Do Economic Reforms Promote Urbanization in India?

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Abstract
We assess the impact of economic reforms on urbanization in India for the period of 1991 to 2016. It is found that economic reform variables (except import of goods and services as % of GDP) have a positive effect on urbanization. The vector error correction model shows that economic reforms have influenced only on total urban population with a very slower rate with the speed of adjustment of 0.003. The short run effect is also negligible. Granger causality test shows that there is no causal relationship between them. Therefore, we conclude that economic reforms do not promote urbanization in India. Economic reforms for urbanization are required though promotion of small and medium cities, human capital, cultural mobility and formulating proper plans for new green cities.

Keywords: Economic reforms, urbanization, Time series modeling, India.
JEL Codes: O18, C50, R10

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1. Introduction

Developing countries such as India have been experiencing an explosion in urban population in recent years through a transformation of the country's economy from rural to urban which is characteristic the current development process. The nature and pattern of urbanization in India has changed significantly since 1991, i.e., the year when India started its economic reforms through trade liberalization, financial deregulation, making improvements in supervisory and regulatory systems and policies to make them more conducive to privatization and Foreign Direct Investment (FDI) (Gopinath, 2008). Economic reforms have also had a positive effect on India's FDI inflows, economic growth and trade volume. The average annual economic growth in India was about 4 % in 1960-1990, but it increased to about 7 % in 1991-2016. Also, the average Merchandise trade (% of GDP) increased from 9.97% in 1960-1990 to 26.57% in 1991-2016. Foreign direct investment and net inflows (% of GDP) increased from 0.03% in 1975-1990 to 1.23% in 1991-2016. On the other hand, India's urban population increased from 217.18 million in 1991 to 377.10 million in 2011, constituting an increase of about 73.63 %. The percentage of urban in total population saw an increase from 25.72 % to 31.16 % during the same time-period. The number of towns and cities also increased from 4615 in 1991 to 7935 in 2011, accounting for an increase of over 72 %. The above figures indicate that economic reforms and the consequent higher level of economic growth, higher trade performance and higher investment may have had direct links with the urbanization process in the country. It is evident that cities have played a significant role in driving higher economic growth in India (Tripathi, 2013a; Tripathi and Mahey, 2017a). For instance, the contribution of urban as a % of total Net Domestic Product (NDP) increased from 37.65 % in 1970-71 to 52.02 % in 2004-05. Urban economic growth rate was also very high in this period, i.e. about 6.2 % from 1970- 71 to 2004-05.

In this perspective, the present paper tries to understand the impact of economic reforms on urbanization in India. Recently, urbanization in India has gained a significant fillip from the central government. Government policies, such as, 'Smart city mission', Atal Mission for Rejuvenation and Urban Transformation (AMRUT), and North Eastern Region Urban Development Programme (NERUDP) try to incentivize India's current urbanization. Whether policies promote urbanization or not, urbanization is indeed happening, and it certainly is an

inevitable part of the country's development process. Therefore, it is time to ask whether the reform which was started in 1991 has indeed promoted urbanization or we need a distinct reform initiative by focusing solely on urbanization in India. All available indicators show that Indian cities are poorly managed; they are haphazardly unplanned and crippled by exploding number of vehicles, higher energy consumption, air and noise pollution, street-violence, traffic congestion traffic injuries, fatalities etc. (Tripathi and Kaur, 2017b). It is worth noting here that cities have played a significant role in driving economic development and offering better living standards to populations across the developed world. Therefore, harnessing the development potential of urbanization for economic development is critical, and it raises questions of fundamental policy importance. How can cities be made more productive and efficient? How can the quality of city life be improved? All these questions are crucial in the current juncture, and proper empirical research is urgently needed for formulating appropriate policies. This paper aims to fill this research gap.

The impact of economic reforms on urbanization in India is analyzed in this paper based on data for the period from 1991 to 2016. India initiated major reforms in 1991and hence the choice of 1991 as the base-year. Data for this paper comes are mainly from World Development Indicators from The World Bank.[1] In this paper, the following variables, export of goods and services as % of GDP, import of goods and services as % of GDP, growth rate of GDP, GDP per capita and life expectancy at birth are used to measure economic reforms, and urbanization is measured by four proxy variables; urban population as % of total population, total urban population, population in urban agglomeration of more than 1 million, and population in the largest city to % of urban population. Vector error correction model is used to analyze the relationship.

The rest of the article is organized as follows: The next section presents a brief review of literature to find out the research gap. Empirical framework and results are presented in the subsequent two sections, respectively. Finally, major conclusions and implications are given in the last section.

[1] Data available from the following web link: https://data.worldbank.org/

2. Review of Literature

Among the recent studies in India mostly, post liberalization, Mathur (2005) argued that post-liberalization urban growth was driven by the substantial growth of the urban population and changes in the share of employment in the manufacturing and service sectors. Bhagat (2011) found that the declining trend in the urban population growth rate observed during 1980s and 1990s was reversed at the national level, and level of urbanization increased faster during 2001–2011. Cali (2009) explored the various possible implications of the urbanization process on development outcomes in India. The author found that the level of urbanization and that of economic development seem to go hand within Indian states over time. Chadchan and Shankar (2012) addressed the various complex urban issues associated with the present pattern of urban development through review of urban development of selected metropolitan cities of India which have experienced the impacts of LPG (Liberalization, Privatization and Globalization) process. Spatial trends, prevailing area-zoning, building bye laws (Floor Area Ratio and density) development control regulations, urban housing and transport are analyzed in the context of the current phenomenon of urban sprawl witnessed in India. Abhishek et al. (2017) found that initial population and capital city status have a strong positive impact on city growth; proximity to cities causes nearby cities to be larger; these results are consistent throughout three years, i.e., 1991, 2001 and 2011. Chaudhuri et al. (2017) found that there is a fair amount of variation in the growth of towns across all categories of states in India. The paper also found that small and medium towns can play an important role in the growth of manufacturing activities. Tripathi (2017c) suggests that improvement of infrastructure facilities may not significantly increase population agglomeration (measured by size, density, and growth rate of city population) in the large cities, but it will substantially improve the potential contribution of the cities to national economic growth in India by improving the ease of living and by facilitating business activities.

In the context of linking urbanization and economic growth, Sridhar (2010) in her analysis of the links between urbanization and economic growth in India, estimated the determinants of city growth and output both at the district and city levels and found that factors such as proximity to a large city and the process of moving from agriculture to manufacturing, determine the size of a city. Tripathi (2013a) using data from various sources and using new economic geography model found that India's agglomeration economies are policy-induced as well as market-determined,

and offer evidence of the strong positive effect of agglomeration on urban economic growth in India's urban system. Tripathi and Mahey (2017a) investigated the relevant determinates of urbanization and its impact on economic growth for the Indian state of Punjab. The paper found that the distance to the nearest railway station from a city, city-wise rainfall have had a negative effect while basic infrastructural facilities (i.e., number of schools, latrines, hospital, water availability) have had a positive impact on urbanization. Finally, it founds a positive link between urbanization and economic growth in Punjab. The novelty of this paper is that it establishes the positive link between urban agglomeration and economic growth at state level.

In the perspective of linking agricultural growth with urbanization, Tripathi and Rani (2018) show that overall agricultural activities measured by share, growth rate and total agricultural production, amount of cultivated land area, amount of rainfall and rural male employment have a negative effect on urbanization. The paper also suggests that we need to have balanced rural and urban policy for a smooth rural- urban transformation in India. Kalamkar (2009) analyzed the relationship between urbanization and agriculture growth in India. According to him, population growth has resulted in a downward trend in per capita availability of forest and agricultural land since the 1950s. Narayan (2016) investigates the causal relationship between economic growth and urbanisation in India, using World Development Indicators (WDI) data pertaining to the period 1960–2013. The estimated results for India indicate that economic growth has had a positive causal effect on urbanisation, while urbanisation, in turn, has not had any causal effect on economic growth.

Urbanization has also impacted poverty and inequality in India. Kundu (2006) found that as of 1999-2000, the per capita monthly consumption expenditure of million plus cities was Rs. 1070, about 53 per cent higher than that of small towns. Tripathi (2013b) found that higher level of urban economic growth and large city population agglomerations reduces poverty and increases extent of inequality. Tripathi (2017b) suggest that the upcoming “Smart cities” in India will emerge as a greater platform for future development of urban India, only if these cities ensure equitable distribution of the fruits of urban economic growth to the poorer section of urban dwellers. The Urban Poverty Report by the Government of India (2009) found that across the Indian states, poverty is negatively correlated with the level of urbanization, and that large and medium cities have a lower incidence of poverty than small cities in India. Other studies (World

Bank 2010; Gangopadhyay et al. 2010) have also found that the poverty level in large cities is much lower than that in the small towns, though their method of analysis was different from earlier researchers. Gibson et al. (2017) found that growth of secondary towns may do more to reduce rural poverty than big city growth, although cities may eventually take over towns as the drivers of rural poverty reduction.

The above review of literature suggests that quantitative research work on urbanization of India is scanty due mainly to limited availability of data. Most importantly, time series data analysis on urban issues is very much deficient. In addition, linking urbanization with economic reforms has not been done before. Therefore, the main goal of the present paper is to addresses these issues.

3. Data and Methodology

Time series analysis is used in this paper to analyze the impact of economic reforms on urbanization. Data for dependent and independent variables are collected from the World Development Indicators for the period from 1991 to 2016. EViews10 software has been used to calculate the results. Based on urban and development literature we consider the following variables and functional form to assess the relationship.

$$Urbanization = f(EGS, IGS, GDPG, GDPPC, LEB) \quad \ldots\ldots\ldots (1)$$

Whereas urbanization is measured by considering the following four variables i.e., urban population as % of total population (UPP), total urban population (UP), population in urban agglomeration of more than 1 million (PUA), and population in largest city to % of urban population (PLC) economic reforms are measured by export of goods & services as % of GDP (EGS), import of goods and services as % of GDP (IGS), growth rate of GDP (GDPG), GDP per capita (GDPPC) and life expectancy at birth (LEB). Table 1 presents the definition of variables and transformation of variables for the analysis.

Table 1: Definitions of variables and time-series transformations

Variables	Definitions of variables are taken from World Development Indicators, World Bank
LUPP	Natural logarithm of urban population (% of total). The data are collected and smoothed by United Nations Population Division.
LUP	Natural logarithm of total urban population. Urban population refers to people living in urban areas as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations World Urbanization Prospects.
LPUA	Natural logarithm of population in urban agglomerations of more than 1 million (% of total population). Population in urban agglomerations of more than one million as a percentage of a country's population living in metropolitan areas that had a population of more than one million people in 2000.
LPLC	Natural logarithm of Population in the largest city (% of urban population). Population in largest city is the percentage of a country's urban population living in that country's largest metropolitan area.
LEGS	Natural logarithm of exports of goods and services (% of GDP). Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.
LIGS	Natural logarithm of Imports of goods and services (% of GDP). Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.
LGDPG	Natural logarithm of GDP growth (annual %). Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.
LGDPPC	Natural logarithm of GDP per capita. GDP per capita is gross domestic product divided by midyear population.
LLEB	Natural logarithm of Life expectancy at birth, total (years). Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.
Transformation	**Definitions of Transformations**
DLUPP	First difference of LUPP
D(DLUPP)	Second difference of LUPP
DLUP	First difference of LUP
DLPUA	First difference of LPUA
D(DLPUA)	Second difference of LPUA
DLPLC	First difference of LPLC
D(DLPLC)	Second difference of LPLC
DLEGS	First difference of LEGS
DLIGS	First difference of LIGS
DLGDPG	First difference of LGDPG
DLGDPPC	First difference of LGDPPC
DLLEB	First difference of LLEB

Source: Author's compilation

3.1 Choice of variables for regression analysis:

What follows is a discussion about the choice of dependent and independent variables. GDP per capita is an important indicator to measure economic performance of a country. GDP per capita is more important as it measures stability and wealth within an economy. Knowing per capita GDP is also important to arrive at the average purchasing power of the citizens of a country as higher per capita GDP indicates that a member of the community has more money to spend. Therefore, this paper considers per capita GDP as a measure of economic reforms. Understanding the GDP growth rate is very important as it is based on this that the government decides about fiscal policy and inflation. Further, it also helps to know not only how a country is growing compared to another country but also a given country's development in different time periods. Therefore, economic growth is one of the major indicators of economic reforms. As one of the main components of economic reforms is trade liberalization and trade liberalization in turn is measured by export of goods and services (% of GDP) and import of goods and services (% of GDP), these two indices are considered to measure economic reforms in India. Finally, life expectancy at birth is considered as it indicates the health outcome and well being of the citizen; therefore it is used as proxy for the outcomes of economic growth and economic reforms.

As and where available, this paper uses four proxy variables i.e., urban population as % of total population, total urban population, population in urban agglomeration of more than 1 million, and population in largest city to % of urban population in order to measure urbanization in India. Though India's urban population increased from 78.94 million in 1961 to 377.10 million in 2011 but in percent terms, the increase remains very merge at about 31.16 in 2011. The Indian percentage figure is lower than the developed countries like the United States of America (82.1 per cent) and Japan (90.5 percent) in 2010. It is also lower than in other fast growing developing countries such as China (49.2 per cent), Brazil (84.3), and Russian Federation (73.7 per cent) in 2010 [Tripathi, 2015]. Therefore, it is very important to see how economic reforms have impacted not only total urbanization but also on percentage of urbanization in India. 'Population in urban agglomeration of more than 1 million' and 'population in largest city to % of urban population' also considered for the analysis as India's urban population is mainly concentrated in and around class I (population more than 1 lakh) cities. The percentage share of urban population in class I cities increased from 51.42 in 1961 to 70 in 2011. Also, the number of Class I cities

increased from 394 in 2001 to 468 in 2011. Also needs to be analyzed is the forward and backward linkages between reforms and population change in the large cities. Krugman and Elizondo (1996) explains the existence of large giant cities as a consequence of the strong forward and backward linkages that come up when manufacturing tries to serve a small domestic market. Large cities are an unintended by-product of import-substitution policies and trade liberalization has a negative effect on the population size of the cities. This indicates that population size of large cities has links with trade policy. As this paper measures economic reforms through trade liberalization population change in large cities is considered for analysis.

3.2 Unit Root or Stationary Tests

To test the causality and co-integration between the economic reforms and urbanization, at first, the stationary properties of the time series was checked by unit root test. This can be done in various ways: Dickey Fuller test, Augmented Dickey Fuller test, Phillips - Perron test with trend and without trend. This paper uses Augmented Dickey Fuller (ADF) test which is based on the following regression equation with a constant and a trend in the form as follows:

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \sum_{j=1}^{k} \rho_j \Delta Y_{t-j} + u_t \quad \text{---------- (2)}$$

Where Δ is the first difference operator and u_t is the stochastic error term and k is the number of lags in the dependent variable, the null hypothesis (H_0) of a unit root indicates that the coefficient of Y_{t-1} as zero while alternative hypothesis (H_1) implies Y_t is stationary. If the null hypothesis is rejected, then the series is stationary and no differencing in the series is essential to establish stationarity.

3.2 Testing for Co-integration

The second step to examine the causality and co-integration involves searching for common stochastic trend between the concerned variables. Empirically this can be examined either by Engle-Granger two step co-integration procedures or by Johansen-Juselius co-integration techniques. Johansen-Juselius co-integration technique is used in this study. In this technique, two test statistics known as the trace statistic and the maximum eigen value are used to identify the number of co-integrating vectors. The trace test statistics for the null hypothesis indicate that there are at most r distinct co-integrating vector.

$$\lambda trace = T\sum_{i=r+1}^{k} \ln(1-\lambda I) \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where, λI are the N-r smallest squared canonical correlations between X_{t-k} and ΔX_t (where X_t= (upp/up/pua/plc, egs, igs, gdpg, gdppc, leb) and where all variables in X_t, are assumed I(1)), corrected for the effects of the lagged differences of the X_t process.

The maximum eigenvalue statistic for testing the null hypothesis of at most r co-integrating vectors against the alternative hypothesis of r +1 co-integrating vectors is given by

$$\lambda max = -T\ln(1-\lambda r+1) \quad \ldots\ldots\ldots\ldots\ldots\ldots .. (4)$$

Johansen (1988) shows that equations (1) and (2) have non-standard distributions under the null hypothesis and provide approximate critical values for the statistic.

3.3 Vector Error Correction Model

The cointegration among variables solely shows a long run equilibrium relationship though there could be disequilibrium in the short run. To investigate the short run dynamics among the concerned time series variables, Vector Error Correction Model (VECM) has been developed and used in this study.

The standard error correction model (ECM) considers the following form

$$\Delta Y_t = \varphi + \gamma X_t + \lambda \hat{\epsilon}_{t-1} + w_t \quad \text{---------- (5)}$$

where $\hat{\epsilon}_{t-1} = (Y_{t-1} - \hat{Y}_{t-1})$ is one-period lagged value of the error from the co-integration regression and w_t is the error term in the ECM. When $\hat{\epsilon}_{t-1}$ is non-zero, there is disequilibrium in the short run. However, equilibrium will be restored in the long run if and only if $\lambda < 0$.

4. Empirical Results

Table 2 presents the descriptive statistics of the variables used for analysis. The calculation is based on 26 observations as the study's time period lies between 1991 and 2016. Further, yearly time series data is used for analysis. All the variables are presented in the logarithmic form. Standard deviations (Std. Dev.) are very low for almost all the variables which indicate that the extent of variation or dispersion of data values is very minimal. The positive skewness values of UPP, PUA, PLC, and GDPPC indicate that in these variables the mass of the distribution is concentrated on the left of the figure. On the other hand, the negative skewness values of UP, EGS, IGS, GDPG, and LEB specify that the mass of the distribution is concentrated on the right

of the figure of these variables. Finally, Jarque-Bera test shows that expect PLC and GDPG, data for all other variables follow the normal distribution.

Table 2: Descriptive statistics of variables

	LUPP	LUP	LPUA	LPLC	LEGS	LIGS	LGDPG	LGDPPC	LLEB
Mean	3.365	19.583	2.538	1.738	2.749	2.866	1.812	6.513	4.156
Maximum	3.501	19.900	2.701	1.797	3.236	3.442	2.328	7.444	4.227
Minimum	3.250	19.249	2.390	1.710	2.150	2.150	0.055	5.698	4.068
Std. Dev.	0.078	0.201	0.093	0.026	0.366	0.415	0.469	0.613	0.049
Skewness	0.192	-0.052	0.098	1.145	-0.163	-0.118	-2.086	0.227	-0.187
Kurtosis	1.763	1.767	1.895	2.971	1.485	1.584	8.543	1.499	1.847
Jarque-Bera test (Probability)	1.816 (0.40)	1.658 (0.43)	1.365 (0.50)	5.686 (0.05)	2.601 (0.27)	2.231 (0.32)	52.132 (0.00)	1.816 (0.40)	1.658 (0.43)

Source: Author

To evaluate the long run relationship between economic reforms and urbanization, the stationarity properties of the data are checked using the Augmented Dickey - Fuller (ADF) test.

Table 3: Test for stationary

Variables	With trend and intercept			Without trend and intercept		
	Level	First Difference	Second Difference	Level	First Difference	Second Difference
LUPP	-2.269	-2.2426	-3.207[@]	1.553	1.164	-3.148***
LUP	-0.8077	-2.002	-3.2068[@]	0.242	-1.670*	-3.1031***
LPUA	-2.366	-2.279	-3.378*	2.184	0.483	-3.501***
LPLC	-1.039	-2.566	-4.508***	1.258	-1.354	-4.695***
LEGS	-0.1874	-5.535***	-5.5193***	1.593	-1.847*	-11.752***
LIGS	0.3944	-4.268**	-8.522***	1.495	-3.628***	-8.766***
LGDPG	-6.627***	-7.788***	-5.53***	-0.291	-8.211***	-5.715***
LGDPPC	-1.871	-4.289**	-6.037***	4.787	-2.664**	-6.383***
LLEB	0.578	-4.254**	-3.551*	-1.825*	-2.656**	-1.872*

Note: ***, **, * and @ denote rejection of the null hypothesis of unit root at 1%, 5%, 10%, and 11 % significance level respectively.

Table 3 shows that expect the variables used to measure urbanization, all other variables (egs, igs, gdpg, gdppc, leb) are stationary in the first differenced series, i.e., I(1) . When time series data is not stationary at their level form, they usually become stationary in the first difference. Among the urbanization variables, total urban population (up) is I(1) and other variables are I(2). As most of the variables follow I(1) process, the paper looks for the long run relationship among the variables.

Table 4: Johansen's test for co-integration

Null	Alternative	Trace statistics	Max statistics	Trace statistics	Max statistics	Trace statistics	Max statistics	Trace statistics	Max statistics
		UPP		UP		PUA		PLC	
r=0	r=1	237.99***	95.02***	252.29***	133.13***	200.86***	78.12***	177.97***	61.31***
r≤1	r=2	142.98***	55.02***	119.16***	55.14***	122.74***	51.71***	116.66***	51.98***
r≤2	r=3	87.96***	52.51***	64.02***	36.63***	71.03***	26.95*	64.68***	28.18**
r≤3	r=4	35.45**	19.10*	27.39*	13.70	44.08***	21.79**	36.50***	17.56
r≤4	r=5	16.35**	14.43**	13.69*	11.48	22.29***	12.76*	18.95**	11.19
r≤5	r=6	1.92	1.92	2.21	2.21	9.53***	9.53***	7.76***	7.76***

Note: ***, **, and * denote rejection of the hypothesis at 1%, 5% and 10% significance level respectively. Source: Author's calculation

Table 4 reports the Johansen- Juselius co-integration result. Co-integration of the variables was tested by taking it in the non-stationary form. The results show that the null hypothesis of no co-integration, i.e., r = 0, is rejected for almost all variables used in the regression model. This is because either λtrace or λmax is larger than the critical value at least at 1% significant level. The results provide evidence that there is at least one co-integrating vector in each case. In some cases there is even more than one vector. Johansen's tests for co-integration results clearly state that the long run relationship exist among considering variables. In other words, the results show that that there is a co-integration relationship among the economic agency variables (EGS, IGS, GDPG, GDPPC, LEB) and urbanization (UPP/UP/PUA/PLC) in India, that is, a long-term stable equilibrium relationship.

Table 5: Cointegrating equation results (1 Cointegrating Equation)

Variables	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
LUPP			LUP		LPUA		LPLC	
LEGS	0.138***	0.003	0.135***	0.002	0.128***	0.005	0.136***	-0.024
LIGS	- 0.148***	0.003	-0.145***	0.002	-0.157***	-0.005	- 0.1534***	0.0289
LGDPG	0.003***	-0.0004	0.004***	0.0003	-0.002***	-0.001	0.024***	0.0053
LGDPPC	0.068***	0.0009	0.061***	0.0009	0.042***	-0.002	0.005	0.0115
LLEB	1.071***	-0.032	3.643***	0.019	1.704***	-0.056	0.966**	0.371

Note: ***, ** and * denote rejection of the hypothesis at 1%, 5% and 10 % significance level respectively. Source: Author's calculation

Table 5 presents the normalized co-integrating coefficients from the Johansen test for co-integrations. The results are presented by considering first lag as higher order lags are not considered due to data limitation. The signs of the normalized co-integrating coefficients are reversed to enable proper interpretation. The co-integrating equation results show that dependent

variables are significantly influenced by the independent variables. Almost all the independent variables have a statistically significant (1 % level) effect on urbanization. Export of goods and services as % of GDP has a positive effect on urbanization as measured by urban population as % of total population, total urban population, population in urban agglomeration of more than 1 million, and population in largest city to % of urban population. For example, the results show that an 100 % increase in export of goods and services as % of GDP increases total urban population by 13.5 %. In contrary, import of goods and services as % of GDP has a negative effect on urbanization in India. An 100% increase in import of goods and services as % of GDP leads to decrease in total urban population by 14.5%. Growth rate of GDP has a positive effect on urbanization as measured by urban population as % of total population, total urban population, and population in largest city to % of urban population. However, growth rate of GDP has a negative effect on population in urban agglomeration of more than 1 million. For example, an 100 % increase in GDP growth rate, the percentage of urban population in the total increases by 0.3 %. GDP per capita also have a positive effect on urbanization variables except population in the largest city to % of total urban population. Finally, life expectancy at birth has a positive effect on urbanization. The results indicate that a 10 % increase in life expectancy at birth leads to reduction of 10.7 % in urban population as % of total population.

As there is co-integration among non-stationary variables, the study estimates Vector Error Correction (VEC) model for studying both short-run and long-run causality. Most importantly, the co-integrating equation is interpreted as the long-run equilibrium relationship and the VEC model allows one to study the short-run deviations from this long-run relationship. In other words, in order to verify whether there is a short-term fluctuation relationship between the agency variables of economic reforms (EGS, IGS, GDPG, GDPPC, and LEB) and urbanization level (UPP/UP/PUA/PLC), a short-term fluctuations model is built to explore the relationship between short-term volatility and long-term equilibrium.

Table 6 presents the estimated results of the VEC model. Results from the first equation relating to four dependent variables are presented separately. As urbanization variables, i.e. urban population as % of total population, population in urban agglomeration of more than 1 million and population in the largest city to % of urban population are all found stationary at second difference, the study uses second differenced data of these variables to estimate VECM model as

VECM requires stationary data. On the other hand, as total urban population data is stationary at first difference, the study uses it without making any difference for the estimation. E-views automatically make one difference in case of VECM (restricted VAR) operation. Therefore, the variable is introduced in the following order in EVIEWS i.e., DUPP/UP/DPUA/DPLC, EGS, IGS, GDPG, GDPPC, and LEB. The results presented here only takes the first lagged of the variables as higher order lags are not permissible due to small time periods. Results show that R^2 values are very high for regression model 2 which indicates the better model- fitting of our data. The study also calculates the adjusted R^2, as it adjusts for the number of explanatory terms in a model, i.e., it incorporates the model's degrees of freedom. High values of adjusted R^2 for regression model 2 indicates that a high percentage of total variation in the dependent variable of the regression models. The F statistics values also are significant for regression model 2 which indicates that our regression models as a whole have statistically significant predictive capability. However, regression models 1, 3 and 4 do not show higher value of R^2 and significant values of F statistics which indicates that these regression models do not fit properly with the data used in the study. The insignificant observed R square values of Heteroskedasticity ARCH effect and Breusch-Godfrey Serial correlation LM test clearly show that the results obtained are free from Heteroskedasticity and serial correlations. However, regression model 4 suffers from Heteroskedasticity ARCH effect. The insignificant Durbin-Watson statistics indicate that the regression models used in the study are free from autocorrelation problem. The insignificant Q-Statistics indicate that there is no problem of lag selections. Finally, as R^2 values are less than Durbin-Watson statistics, the regression results are not spurious regressions. Based on these desirable tests for finding a good regression model, regression model 2 is chosen as it qualifies all the required tests.

The coefficient of co-integrated model or coefficient of the error correction term is statistically significant and negative for regression model 2, i.e., for total urban population. This implies that changes in economic reforms which are measured in terms of export of goods and services as % of GDP, import of goods and services as % of GDP, growth rate of GDP. GDP per capita and life expectancy at birth, exert influence on total urban population in the long run. In other words, there is long run causality running from economic reforms to urbanization as measured by total urban population. In the error correction model above, the coefficient of the error correction term is - 0.002715, which is consistent with the reverse correction mechanism. The greater the last

period deviates from the long-term equilibrium, the greater the amount of correction in the current period. When the short-term fluctuations deviate from the long-term equilibrium, the system will pull the non-equilibrium state back to equilibrium with adjust intensity of 0.0027. According to this estimation, speed of adjustment is slow.[2]

Table 6: Estimation of error correction model

	Dependent Variable			
	D(DLUPP)	D(LUP)	D(DLPUA)	D(DLPLC)
	(1)	(2)	(3)	(4)
CointEq1	-0.002715	-0.015554**	-0.013638	-0.237848
	(0.007031)	(0.006512)	(0.107665)	(0.277825)
DLUPP(-1)		0.882485***		
		(0.150996)		
D(DLUPP(-1))	0.254319		0.193690	-0.092399
	(0.277136)		(0.266406)	(0.277037)
D(LEGS(-1))	0.000871	-0.002241	0.001148	0.012903
	(0.003367)	(0.003048)	(0.005852)	(0.019958)
D(LIGS(-1))	-0.002015	-0.000613	0.001835	0.003997
	(0.003062)	(0.002649)	(0.005827)	(0.018050)
D(LGDPG(-1))	7.32E-05	0.000223	0.000384	-0.000184
	(0.000697)	(0.000306)	(0.001028)	(0.003914)
D(GDPPC(-1))	0.000124	0.002222	0.002037	-0.008808
	(0.003358)	(0.002510)	(0.005073)	(0.020696)
D(LEB(-1))	-0.219753	-0.549900**	-0.052191	1.116846
	(0.615510)	(0.250162)	(1.094199)	(1.798937)
Constant	0.001574	0.006395	0.000179	-0.006849
	(0.003788)	(0.004420)	(0.006827)	(0.010550)
Heteroskedasticity ARCH effect; Observed R square (lag 1)	2.208	0.124	1.047	8.356***
Breusch-Godfrey Serial correlation LM test; Observed R square (lag 1)	0.956	1.41	0.044	0.1218
Q-Statistic with lag 1	0.785	7.99	0.0025	0.0188
R square	0.201	0.918286	0.195	0.2077
Adjusted R square	-0.1723	0.882536	-0.181	-0.1621
F-statistic	0.5379	25.68633***	0.518	0.561
Durbin-Watson stat	1.8809	1.919740	1.945	2.053610

Note: Standard errors are included in parentheses. *** denotes significance at the 1 % level and ** at the 5% level.
Source: Author's calculation

[2] The coefficient of the error correction term is negative and statistically significant. Therefore, it is consistent with error correcting behavior. The bigger the (negative) statistically significant coefficient, more rapid is the correction. Desirable values of ECM should lie between -1 to 0. The coefficient being negative (-0.0027) and significant means that the system corrects its previous period disequilibrium at a speed of 0.27% and it indicates a very slow speed of adjustment of disequilibrium correction for reaching long run equilibrium steady state position.

However, the results also indicate that economic reforms have no influence, i.e., no long run causality running from economic reforms to urbanization as measured by urban population as % of total population, population in urban agglomeration of more than 1 million, and population in largest city to % of urban population. Most importantly, regression model 2 shows that life expectancy at birth has a significant effect on total urban population in the short run. However, in regression models 1, 3 and 4, none of the variables which measure economic reforms are found to have any impact on urbanization as measured by urban population as % of total population, population in urban agglomeration of more than 1 million, and population in largest city to % of urban population.

Normalizing with respect to the coefficient for variables as measured for urbanization yields the following cointegrating relationship in the Johansen long run equation from VEC Model:

$$DUPP = 22.02889 - 0.137895 \times EGS + 0.256988 \times IGS - 0.180623 \times GDPG + 0.217790 \times GDPPC - 5.641094 \times LEB \quad \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

$$UP = 13.01635 + 0.302959 \times EGS - 0.148955 \times IGS - 0.093275 \times GDPG + 0.053638 \times GDPPC + 1.440118 \times LEB \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

$$DPUA = 2.546154 - 0.032372 \times EGS + 0.051904 \times IGS - 0.017540 \times GDPG + 0.020121 \times GDPPC - 0.647405 \times LEB \quad \text{----------} (3)$$

$$DPLC = -1.211619 + 0.004961 \times EGS - 0.014129 \times IGS + 0.026107 \times GDPG - 0.002456 \times GDPPC + 0.290547 \times LEB \quad \text{----------} (8)$$

Since a double logarithmic functional form is used here, the coefficients can be interpreted as having long-term elasticities. As regression model 2 is the best fitting model, only the sign conditions of equation two are considered. It is thus found that the coefficients of export of goods and services as % of GDP, GDP per capita, life expectancy at birth are positive, where as the coefficients of import of goods and services as % of GDP and growth rate of GDP are negative. The signs are same as the earlier results of normalized co-integrating coefficients from the Johansen test for co-integrations except the sign of growth rate of GDP. To test whether the coefficients are significant, linear restrictions (LR test) are conducted by considering chi-square values of Wald statistics. Each test variables used to measure the economic reforms are tested individually for significance; the test showed that there is a short run causality running from lag of only one independent variable i.e., life expectancy of birth to total urban population in India.

Co-integration test and error correction model can only show that there is a long-term equilibrium and short-term fluctuation relationship between the variables of economic reforms and urbanization in India; it cannot however explain whether there is a causal relationship between them. Therefore, Granger causality test is used to do further verification. As the considered variables are not found stationary at level, Granger Causality test was done by considering first or second differences of the variables. Separate vector auto regressive models (VAR) were used for separate dependent variables (UPP/UP/PUA/PLC) to find out the optimal lag length. VAR model test could be done up to only 3 lags with our limited number of observations. Finally to select the optimal lag the minimum value of Akaike Information Criterion (AIC) was used.

From the Granger causality test results (Table 7), it can be seen that there is no Granger causality between the variables at the optimal lag periods. Most importantly, total urban population (up) does not Granger Cause growth rate of GDP (GDPG); GDPG does not Granger Cause UP ; UP does not Granger Cause GDP per capita (GDPPC); GDPPC does not Granger Cause UP. This indicates that urbanization as measured by total urban population neither causes growth rate of GDP or GDP per capita and vice-versa. However, the results also show that UP does Granger cause import of goods and services as % of GDP (IGS), but IGS does not Granger Cause UP. The results imply that urbanization as measured by total urban population promotes economic reforms through higher import in India.

Table 7: Granger causality test

Null hypothesis	Lag length	F-Statistic	Prob.
DEGS does not Granger Cause DDUPP	2	0.78660	0.4713
DDUPP does not Granger Cause DEGS	2	0.77845	0.4748
DIGS does not Granger Cause DDUPP	2	0.63201	0.5436
DDUPP does not Granger Cause DIGS	2	1.08579	0.3599
DGDPG does not Granger Cause DDUPP	2	1.31149	0.2953
DDUPP does not Granger Cause DGDPG	2	1.39860	0.2740
DGDPPC does not Granger Cause DDUPP	2	0.63934	0.5399
DDUPP does not Granger Cause DGDPPC	2	0.65822	0.5305
DLEB does not Granger Cause DDUPP	2	0.11334	0.8935
DDUPP does not Granger Cause DLEB	2	0.33989	0.7166
DEGS does not Granger Cause DUP	3	0.69409	0.5698
DUP does not Granger Cause DEGS	3	1.99879	0.1575
DIGS does not Granger Cause DUP	3	0.37440	0.7727
DUP does not Granger Cause DIGS	3	4.91528	0.0142
DGDPG does not Granger Cause DUP	3	0.98040	0.4282
DUP does not Granger Cause DGDPG	3	0.77818	0.5243
DGDPPC does not Granger Cause DUP	3	0.71189	0.5599
DUP does not Granger Cause DGDPPC	3	1.05306	0.3981
DLEB does not Granger Cause DUP	3	1.09918	0.3801
DUP does not Granger Cause DLEB	3	0.02614	0.9940
DEGS does not Granger Cause DDPUA	2	0.79076	0.4695
DDPUA does not Granger Cause DEGS	2	1.21194	0.3221
DIGS does not Granger Cause DDPUA	2	0.76563	0.4804
DDPUA does not Granger Cause DIGS	2	1.61537	0.2279
DGDPG does not Granger Cause DDPUA	2	0.48781	0.6223
DDPUA does not Granger Cause DGDPG	2	1.31141	0.2954
DGDPPC does not Granger Cause DDPUA	2	1.02416	0.3802
DDPUA does not Granger Cause DGDPPC	2	0.80112	0.4651
DLEB does not Granger Cause DDPUA	2	0.46175	0.6379
DDPUA does not Granger Cause DLEB	2	1.02869	0.3787
DEGS does not Granger Cause DDPLC	2	1.62495	0.2261
DDPLC does not Granger Cause DEGS	2	0.23795	0.7908
DIGS does not Granger Cause DDPLC	2	2.43652	0.1174
DDPLC does not Granger Cause DIGS	2	0.85379	0.4433
DGDPG does not Granger Cause DDPLC	2	1.60426	0.2300
DDPLC does not Granger Cause DGDPG	2	0.02045	0.9798
DGDPPC does not Granger Cause DDPLC	2	0.89993	0.4251
DDPLC does not Granger Cause DGDPPC	2	0.03694	0.9638
DLEB does not Granger Cause DDPLC	2	1.10868	0.3527
DDPLC does not Granger Cause DLEB	2	0.07051	0.9322

Note: Results are based on 22 observations.
Source: Author's calculation

5. Conclusions and policy implications

5.1 Conclusions

This paper investigates the impact of economic reforms on urbanization in India. As India started its major economic reforms in 1991, the study period spans the years 1991 to 2016. Urbanization is measured by four alternative variables, i.e., urban population as % of total population, total urban population, population in urban agglomeration of more than 1 million, and population in largest city to % of urban population. On the other hand, economic reforms are measured by export of goods & services as % of GDP, import of goods and services as % of GDP, growth rate of GDP, GDP per capita and life expectancy at birth. The choice of appropriate variables for the analysis is based on available development and urbanization literature and also availability of data.

Augmented Dickey - Fuller (ADF) tests were conducted to check the stationarity of the data. Further, Johansen- Juselius co-integration test was conducted to find out the long run relationship between economic reforms and urbanization. The results show that there is a long run relationship between them. Co-integrating equation results show that agency of economic reform variables (except import of goods and services as % of GDP) has a positive effect on urbanization. Import of goods and services as % of GDP has a negative effect on urbanization. The results are consistent for different dependent variables across different regression models. Based on co-integration results, Vector Error Correction model was estimated to study the both short-run and long-run causality. The results show that economic reforms have influence only on total urban population and not on the other variables which measure urbanization. However, the speed of adjustment is very slow with adjust intensity 0.0027. The study did not find any causality running between/among rest of the variables in any other form. Except one variable i.e., life expectancy no other short run effect is seen having any significant effect on total urban population in the short run. Finally, Granger causality test was executed to test the direction of causal relationship between urbanization and economic reforms. Akaike Information Criterion (AIC) was used to select the optimal lag. The results show that there is no causal relationship between the variables; only total urban population does Granger Cause import of goods and services as % of GDP.

3.2 Policy Implications

The results of this paper clearly show that though there is long run relationship between economic reforms and urbanization, but the strength of this relationship is very low. Results indicate that the impact of economic reforms on urban population in India is very negligible in the long run. Similarly, the short run effect is also negligible. Results of this study disprove the existence of any causal relationship between urbanization and economic reforms in India. In short, economic reforms have failed to promote urbanization in India.

Urbanization is an inevitable part of development process and no country has developed without promoting urbanization. India is also experiencing rapid urbanization though at a slower space. Tripathi (2015) reviewed the entire Planning Period of India to evaluate the urban policies in India. The above study shows that major urban policies came up with the establishment of Housing & Urban Development Corporation (HUDCO) under fourth Planning Period. But only the Eight Plan Period signifies the role and importance of urban sector for the national economy. Though successive Plan Periods have addressed different urban policies, but first major central government intervention to promote urbanization was started with Jawaharlal Nehru National Urban Renewal Mission (JNNURM) in 2005. However, the policy intervention failed to click due to lack of appropriateness of policies and inadequateness of funding. Based on these, this study suggests the following policies to promote urbanization in India.

First, the county needs to promote and strengthen the small and medium cities and towns of India. India's large cities are overcrowded and face several problems in terms delivery of public goods. Therefore, to increase the impact of agglomeration economics we need to bring down the population for the large cities that is class I cities in India. Gibson et al. (2017) found that growth of secondary towns do more to reduce rural poverty than big city growth. This lesson can implemented through putting quantity restriction on migration from rural/urban to class I cities in India. China's hukou system would be a good example in this context. Investment in medium and small cities will also be good to reduce spatial imbalance in terms of earning and investment as large cities earn and get a lion share of investment. In India, 468 class I cities out of 7,935 towns in the country accommodate about 70 % urban people. Therefore in the next 10 years we have to reduce it to 50 % without reducing its population size.

Second, there is a need to make Indian cities more competitive. A report from the Economist Intelligence Unit, "The 2025 Global City Competitiveness Index" measures the competitiveness of 120 cities and ranked Indian cities - Mumbai, Delhi, Bangalore, Pune, Hyderabad, Chennai, Ahmedabad, and Kolkata as 51, 56, 94,99, 100, 101, 104,and 109 respectively for the year of 2025.[3] This indicates that competitiveness of Indian cities very poor compared to the top five competitive global cities viz., New York, London, Singapore, Hong Kong, and Tokyo. Now the question is what needs to be done to improve the competitiveness of Indian cities. First and foremost, we need to improve infrastructure and basic service delivery to urban dwellers. But it is easy to advice this but very tough to materialize it as we are lacking of appropriate amount of funding. India's saving rate has fallen from 38 per cent of GDP in 2007-08 to 31 per cent of GDP from 2016-2017. It has to be remembered that India's savings and investment rates picked up in 2003 and resulted in a higher economic growth about 8% range. Therefore, the country needs to promote saving and investment to finance urban infrastructure and delivery systems. Particularly, long term saving needs to be encouraged as it provides higher interest rate to the investor on one hand and on the other, more flexibility to government to allocate funds for infrastructure development, particularly for those projects with higher gestation

Third, in order to boost human capital, there is a need to privatize education for those who can access education by paying higher fees. As of 2014, the country has about 185 State Private universities. Given the paucity of government funding, the private sector needs to be encouraged to cater to the demand for higher education that the government cannot meet from its own funds. In this, case quality of education has to be monitored by the government though ensuring proper remuneration to faculty in such private institutions. India has the known potential to become a global hub for higher education and much can be gained without government having to do heavy lifting, though government has to promote private endeavors in this direction wholeheartedly. The return on this investment will be massive. But government has to ensure that private universities do not cheat students by providing false information about their placement record and tuition costs. India can also earn foreign currency through promoting higher education. Most

[3] The Index scores each city across eight categories: economic strength, physical capital, financial maturity, institutional character, social and cultural character, human capital, environmental and natural hazards and global appeal.

of the universities in India are urban based; therefore promoting quality education through privatization may lead to boost to urban human capital formation also. Such an imitative will not only improve competitiveness of the cities but also boost business environment through encouraging new start ups. Also, there is an urgent need to provide industry specific knowledge in regular university teaching, which is currently lacking in India.

Fourth, to bring about a more inclusive cultural, social and emotional climate, we need to make Indian cities more cosmopolitan. Also, amore enabling environment can be created by promoting English language as a medium of conversation so that our cities can seamlessly connect to the global community. Higher education and demand in the corporate job market will automatically force students to learn English in future. While every Indian can be proud of our great culture and traditions, one should also be receptive to refreshing ideas and winds from other parts of the globe.

Finally, to build environment friendly cities, there is a need to make master plans for the newly extended part of the cities or towns where future development will take place. It will also help to divert population concentration in the core to periphery.

It has to be remembered that half of the world's the population that lives in cities generate more than 80% of global GDP. Indian cities have a great potential to contribute to the national GDP. It is hoped that these policies will change India’s urbanization pattern and will add to the current ongoing urban policies in India so that our cities become more competitive and the quality of life of the urban dwellers will improve.

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