2 emissions, fertility rates, and the Gini index have a negative effect on the HDI. The higher rate of inflation reduces the purchasing power of money, makes investment less desirable, so it may reduce GDP and the HDI. However, the Phillips curve shows that high inflation is consistent with low rates of unemployment. This implies that inflations have a positive effect on economic growth. Therefore, inflations may have a positive or negative effect

on the HDI. The FDI stimulates the labor market and economic growth, a high tax incentive environment. Therefore, a positive impact of FDI on the HDI is expected [Khan et al., 2019].

3. Regression results

Before we go to regression results, first we present the descriptive statistics of the variables. Table 1 presents the summary statistics of each variable used in the regression models. The coefficient of variation (CV) measures the dispersions of data points in a data series. HDI, Gini coefficients, life expectancy at birth, adult literacy rate, fertility rate, percentage of urban population, and population in the largest city have lower values of a CV, which indicates that little differences in their means, implying a more symmetrical distribution. However, it is not the case for inflation rate, total urban population, foreign direct investment, and GDP growth rate.

Table 1: Descriptive statistics of panel data variables

Variable	No. of observation	Mean	Standard deviation	Minimum	Maximum	Coefficient of Variation
Human development index (HDI)	4725	0.655	0.166	0.2	0.95	25.4
Percentage of urbanization (PU)	5230	53.86	23.39	5.42	100	43.43
Total urban population (TUP)	5227	1.66e+07	5.31e+07	4873	8.00e+08	319.88
Urban population growth (UPG)	5226	2.24	2.06	-7.18	17.76	92.31
Population in urban agglomerations of more than 1 million (PUAM)	3301	23.831	16.833	2.105	100	70.63
Population in the largest city (PLC)	4107	33.059	17.342	2.867	100	52.46
Adult literacy rate (ALR)	687	81.06	20.47	10.89	99.99	25.25
CO_2 emissions (CO_2)	4347	0.281	0.243	0.005	2.12	86.54
Foreign direct investment (FDI)	4848	6.50	39.81	-58.32	1282.63	612.05
Fertility rate (FR)	5096	3.24	1.68	0.901	8.606	51.83
GDP growth rate (GDPG)	5004	2.11	6.33	-64.99	140.37	300.46
GDP per capita (GDP)	4996	11656.8	17003.9	164.3	141200	145.87
GINI index (GINI)	1359	39.22	9.40	23.7	65.8	23.97
Inflation rate (IR)	5004	38.41	496.61	-36.56	26765.9	1293.01
Life expectancy at birth (LEB)	5096	67.89	9.79	26.17	84.68	14.43

Source: Author

Table 2 presents the raw correlation coefficients. The estimated values of correlation coefficients quantify the direction and strength of the linear association between the variables. The results show that the HDI have a positive association with percentage of urban population, adult literacy rate, per capita GDP, life expectancy at birth, and population in million plus urban agglomerations. In contrast, the values of the HDI are negatively correlated with urban

population growth rate, fertility rate, populations in the largest city, Gini coefficients, and GDP growth rate.

Table 2: Correlation coefficient of the variables used in regression model

	HDI	PU	TUP	UPG	PUAM	PLC	ALR	CO_2	FDI	FR	GDPG	GDP	GINI	IR	LEB
HDI	1.00														
PU	0.80	1.00													
TUP	0.07	0.00	1.00												
UPG	-0.71	-0.64	0.00	1.00											
PUAM	0.49	0.72	0.02	-0.42	1.00										
PLC	-0.13	0.00	-0.49	-0.01	0.37	1.00									
ALR	0.86	0.70	0.06	-0.61	0.47	-0.09	1.00								
CO_2	0.09	-0.05	0.22	-0.09	-0.19	-0.34	0.20	1.00							
FDI	0.00	0.07	-0.15	0.01	0.08	0.28	0.06	-0.03	1.00						
FR	-0.89	-0.68	-0.20	0.72	-0.37	0.23	-0.83	-0.23	0.06	1.00					
GDPG	-0.12	-0.10	0.10	0.03	0.06	0.12	0.02	-0.04	0.13	0.05	1.00				
GDP	0.71	0.53	0.04	-0.44	0.26	-0.17	0.45	-0.06	-0.07	-0.57	-0.25	1.00			
GINI	-0.04	0.23	-0.01	0.09	0.39	0.11	0.14	-0.20	0.03	0.05	0.10	-0.21	1.00		
IR	0.01	0.04	-0.02	-0.13	-0.05	-0.05	0.10	0.30	-0.04	-0.09	-0.04	-0.09	-0.18	1.00	
LEB	0.89	0.72	0.08	-0.65	0.46	-0.06	0.74	-0.01	-0.03	-0.86	-0.14	0.64	0.02	-0.05	1.00

Note: See Table 1 for variable definitions. The correlation coefficients are based on 204 observations.
Source: Author.

Table 3 presents the estimated random effect Tobit regression models of equation 3. The sigmas signify the variances of the two error terms μi and εit. Their relationship is explained by the variable rho, which informs us about the relevance of the panel data nature. When rho is zero, the panel-level variance component is unimportant, and the panel estimator is not different from the pooled estimator. As can be seen from Table 3, the panel data structure of the model has to be taken into account. The significant values of Wald chi^2 specify that for regression models 1-6 fit well; all coefficients in the model are different from zero. The higher values of log-likelihood for regression models 1-6, our regression estimations are good. The statistically significant values of likelihood-ratio tests for all the regression models reject the null hypothesis that there are no panel-levels effects.

The size of our country sample for estimations varies between 66 and 116, depending on the explanatory variables that are included in the regressions. Regression model 1 presents the full model, which includes all variables identified by the literature review. Regression models 2-6 report results for a parsimonious model, excluding controls that are not found to be statistically significant in our data and to estimate the impact of particular independent variables on the

dependent variable. In other words, regression model 2-6 are designed to capture the effect of each urbanization variables on the HDI separately.

Table 3: Random Effect Tobit Estimation Results for all countries (dependent variable: HDI)

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Percentage of urbanization	0.001***	0.0005**				
	(0.0004)	(0.0002)				
Urban population	0.0002***		0.0002***			
	(4.61e-05)		(4.18e-05)			
Urban population growth	-0.004***			-0.004**		
	(0.002)			(0.002)		
Population in the largest city	3.38e-05				-0.0006**	
	(0.0005)				(0.0003)	
Population in million plus urban agglomerations	-0.0002					0.002***
	(0.0006)					(0.0002)
Adult literacy rate	0.003***	0.0032***	0.003***	0.004***	0.004***	
	(0.0004)	(0.0004)	(0.0003)	(0.0003)	(0.0004)	
CO_2 emissions	-0.0179	-0.0578***	-0.0363**	-0.057***	-0.063***	-0.074***
	(0.0166)	(0.014)	(0.0145)	(0.014)	(0.015)	(0.004)
Foreign direct investment	0.0005	0.0002	0.0002	0.0003	0.0004	0.0002***
	(0.0005)	(0.0003)	(0.0003)	(0.0003)	(0.0005)	(6.56e-05)
Fertility rate	0.005	-0.003	0.0006	0.001	0.0007	-0.028***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.001)
GDP growth rate	0.0001	0.0002	7.58e-05	0.0002	0.0001	-0.0002***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(6.87e-05)
GDP per capita	4.59e-06***	4.05e-06***	4.37e-06***	4.36e-06***	4.46e-06***	2.63e-06***
	(7.26e-07)	(6.28e-07)	(6.24e-07)	(6.27e-07)	(6.83e-07)	(1.23e-07)
GINI index	-0.001***	-0.001***	-0.001***	-0.0013***	-0.001***	
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	
Inflation rate	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***	
	(3.96e-05)	(4.34e-05)	(4.10e-05)	(4.39e-05)	(4.37e-05)	
Life expectancy at birth	0.007***	0.008***	0.0085***	0.008***	0.008***	0.009***
	(0.0007)	(0.0007)	(0.0006)	(0.0007)	(0.0007)	(0.0002)
Constant	-0.150**	-0.141**	-0.174***	-0.138**	-0.169**	0.088***
	(0.063)	(0.063)	(0.059)	(0.0626)	(0.066)	(0.015)
/sigma_u	0.0405***	0.039***	0.0409***	0.0383***	0.0398***	0.0582***
/sigma_e	0.0099***	0.0114***	0.0106***	0.0116***	0.0115***	0.0174***
rho	0.943	0.924	0.937	0.9159	0.9235	0.918
Wald chi2	2153.27***	1929.11***	2182.18***	1988.14***	1826.04***	15109.8***
Log likelihood	531.73	556.69	564.90	557.13	538.95	6647.32
Likelihood-ratio test	195.90***	197.56***	232.52***	208.38***	215.49***	4993.22***
Observations	204	226	226	226	217	2,648
Number of group	66	84	84	84	76	116

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Estimated using equation 3

The regression models 1-6 show that adult literacy rate, FDI, per-capita GDP, and life expectancy at birth have a positive and statistically significant effect (at 1 % level) on the HDI. For example, the coefficient 0.003 in regression model 1 indicates that for a unit increase in percentage adult literacy rate, there is a 0.003 point increase in the predicted value of HDI. On the other hand, CO2 emissions, fertility rate, GDP growth rate, Gini index, and inflation rate have a negative and statistically significant effect on the HDI. The sign of most of the estimated coefficients is matched with the expected sign. The impact of GDP, life expectancy rate, literacy rate, Gini index, fertility rate, and Co2 emissions on the HDI support the findings of Shah (2016) and Arisman (2018). In the line of Khan et al. (2019), we also get a positive impact of FDI on the HDI. However, the negative impact of economic growth on the HDI does not support the findings of Khan et al. (2019). It is most of the developing countries in the world are having a higher growth rate but the rank in the HDI is very low, so only economic growth cannot increase the HDI value. For example, India has experienced a 7.08% GDP growth rate between 2000 and 2016 but India's rank in the HDI is 130. So if growth does not guarantee education and health, a higher economic growth rate cannot increase alone the HDI rank. Inflation rates have a negative and statistically significant effect on the HDI. This shows that higher inflation is bad for economic growth and it reduces the HDI values.

Turning now to our main focus of interest, we observe that the percentage of urbanization and urban population have a positive and statistically significant effect on the HDI, while higher urban population growth rate has a negative effect on it.

Regression model 1 shows that a 1 unit increase in the percentage of urban population leads to a 0.001 point increase in the predicted value of HDI. Moreover, a 1 unit increase in total urban population associated with a 0.0002 point increase in the predicted value of HDI. To avoid collinearity of the urbanization variables, we obtain separate regression results for 5 independent variables used for measuring urbanization regression models 2 to 6. Regression models 2-4 are consistent with results are obtained in the regression model1. Regression model 5 shows that the percentage of urban population living in the largest city has a negative and statistically significant effect on the HDI. In contrast, regression model 6 indicates that the percentage of urban population living in million-plus agglomerations has a positive effect on the HDI. The coefficient 0.002 specifies that for a unit increase in the percentage of urban population living in million-plus agglomerations, there is a 0.002 point increase in the predicted value of the HDI.

Table 4: Marginal effects of the overall expected value of estimated random effects Tobit coefficients

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Percentage of urbanization	0.097	0.045				
Urban population	0.011		0.009			
Urban population growth	-0.015			-0.012		
Population in the largest city	0.002				-0.029	
Population in million plus urban agglomerations	-0.008					0.054
Adult literacy rate	0.379	0.405	0.413	0.456	0.446	
CO_2 emissions	-0.007	-0.022	-0.014	-0.021	-0.024	-0.032
Foreign direct investment	0.003	0.001	0.001	0.001	0.002	0.001
Fertility rate	0.025	-0.011	0.003	0.005	0.003	-0.179
GDP growth rate	0.001	0.001	0.0003	0.001	0.001	-0.001
GDP per capita	0.044	0.039	0.043	0.043	0.042	0.041
GINI index	-0.087	-0.083	-0.088	-0.083	-0.079	
Inflation rate	-0.004	-0.003	-0.003	-0.003	-0.003	
Life expectancy at birth	0.789	0.840	0.898	0.822	0.897	0.966

Source: Author

Table 4 presents the marginal effects of the overall expected values of the estimated random effect Tobit coefficients. In regression model 1 shows that a one-unit increase in the percentage of urbanization (or total urban population) is associated with an increase of 0.097 (0.011) units on the HDI. Most importantly, regression model 6 shows that a one-unit escalation of the percentage of urban population living in million-plus agglomerations contributes to 0.054% higher probability of an increase of the HDI. Among the other important independent variables (except urbanization variables) we find that adult literacy rate and life expectancy at birth have a strong effect on the HDI. Regression model 1 shows that a one-unit increase of adult literacy rate (or life expectancy at birth) is associated with an increase of 0.379 (or 0.789) units on the HDI. On the other hand, a higher value of the Gini index reduces the values of HDI.

However, regression models 1-6 consider all countries together. As different countries are in a different phase of urbanization, we run the regression models separately for high, upper-middle, lower-middle, and low-income countries as well. We only consider urbanization variables as lower data size of the other explanatory variables do not show robust results.

Table 5 presents the estimated random effect Tobit estimation results where we consider only all the variables of urbanization together. The results are almost similar to the results presented in regression results 1-6 with little variations. The percentage of urban population has a positive and statistically significant effect on HDI for all countries irrespective of income differences.

Table 5: Random Effect Tobit Estimation Results (dependent variable: HDI)

	All countries	High income countries	Upper middle income countries	Lower middle income countries	Low income countries
VARIABLES	Model 7	Model 8	Model 9	Model 10	Model 11
Percentage of urbanization	0.00779***	0.00791***	0.00628***	0.00978***	0.00202**
	(0.000303)	(0.000547)	(0.000588)	(0.000701)	(0.000872)
Urban population	0.000937**	0.00683***	7.72e-06	0.00619***	0.130***
	(0.000386)	(0.00230)	(0.000460)	(0.000781)	(0.0113)
Urban population growth (annual %)	-0.000644	-0.000166	0.00468***	-0.00105	-0.00478***
	(0.000574)	(0.00115)	(0.00113)	(0.00162)	(0.000871)
Population in urban agglomerations of more than 1 million (% of total population)	0.00426***	0.000915	0.00564***	0.00211	0.00877***
	(0.000578)	(0.000979)	(0.00130)	(0.00139)	(0.00133)
Population in the largest city (% of urban population)	-0.00181***	-0.000795	-0.00148	0.00275***	-0.00580***
	(0.000424)	(0.000923)	(0.00102)	(0.000939)	(0.000716)
Constant	0.158***	0.200***	0.195***	-0.0267	0.410***
	(0.0224)	(0.0514)	(0.0427)	(0.0436)	(0.0438)
Observations	3,159	966	860	808	525
Number of group	118	35	32	30	21

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The total urban population has a positive effect on HDI for the regression results are obtained for all countries, high-income countries, lower-middle-income countries, and low-income countries. The effect in upper-middle-income countries is not statistically significant. The urban population growth rate does not have any effect on the HDI for all country-level, high-income countries, and lower-middle-income country's estimation. In contrast, it has a positive (or negative) effect on HDI for upper-middle-income countries (or low-income countries). The percentage of the population living in urban agglomerations of more than 1 million people has a positive effect on HDI except for high and lower-middle-income countries. The percentage of the urban population living in the largest city has a positive effect on HDI in lower-middle-income countries while it has a negative effect on the results obtained for all countries level and low-income countries. However, it does not have any impact on HDI for high and upper middle- income countries.

4. Discussion on impact of urbanization on the HDI

The estimated results show that, overall, the percentage of the urban population, total urban population, and percentage of urban population living in million-plus urban agglomerations have a positive effect on HDI. Moreover, it is suggested that urbanization is beneficial for improving the social and economic development of a country. Now the question arises on how urbanization improves HDI. The basic idea is that urbanization pulls resources from the predominantly

agricultural sector to more advanced industrial and service sectors. This is part of economic development (Lewis, 1954). Therefore, the process of economic development not only accompanies economic structural change, but also contributes to a higher urbanization rate. It works with two forces: push from the country-side and pull from the city (Lewis, 1954; Fei and Ranis, 1964). The city offers greater specialization of labor (Smith, 1976), which leads to greater efficiency benefits (Marshal, 1890; Duraton, 2008). It is sourced from urban increasing returns (Krugman, 1991), which include sharing (e.g. local infrastructure), matching (e.g. employers and employees), and learning (e.g. new technologies) (Duraton & Puga, 2004). It also spurred the civic leadership to upgrade urban infrastructure and improve the spatial arrangement of towns and cities (Briggs, 1968; Hunt, 2004). Greater efficiency and rising prosperity are the outcomes of what is, on the whole, a virtuous circle [Turok, 2014]. Therefore, urbanization not only improves the income of a country but also the quality of life of its residents.

The results also show that a higher urban population growth rate and a higher percentage of the population residing in the largest city of a country have a negative effect on HDI. This indicates that when a city becomes very large or suffers from over-concentration of population, it challenges the provision of basic public services to the urban dwellers and increases pollution which impacts badly on human health mostly in developing countries. This clearly specifies that over-concentration or urbanization through the largest city harms the quality of life and reduces the value of HDI.

5. Conclusions and policy implications

The present paper links the urbanization with HDI. We consider 187 countries from the period of 1990-2017. The random effect Tobit panel data models are estimated for the analysis. Urbanization is measured by the total urban population, percentage of the urban population, urban population growth rate, percentage of the population living in million-plus urban agglomerations, and percentage of the population living in the largest city. With addition to urbanization, we also add other important variables such as adult literacy rate, Co_2 emissions, FDI, fertility rate, GDP growth rate, GDP per capita, level of inequality (Gini index), inflation rate, and life expectancy at birth to investigate the determinants of the HDI.

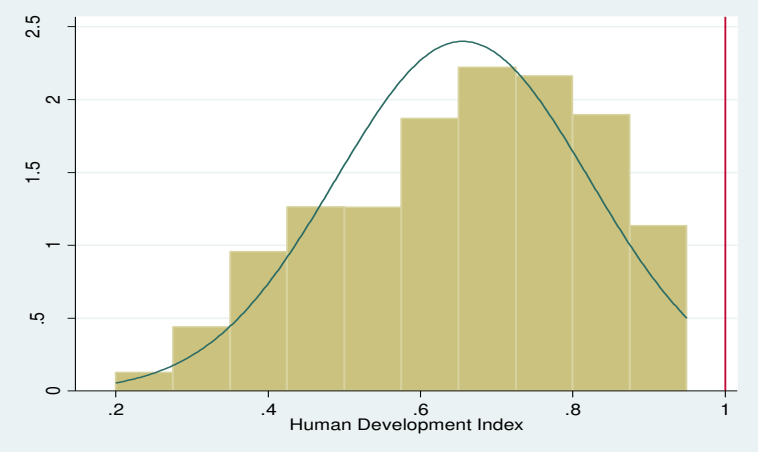
As different countries are experiencing different stages of urbanization, we also separate our analysis by high-income countries, upper-middle income countries, lower-middle income countries, and low-income countries. HDI data is collected from the UNDP and urbanization

data is obtained from World Development Indicators provided by the World Bank.

All country level analysis suggests that the percentage of urbanization, total urban population, and percentage of the population living in million-plus agglomerations have a positive and statistically significant effect on HDI when we run the regression for five independent variables designed to measure urbanization, separately with controlling all other important variables. On the other hand, urban population growth rate and percentage of urban population living in the largest city in a country have a negative effect on HDI. However, when we run all the independent variables jointly we find also almost similar results with little variations. The urban population growth rate does not have any effect on all country level, high-income countries, and lower-middle income countries estimations. The percentage of urban population living in million plus agglomerations does not have any impact on the HDI for high income and lower middle income countries. In addition to that literacy rate, FDI, per-capita GDP, and life expectancy at birth have positive effect on HDI, while higher CO_2 emissions, fertility rate, GDP growth rate, inequality, and inflation rate have negative effect on it.

Based on the results, we suggest that urbanization has a strong positive effect on HDI. The increase of the percentage of urban population is the most important indicator of urbanization to increase the HDI of a country. We need to promote balanced urbanization. This indicates that though million-plus cities advantageous for higher HDI, it is not the largest city of a country which is mostly over urbanized and over populated. We need to have sustainable urban development which includes the adequate provision of basic services such as urban roads, water, electricity, medical facilities, etc. Most importantly, developing countries like India are experiencing unplanned urbanization with insufficient provision of basic services. Therefore, to reap the maximum benefits of urbanization, we need to have sustainable urbanization, mostly, in developing countries.

Appendix Figure 1



Source: Author

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