An Economic Analysis of Urbanization and Economic Growth in the Republic of China

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Abstract

Urbanization is an integral part of growth and development transition of economies as no country has ever achieved middle-income without urbanizing, and none has ever achieved high income without vibrant cities that are centers of innovations entrepreneurship and efficiency. Cities have since been accounting for 70% of global GDP which makes current economic development and planning emphasizing on the means of reaping the benefit of urbanization rather than containing it`s unprecedented historical convergence. The study aims at investigating urbanization and economic growth in the context of China, for the period of 1986-2013. A time series analysis confirms that the data are stationery and co-integrated using Engels and Granger test. Evidence from Granger Causality confirms that bi-lateral causality between urbanization and economic growth exists. Ordinary Least Square Method is adopted; the finding from the result indicates a significant and positive relationship between urbanization and economic growth for the period under review. The paper recommends and ardent policy development on economic base, favorable migration, and tertiary service sector growth, which will absorb and as well propel marginal efficiency of labor as the research concludes significant importance of population growth in the cities.
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Keywords: Urbanization, Economic Growth; Co-integration, Error correction Model, Granger Causality.

1. Introduction

Urbanization has been seen as an integral part of economic growth, as a defining phenomenon of the 21st century, it puts the developing world in a position of economic and demographic transformation with a complex and nuance development process. urbanization is the massive and unprecedented historical movement of people from one rural country side to the bourgeoning cities of the world (Todaro and Smith 2006).This suffice urbanization to be viewed as a population shift from rural to urban areas, and the ways in which society adapts to the change (N.L.M 2014).The link between rural-urban migration and urbanization however goes far beyond the supply of additional population to urban centers, indeed as a component of urbanization process, and as well its prerequisite, migration and urbanization are both the consequence of modernization of an economy, connected historically with industrialization, and economic growth (Bhattacharya, 1993).

Special features of different societies around the globe from the sands of time have projected different peculiar characteristics to such nations. China has made history in population growth and also a remarkable shift of the labor force from the agricultural China, to the urban industrialized cities since economic liberalization. The country's urban population has risen more than 500million, amounting to America and three Britain. The main lands of urban population by the end of the year 2012 has been 52.6% of the total population, rising from 26% in the year 1990 according to the United Nation's, World Urbanization Prospects (2011). The figure will rise to nearly 70% by the year 2035. The developing world is at the center of a demographic and economic transformation, where 400,000 square kilometers will be constructed for urban uses approximately between the year 2000 and 2030, doubling the world's built up urban area. Nearly two billion new urban residents are expected in the next 20 years, and the urban populations of South Asia and Africa will double. China in particular over the next two decades will be building 20,000 to 50,000 new skyscrapers, and more than 170 cities requires mass transit system come 2025.Such urbanization takes place only once in a country's lifetime and countries' cannot afford to get it wrong.

The concept of urbanization and economic growth goes hand in hand; in fact no country has ever attained middle-incomes without urbanizing, and none has reached high income without vibrant cities that are centers of innovation, entrepreneurship and culture accounting for 70 percent of global GDP (Knowledge Platform 2012). According to Petty-Clark's law, a corresponding increase of per capita national income serves as a driving force for labor transfer from the agrarian sector to the secondary industry and other non-agricultural sectors, and with the further development of the economy, the labors will transfer to the service industry. So the relationship between industrial development and urbanization is paramount to the economic structure of nations like China.

The process of Chinese urbanization has become one of the major research topics among the domestic and international scholars. "The urbanization of China" and "The high-tech of America" have been referring to as the two key factors that affect all mankind in the 21st century by Stieglitz.   Recent economic thinking is reshaping how policymakers and development practitioner view urbanization. In other words, the policy debate has evolved from containing urbanization to one of preparation for reaping the benefits of economic growth associated with it. Urbanization is a game changer that is reshaping the growth and development dialogue at a global scale as recommendations suiting economic growth in the midst of high urban population concentration is always an attractive research area among scholars.

1.1 Review and Theoretical Model

The concept of urbanization and its determinants has been of paramount significance in economic development and planning as many endeavors were made in making the different perceptions on what best explains the phenomenon both in theoretical and empirical terms.

Cheng (2012) in his analysis between urbanization and service industry growth using time series econometric models finds out that urbanization is the force behind the growth of service sector in China. He concludes that the level of increase in the rate of urbanization has a positive relationship with the increase in the level of service sector, hence a positive impact on the GDP of China. The above findings of Cheng suits a similar dynamic econometric analysis carried out on the nature of relationship between urbanization and economic growth in per-capita GDP and environmental pressure in Ningxia China by Zhang et`al (2014).The outcome being a linear impact on the GDP and environmental pressure. The same follows in an econometric descriptive analysis of urbanization in Europe (1986) by Bairoch P & Goertz G showing a positive correlation between urbanization and economic growth dating from the industrial revolution.

Moomaw and Shatter (1993) using regression techniques concluded that urbanization is a feasible stimulant of economic growth related growth. In their subsequent study (1996), they established facts that not only per capita GDP is increased by urbanization, but also the industry share of GDP. Similar empirical evidences can be found in Abdel-Rahman et al. (2006) study of the level of urbanity and standard of living using a cross section data that a positive and significant relationship exists between the two variables, measured by real per capita GDP. A similar contribution by Henderson (2003) opines a non-monotonous urban primacy on growth, below which urban concentration promotes productivity. He concluded that that the optimal degree of urbanization concentration varies with the level of development and country size. In his cross-country productivity studies, he pointed out that urbanization per se does not drive the growth, rather it is the urban concentration (or the

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degree to which urban resources are concentrated in one or two large cities) that is more relevant.

Within the context of time-series analysis, a research of McCoskey and Kao (1998) using panel co-integration methods and accounting explicitly for developed and less-developed countries, found that long-run effects of urbanization on output per worker cannot be rejected. Their findings suggest that, although the impacts of urbanization on growth are evident, the impact varies greatly across countries and time. Therefore, determining the long run effects based on simple cross section techniques may produce biased and inconsistent results. Studying the relationships in the framework of time series may greatly facilitate our understanding of the interrelation of urbanization and growth, truly capturing the dynamic and temporal nature of the question.

2. Model Framework

2.1 The Dualistic Labor-Surplus Model

Economic development has always been credited to the transformation of economies from agriculture to modern urban industrial economies, driven by labor migration and capital accumulation in the urban destination.

W.Arthur Lewis in his work on 'Economic development with unlimited supplies of labor' (1954) analyzed developing economies' labor market dualism and the structural difference between the subsistence sector and capitalistic sector. Lewis originally named the two sectors subsistence and capitalistic sectors, but eventually renamed as traditional and modern sectors. Afterwards, the Lewis model was formalized and extended by John Fei and Gus Ranis in 1961 and the combination is named as the Lewis Ranis and Fei (LRF) model. The model, which takes to account the context of developing countries, explains a dual economy model of economic development with an assumption that there exists surplus labor in the traditional (agricultural) sector which is to be re-allocated to fill the rising modern (urban) sector labor demands. This means that the loss of labor in the traditional agriculture sector does not reduce agricultural production as a result of migration of labor to the modern sector. The traditional agricultural sector is characterized by low wages and very low/zero marginal productivity of workers. Each family member in the traditional agriculture sector earns an average product of labor, i.e. the wage in agriculture (WA) = TPLA / LA (total product of labor in the agriculture sector (TPLA) divided by the total agricultural labor of the rural population (LA).

The labor in the modern manufacturing sector has a positive marginal product and because of incentives in the modern sector individuals in traditional sector are motivated to migrate to the modern manufacturing sector. As a result of cheap surplus labor, the modern manufacturing sector accumulates capital leading to saving and investment. Saving and

Investment over time leads further to capital accumulation and then triggering economic growth with no change in agricultural output and in industrial wage rate.

The dual economy model, thus, suggests that agriculture provides the necessary resources for industrialization. The model also describes that rural-urban migration facilitates investments in modern labor-intensive industries, to make use of the rural labor and circumvent disguised unemployment in the traditional sector. The model in general explains the importance of labor at initial stage of economic development in developing economies (because of assumed scarcity of capital and the abundance of labor). The model points out the importance of surplus labor in generating inter-sectoral shift of employment and then triggering economic growth without increase in real wages in the formal sector. As pointed out by Ranis (2004), the dual economy model continued to be relevant and an important policy guide for labor abundant countries with heavy population pressure and scarcity of cultivable land.

3. Methodology

3.1 Data Selection

For testing the dynamic relationships between urbanization and economic growth, the paper selects Chinese data from the year of 1986 to 2013 for quantitative analysis as GDP per capita is used to capture the economic growth. The rate of urbanization is the percentage of town population /total population, which is the common indicator to measure the level of urbanization in the world at present. In order to eliminate the heteroskedasticity of the data, the paper uses LN analysis on GDP and URBN, so the final data is expressed by LNURBN and LNGDP as urbanization and GDP respectively.

3.2 Model Development

Firstly, the paper makes Co-integration Test between the two variables which refer to the level of urbanization and per capita GDP. At the same time, it starts to do empirical research using time series analysis methods. Firstly, among the process of the Co-integration Test, the Engel-Granger method is applied between the two variables; the first step is unit root test and determines the stationary in the two sides. Then we can conclude that whether the two variables have long run association, and further analyze the long-term equilibrium relation between them. Next, in accordance with the error-correction model, this paper tests the magnitude of the deviation between the long-term equilibrium relationship and the speed of adjustment between the two variables. At last, with the Granger causality test, one can   find whether the two variables have uni-lateral causality or the bi-lateral causality in both the short run and the long run.

4. Data Analysis

4.1 Unit Root Test

At first, we should test whether the time series of the two variables is non stationary at level form, but stationery after first difference, and whether the fallacy test exists. The purpose is to avoid the problem of "spurious regression". With the software of Eviews8.0, the paper applies the AIC criterion to determine the optimal lag order (Li & Song, 2011). The ADF and KPSS test to determine whether each sequence has a unit root. Results are show as follows:

Table: 1

Variables	Test	T-value	1%	5%	10%	Result
LNGDP	ADF	-0.9395	-3.7240	-2.99	-2.63	Non Stationary
LNGDP	KPSS	0.670	0.749	0.463	0.347	Non Stationary
LNUBRN	ADF	-1.5638	-3.724	-2.986	-2.632	Non Stationary
LNUBRN	KPSS	0.6736	0.739	0.347	0.347	Non Stationary
ΔLNGDP	ADF	-2.4535	-3.711	-2.981	-2.629	Non Stationary
ΔLNGDP	KPSS	-0.981	0.739	0.463	0.347	Stationary
ΔLNUBRN	ADF	-1.314	-3.724	-2.986	-2.632	Non Stationary
ΔLNUBRN	KPSS	0.1889	0.739	0.463	0.347	Stationary

LNGDP and LNURBN show the data of GDP and urbanization at level form, while ΔLNGDP and ΔLNUBRN shows the data after first difference. Adopting the two tests of ADF and KPSS, it can seen that both variables have unit root at level form as their Test value is lower than their critical values in the ADF and conversely greater than the KPSS critical values (with the exception of KPSS at 1%). As such we can deduce that the variables are non-stationary at level, satisfying the procedure. Also the variables are seen to be stationary after first difference when conforming to the superiority of KPSS test against the shortcomings of the ADF. The KPSS test values for ΔLNGDP is 0.0981 which is less than the critical values at 1%, 5%, and 10% respectively. The same goes to ΔLNUBN showing 0.1889 to be lesser than the critical values at all corresponding level of significance.

4.2 Co-Integration Test

To further analyze the long-term equilibrium relation between urbanization and economic growth, the paper makes co-integration test for the two variables. Through the above analysis, it finds that the sequences of the two variables LNURBA and LNSERV meet the premise of

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the co-integration test, so one can consider that whether co- integration relationship exists in them (Wang, 2008). Now, with Engle-Granger test (two-step testing method), we can make co-integration test between LNGDP and LNURBN.

First step, using OLS method estimate the long-term equilibrium equation came out to be

$$LNGDP= -2.976143+2.797LNUBRN+RESID$$

This result shows a highly significant value, to be accepted only after testing the co-integration procedure in the second step.

Second step, one should test whether the residuals εt of the above models are stable sequences, and make unit root test to the estimated residuals εt of the above-mentioned regressive equations. The absolute value of the ADF test statistic is -3.718, and it is greater than the absolute value of the critical value when the level of significance at 5%, 10% (-3.461 and -3.130) using the Engel-Granger critical values for co-integration. McKinnon (1991). Therefore, the estimated residuals sequence εt is stationary sequence. So it indicates that co-integration relationship exists in LNURBN and LNGDP.

The co-integration model concludes that the level of urbanization and GDP have a positive correlation, and once the urbanization changes 1% each time; it will make the proportion of the GDP value increasing to 2.797% which concludes that the absolute value of residual εt' ADF test is -3.718, and it is greater than the absolute value of the critical value of Engel-Granger table when the level of significance is at 10%, 5%, so the co-integration regression equation has a practical significance.

4.3 Error Correction Model

The error correction model is the econometric model which has a particular form. According to Engel-Granger theorem, if the co-integration relationship exists in a set of variables, the obvious is that their short-term equilibrium has an error correction model, which means that the co-integration regression always can be converted to the error correction model. Besides, according to Granger theorem and results of the two variables' unit root test and the co-integration test, we can express the error correction model of the short-term dynamic equilibrium relationship between the urbanization and GDP (Wang, 2008). It is:

ΔLNGDP= -0.149+7.766ΔLNUBRN+0.3967ecm   (command from E-views8.0)

The T-value and probability value of the ECM are (2.5880) and (0.038)

The short-term equilibrium relationship shows that once urbanization increases by one unit, the proportion of GDP will increase by 7.766 units in the same direction which is higher than the long-run co-integration as it will have more significant impact in the short run relationship amongst the variables, the speed of adjustment is 0.3967 and it is significant, as such the long-run association of the variables can be corrected in a period of four (4) months.

4.4 Granger Causality Test

To estimate the degree of explanation between GDP and urbanization, the Granger causality test is adopted, estimating from OLS with 6 maximum lag order on how the current LNGDP is explained by its value of lag phase, second, to test whether the lag order that introduce the sequence LNURBN has improved significantly the interpreted degree of LNGDP (Li & Song, 2011).

Table: 2

GRANGER CAUSALITY	Lag length	F-value	P-value	Result
LNUBRN doesn't cause LNGDP	1	7.7914	0.0101	Refuse
LNGDP doesn't cause LNURBN	1	47.874	4.0007	Accept
LNUBRN doesn't cause LNGDP	2	13.9675	0.0001	Refuse
LNGDP doesn't cause LNURBN	2	3.935	0.0354	Refuse
LNUBRN doesn't cause LNGDP	3	6.33625	0.0040	Refuse
LNGDP doesn't cause LNURBN	3	1.8484	0.1746	Accept
LNUBRN doesn't cause LNGDP	4	3.2911	0.0397	Refuse
LNGDP doesn't cause LNURBN	4	1.3098	0.3110	Accept
LNUBRN doesn't cause LNGDP	5	2.4934	0.0904	Accept
LNGDP doesn't cause LNURBN	5	1.1507	0.3869	Accept
LNUBRN doesn't cause LNGDP	6	1.1818	0.3942	Accept
LNGDP doesn't cause LNURBN	6	0.22829	0.9570	Accept

The above table therefore shows that, in lag phase 1, the level of urbanization cause the growth of GDP, but the latter can't cause of the former. In lag phase2 there is a bilateral causality as both variables determines one another, lag phase 3 and 4 shows the same case as in lag phase one, a unilateral causality. Lag phase 5 and 6, the two sides have non-Granger causality (Li & Song, 2011). From the above, we can conclude that the level of urbanization and the growth of GDP have Granger causality recently, and the effect is two-way, which means that the improvement of urbanization level promotes the growth of GDP conforming to the theoretical model earlier discussed, and that growth in GDP causes the influx of population to the urban centers for the obvious reasons; say "bright light of the cities". In the long-term perspective, the mutual influences of urbanization and service industry have non-Granger causality.

5. Conclusion and Recommendations

By adopting the unit root test, Engel-Granger co-integration test and the error correction mechanism on the data of China for urbanization and GDP from 1986 to 2013, and also by the use of Granger causality approach amongst the variables, this paper comes to the following conclusion;

From the co-integration, it is realized that the equation fits very well and the coefficients are being significant; from the co-integration model, the level of urbanization and GDP have a positive correlation; finally, the research concludes that the level of urbanization promotes economic growth, in other words, urbanization is the power of promoting the growth of the economy in China

From the test of causality, the level of urbanization and the GDP have the Granger causality recently, and the effect is two-way, which suggest that the level of urbanization promotes the development of GDP and vice-versa. In the long-term perspective, the influences of urbanization and GDP have a one-way causality with urbanization as the driving force for economic growth and not the other way round.

Finally, the growth of urbanization causes the growth of GDP and the population structure of China as it causes the movement of population and change in the nature of jobs from the rural agricultural sector to the urban industrial sector which eventually, fosters economic growth.

The research suggests the following recommendations;

The barrier of urbanization should be eliminated to fully achieve the gentle and synergistic relationship between the urbanization and economic growth. In cities, the number of the migrant labor is gradually increased and they make great contribution to the economic development. In rural areas, the government should enhance job training to improve the quality of peasants and break the discrimination of employment and policy which exists in the labor market (GAO, 2010). With the flowing of the rural surplus labor, authorities should reform every aspect of welfare that will cover the entire populace in employment, education, medical care, and social insurance to protect the legal right of the migrant labors, thus achieving the scientific city management. Therefore, the household, employment and social insurance system should be improved to do away with the barrier that exists between urban and rural areas. In this way, it can stimulate the economic growth and in return, drive further the speed of the urbanization process.

We should optimize the overall economic base to promote the development of the economy. This is because loose structure of productive base is the ailment that causes inconformity between urbanization and the development of economies. From economy development practices, urbanization is a prerequisite we must pass. Therefore, we can't afford to get it wrong. We need to constantly adjust the all structures, strengthen, and diversify the productive base of the economy. Thus, it helps in smoothing the rural surplus labor transmission to non-agriculture forces and realizes the transformation of urbanization, promotes the urbanization process of China.

We should provide a conducive atmosphere for urbanization. This entails the coordination of the service sector. Reasonable and appropriate size of city system provide a stage for the development of the service industry, and gradually forms urban agglomerations or metropolitan area on the basis of major cities, thus boosting the size and performance of service industry. Alternatively, we should also enrich the development level of the service sector and develop the new raised service industries intensively so as to change the elements and the economic structure of cities, paving way for the development of the urbanization. This is because; the service sector is highly elastic and as well, has a high absorbing capacity of labor. As such, raising the level of its efficiency will continue to impact a positive effect towards overall urban employment. In a nutshell, proper consideration given to urbanization and the service sector by the authorities will promote mutual development between them and hence, fetching more national income that fosters economic development.

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