CHINA'S URBAN DEVELOPMENT. A REGRESSION ANALYSIS BEFORE AND AFTER 1990

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Abstract
China represents one of the 21st-century forerunners in terms of economic power and technological advances, and, with its ample development programs, has achieved the status of a modern, high-tech country with great perspectives. The population growth and the movement of the latter towards urbanized centers has been both a cause and consequence of China's status today. The urban development in China started after the fallout during the Mao era, with the Great Leap Forward and the Cultural Revolution movements that destabilized the country both economically and politically. After the country has been devastated internally and externally, by the late 1970s, China had a stronger and growing economy. Today, China has, according to the OECD Urban Policy Reviews: China (2015), no less than 15 megacities, each with more than 10 million inhabitants. Compared to the mean OECD urbanization trend of 2015, China exhibits a greater growth rate of almost 1,5% in large metropolitan areas, in contrast to the less than 1% growth experienced within the OECD area. Based on these facts, the present research has attributed a series of variables as causes and consequences of Chinese urban development, and, with the application of the regression analysis, has offered a generalized review on the impact of FDI, GDP, population growth, and other factors, on urbanization in China. The paper also identifies the shifts produced in the decades before 1990 and after 1990, under the form of a historical analysis of the overall impact of different economic and social factors on the urban development in China. The variables have been divided into causes, consequences, and both causes and consequences of urban development. The analysis was, as a result, interpreted from the three different perspectives, showcasing the importance of each major element of impact on urbanization as a fundamental force in the economic growth of modern China.

Keywords
Urban development; China; Regression analysis; Historical analysis; Migration.

Introduction

A civilization that has thrived for more than 5000 years, from its ancient historical heritage and culture to the contrasting modern lifestyle, China is both a country and an economy worth observing, and, to some extent, learning from. The potential for social and technological expansion stems from the capacity of a population to learn to outgrow its limitations. With the biggest expanding workforce, and a ruling communist party, this country managed in a few decades to compete as a major force on the international markets. Although China cannot take pride from its country image in the Western world,

there are many accomplishments this country accumulated; starting with impressive building technologies, robotics, and engineering, to the ever-growing innovation programs, China continuously works on bettering the structural and organizational framework within, showing the world that when it comes to R&D, this country really qualifies for first prize.

From an economic perspective to China is attributed the fastest growing economy of the world. Joseph Schumpeter (1991) nicely puts it that the fiscal history of a country tells more about its people, its culture, and its social structures than anything else. In essence, it is quite marvelous how intricate the economic system is, and how we, as a pawn in it, struggle to understand it, prevision it, and model it. Using different econometric instruments for correlations and prediction, the academic sector has enriched the knowledge regarding the implications of different economic factors on the development of a country.

The urban development programs in China are of colossal magnitude, determining the need for identifying all the forces directing this trend. What triggered the movement towards the urban settlements and how those have influenced the status that China occupies today in the global economy? To answer this research question, information has been gathered from the World Bank databases, and, using Stata, was analyzed through the multifactorial regression analysis. The variables have been compiled in categories, depending on their significance, as follows – economic, population, labor, and development and consumption-related. Moreover, the variables were conditioned by their context of either being causes, consequences, or both causes and consequences of urban development in China.

At the same time, the impact of those variables on urban development has been assessed before and after 1990, to better understand, also from a historical point of view, how the transformation took place, and how the influences between the factors have altered. The results showcase how, before 1990, foreign direct investments have aided the urban development in China, while after 1990, the expenditure of the Chinese government in Research & Development has produced some of the greatest achievements in the modern history of the country. Among the consequences of urban development in China, the population and labor-related indicators can be reminded.

It is quite formidable how the economic mechanisms work, how connected everything is, and, at the same time, it is fascinating to read in the numbers how a country can grow and develop to become one of the principal forces in the world's economy.

Literature review

According to the probabilistic study of Gerland et al. (2014) on the UN world population projection data, there is an 80% chance that the world population will continuously grow until reaching between 9.6 and 12.3 billion by 2100. The highest population growth will be registered on the African continent, even though Asia will remain until mid-century the most populous continent. In the past decades, our world has experienced the largest wave of urban growth in history, with more than half of the world's population living in urban areas. This trend is currently undergoing an

expansion process, as the UN announced in 2018, and the global urban population is expected to increase from 55% in 2018 to 68% by 2050 (United Nations, 2018).

To acquire a historical perspective on urbanization, only 30% of the world population used to live in urban areas in the 1950s, compared to 55% in 2018 (United Nations, 2018). Moreover, the most urbanized regions of the world include the American continent with around 81% of its population living in cities and towns, Europe with 74% urbanized population, and Oceania with 68% urban population. Nevertheless, Asia is home to 54% of the world's urban population. Currently, there are two trends pushing urbanization growth, namely global population growth and the upward shift in the urban population.

China, one of the oldest civilizations of the world, has a written history of 5000 years and boasts rich cultural relics and historical sites. To the Chinese culture are attributed several significant inventions, including the compass, papermaking, gunpowder, and printing. Among the most visited and historically wealthy sites in China are The Great Chinese Wall, the Grand Canal, and Karez irrigation system, which represent some of the great ancient engineering projects, built millennia ago, symbols of the rich Chinese culture and history. Although ancient history portraits China as a colossus of innovation and technology, there have been gloomy decades in the more recent history of China, where slavery, feudalism, or socialism have marked deep into its people and culture. China is today (2020) the home of more than 1.4 billion people, representing 18.4% of the total world population (United Nations, 2019).

Since the mid-20th century, urbanization trends have been irreversible, the world population migrating towards urban centers, mainly in search for better living conditions, as economic development levels tend to be directly correlated with those of urbanization (Chen et al., 2013). Moreover, there are two different perspectives of urbanization depending on the economic development of a country, where developed countries are synchronized in terms of urbanization and economic development, and while the developing countries experience over- or under-urbanization. China is the kind of example that borrows from both categories (Chen et al., 2013), depending on the region under examination. The political and social reforms have had their impact on urbanization in China, determining the situation today, where different regions of the country are thriving both economically and socially, and others fall behind. From the perspective of the Potential Support Ratio of China, this country registered around 7.8 people aged 15-64 per one person aged 65 or more, but the number is projected to decline to 1.8 by the end of the century, placing a tremendous burden on the young generation of working Chinese citizens. Nevertheless, 2020 has marked an important milestone in the history of Chinese urbanization, with more than 60% of the Chinese population living in urban areas. China is also one of the most important economies at a global level, and its development implies colossal urban construction programs. But what triggered this movement towards urban settlements and how did the latter influence the overall economic status of China?

Ultimately, the urbanization phenomenon has been associated with the following determinants: the high-class of the Chinese society is directly linked to the process of over-urbanization, while the low-class population lives in under-urbanized areas (Chen et al., 2013). Between 1960 and 2010, urbanization in China was determined by the rural-urban migration (Zhang & Song, 2003). Among the consequences of the Chinese

urbanization process, urban air pollution has a central position, as urbanization is directly correlated with the increases in the fine particles ($PM_{2.5}$) concentration in the city air (Han et al., 2014). Nevertheless, studies (Aunan, & Wang, 2014) show that the Chinese policymakers have been keen to solve, at least in part, this problem, as the trends showcase a consistent drop in urban household fuel consumption between 2000 and 2010, with estimated annual health benefits from the transition of energy consumption of around 30 billion USD.

Such a tremendous urbanization growth has exposed different types of problems, including economic, social, environmental, and, given the limited land resources, has put a toll on the policymakers and academics in China (Chen, Jia, & Lau, 2008). The Chinese government considered the threats exposed above, and instituted movements that pertain to a more balanced economy, with the introduction of sustainable urban development projects that gave birth to the idea of eco- and/or low-carbon cities (Liu et al., 2014). According to Yin et al. (2014), 40% of the Chinese cities are eco-efficient. Nevertheless, they have identified a direct correlation between GDP, eco-efficiency, and environmental pollutant emission. Therefore, it is not clear if eco-efficient cities are also sustainable, but it can be underlined that the amount of economic return of a certain urban region influences the environmental impact of that area, such that a high economic return will imply a low environmental impact of the respective city (Hahn et al., 2010). Liu et al. (2015) measured the functionality of urban development in China, which, ultimately divided the urban regions into four categories, depending on the amount of FDI and GDP allocated to the development of the urban area. Consequently, an urban area that comprises of more than one city will tend to incorporate, into one polycentric urban development center/region (PUR), all the surrounding cities. There are three phases of such convergence, namely the fusion phase, where the urban regions are formed of a large collection of separated industrialized centers that developed separately but, eventually, fused, the incorporation phase, where towns and small urban centers are being integrated, with the consequence of eliminating rural administrations, and agriculture population counts, and the centrifugal phase, where the cities and towns from a PUR become integrated into their economic specialization (Cai et al., 2012).

Given the potential of urbanization, but considering also the consequences it determines, the United Nations have actively worked towards identifying a sustainable strategy to adapt to the demographic realities of the 21st century, especially focusing on the Asian and African continents, where the urbanization phenomenon is growing exponentially. Urban areas will absorb eventually all the growth in the world's population, and the international migration, as a transformative force, will manage to bring out of poverty millions of people, and it will contribute to the sustainable development of the countries (United Nations, 2019).

Methodology

Research Question

The present research was conducted with the scope of determining the factors influencing the urbanization phenomenon in China. The regression analysis has been performed across 37 variables, classified as causes, consequences, and both causes and consequences, as follows: economic factors (FDI, GDP, trade, gross national expenditure,

household final consumption expenditure, health expenditure, adjusted net national income, adjusted net national income per capita, manufacturing-value added, industry-value added, exports of goods and services, R&D expenditure), population-related factors (total population, population in urban agglomerations of more than 1 million, population in largest city, life expectancy at birth for females, life expectancy at birth for males, urban population, urban population percentage of total, urban population growth, population density, rural population, population growth), labor factors (gross enrolment ratio primary and secondary school, employment in agriculture, unemployment, labor force), and development and consumption-related factors (electric power consumption, physicians per 1000 people, CO_2 emissions, mobile cellular subscriptions, CO_2 emissions from transport, internet users, people with access to basic water sources, people with access to basic sanitation facilities, fossil fuel energy consumption).

The database has been procured from the World Bank website, and the regression has been performed with the Stata software for econometric analysis. The data comprised of indicators' performance between 1960 and 2019. Not all variables contained 60 observations (the maximum number of observations), as depicted in Table 1 – Data Summary. Due to the lack of information, when the consequences were analyzed, not all the variables remained relevant (see Findings – Consequences). The research had performed a differentiated, historic analysis from 1960 to 1990, and from 1990 to 2019, because the mean of the Year variable registered 1989.5 as value, dividing the data into two equal parts, and with the scope of furthering the research with a comparison to European countries before and after the communist regime succumbed.

Research hypotheses on determinants of urban development

The factors influencing urban development are to be perceived from two different perspectives; one perspective would be that of push factors, and the other of pull factors. Examples of such types of factors can be objectively identified, as follows: lack of employment opportunities in rural areas, overpopulation of rural areas, or poor crop yield are considered push factors, while pull factors could be natural population growth and even higher standards of living. Typically, a pull factor will initiate the internal migration of the population (DeWind, & Holdaway, 2008), and the push factors will sustain that decision. Moreover, the causes and consequences of any urban population growth are part of the circular process, where the cause of the phenomenon transforms also into a consequence of the latter. Generally, foreign direct investments and gross domestic product growth are factors that can be attributed to the causes of urbanization, such that one could underline that a developed economy will be prone to internal migration and urbanization phenomena. While economic conditions improve, the country will attract more FDI, the GDP experiences growth, trade develops, export increases, as well as national expenditure in infrastructure, education, health, sanitation, life expectancy, living conditions, etc.

Given the above-mentioned characteristics of urbanization determinants, the research identifies a series of hypotheses to be tested. The hypotheses have been constructed, just like the findings, by referring to each category of variables (see Research Question), namely economic variables (12), population variables (11), labor variables (4), and development and consumption variables (9), and the Year variable, as follows:

Hypotheses on causes of urbanization

H1. The economic variables have a direct influence on the urbanization process in China.
H2. The population and labor-related variables are directly correlated to the urban development process in China.
H3. As the development and consumption related variables determine better living standards in China, there is a visible correlation with the process of urbanization.

Hypotheses on the consequences of urbanization

H4. Urbanization in China determines changes to the values of the economic factors, representing a mean of both economic and population growth.
H5. The growth of the urban population in China influences the population and labor-related indicators, such as total unemployment, life expectancy, rural population levels, etc.
H6. The living standards in China are influenced by the population growth of urban settlements.

Research method

The research method used for the analysis of the causes and consequences of urban development in China is the regression analysis. The latter represents a statistical process that estimates the relationship between different variables such as the effect of GDP and FDI on urban population growth if any. The analysis will show the degree of connection between the dependent variable and the independent variables. By interpreting the correlation coefficient, the strength of a linear association between the variables tested in the regression is measured. The coefficient of determination, R-squared, will give an insight on how well the data fit a statistical model, namely the regression line perfectly fits the data (R squared is 1), the regression line does not fit the data (R squared is 0), or is somewhere in between. Moreover, the p-value will indicate whether the null hypothesis can be accepted or not.

Table 1. Data summary

Variable	Obs	Mean	Std. Dev.	Min	Max
year	60	1989.5	17.46425	1960	2019
fdi	38	93607.73	97259.93	430	290928.4
totpop	59	1082.618	230.8336	660.33	1392.73
tradepercent	59	26.98802	17.9488	4.98269	64.76945
popurb1mil	59	150.5792	99.36774	52.67878	388.3984
poplrgcity	59	11.24489	6.322257	5.4706	25.58214
gdp	59	2151.567	3610.377	46.68518	13608.15
emplagricp~t	33	44.41985	11.20569	25.363	60
co2em	55	2.543848	1.923847	.5741621	7.557211
mobcelsu~100	32	34.38935	38.8075	.0000635	115.5258
lifeexpect~m	59	68.75754	8.666717	45.112	79.051
lifeexpect~e	59	65.81124	8.532598	41.898	74.549
househldex~d	59	846.7041	1371.118	30.12836	5263.179
co2emtransp	44	6.505517	1.204858	4.696472	8.598695
healthexpe~t	23	4.32423	.4111975	3.544976	5.151193

netuserspe~t	25	19.05545	20.3763	.0001687	54.3
randdexpen~t	22	1.404874	.5278274	.56513	2.14512
nni	49	2009.435	2908.028	83.03674	10512.22
nnipercap	49	1512.696	2101.586	101.4728	7547.925
totunemplp~t	29	4.420724	.2284785	3.8	4.9
rurpop	59	726.9079	95.13526	550.0021	836.4789
watersrcpe~t	18	86.98938	4.06956	80.39258	92.84614
expgoodsserv	59	488095.8	804743.5	1913.227	2655609
sanitfacil~t	18	70.61833	9.219354	56.2896	84.76079
fuelenerco~p	44	76.12424	8.490578	59.94989	88.41866
totlabour	30	7.42e+08	4.52e+07	6.42e+08	7.85e+08
popdensit	58	116.0796	24.0873	70.33579	148.3488
manuf	59	759171.5	1184817	13217.92	4002753
industr	59	932820.3	1520125	14594.96	5532093
urbpopgrowth	59	3.530804	1.111994	1.210543	5.493641
urbpop	59	355.7101	221.6443	108.0854	823.8276
urbpopperc~t	59	30.31212	13.60464	16.203	59.152
elepwrcons~p	44	1081.572	1084.663	151.9893	3927.044
gnexpend	59	2104.557	3538.185	47.27435	13255.61
schoolenrol	36	.9020942	.0873002	.77764	1.01431
physici~1000	48	1.263856	.2820901	.85	1.9798
popgrowthp~e	59	1.278737	.7873878	-1.015528	2.787332

Findings

Causes of urban development in China before 1990

Table 2. The Economic Impact on Urban Development

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. reg urbpopgrowth fdi gdp tradepercent gnexpend manuf industr expgoodsserv if year<=1990
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Source	SS	df	MS	Number of obs =	9
				F(7, 1) =	40.97
Model	.738258408	7	.105465487	Prob > F =	0.1197
Residual	.002574184	1	.002574184	R-squared =	0.9965
				Adj R-squared =	0.9722
Total	.740832591	8	.092604074	Root MSE =	.05074

urbpopgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
fdi	.000449	.0000793	5.66	0.111	-.0005585	.0014566
gdp	-.1214364	.0324376	-3.74	0.166	-.5335953	.2907226
tradepercent	.0356227	.0690687	0.52	0.697	-.8419788	.9132242
gnexpend	.061881	.0325557	1.90	0.308	-.3517787	.4755408
manuf	.0004159	.000077	5.40	0.117	-.0005627	.0013946
industr	-.0002978	.000057	-5.22	0.120	-.0010225	.0004269
expgoodsserv	.0000783	.0000447	1.75	0.330	-.0004902	.0006468
_cons	8.169066	1.718613	4.75	0.132	-13.66799	30.00612

The variables FDI, GDP, gross national expenditure, manufacturing value-added, industry value-added, and exports of goods and services are expressed in USD at absolute values. The trade is expressed in percentages of GDP, and the dependent variable urban population growth is also expressed in percentages. According to the results listed in Table 2, it can be stated that there is a positive relationship between the urban population growth and all the independent variables, except for GDP, and industry value-added. As a consequence, an increase in the GDP, or industry value-added will trigger a negative effect on the urban population growth. The coefficient of determination is 0.99, which shows perfect linearity between the variables. The alternative hypothesis that economic growth is correlated to urban development was not accepted, registering a P-value higher than 0.05. Therefore, H1 is not confirmed: any increase in the foreign direct investments, gross net expenditures, manufacturing value-added, trade, and the exports of goods and services will not have a positive and direct impact on the urbanization in China. The results are consistent also with the lack of data before 1990.

Table 3. The Population Effect on Urban Development

```
. reg urbpopgrowth totpop popurb1mil poplrgcity rurpop urbpoppercent if year<=1990
```

Source	SS	df	MS		
Model	26.024564	5	5.20491279	Number of obs	= 31
Residual	35.6221904	25	1.42488761	F(5, 25)	= 3.65
				Prob > F	= 0.0128
Total	61.6467543	30	2.05489181	R-squared	= 0.4222
				Adj R-squared	= 0.3066
				Root MSE	= 1.1937

urbpopgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
totpop	-.5749077	.3090452	-1.86	0.075	-1.211398	.0615827
popurb1mil	.2598877	.4465382	0.58	0.566	-.6597749	1.17955
poplrgcity	6.964826	3.069986	2.27	0.032	.642071	13.28758
rurpop	.7073982	.3594377	1.97	0.060	-.0328776	1.447674
urbpoppercent	5.12203	2.21915	2.31	0.030	.5516054	9.692456
_cons	-152.6593	67.35441	-2.27	0.032	-291.3783	-13.94031

When assessing the results of the second test, the correlation between the population variables and the urbanization in China is direct and negative. Consequently, the urban population growth drops as the percentage of the total population rises. The p-value is lower than 0.05, which means we can accept H2, according to which the population indicators have an influence on the urban development in China before 1990. There are p-values for particular indicators such as total population, the population in urban cities bigger than 1 million people, and rural populations that are higher than 0.05, which means that, considered separately, they do not register the same influence on the urban development. R-squared is 0.422, which shows weak linearity. The H2 of the study stating that the population indicators are directly correlated to the urban development in China before 1990 can be accepted.

Causes of urban development in China after 1990

Table 4. The Overall Development and Consumption influence on Urban Development

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. reg urbpopgrowth watersrcpercent sanitfacilpercent fuelenerconsump elepwrconsump if year>=1990
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Source	SS	df	MS		
Model	2.46554645	4	.616386612	Number of obs	15
Residual	.261064151	10	.026106415	F(4, 10)	23.61
				Prob > F	0.0000
Total	2.7266106	14	.1947579	R-squared	0.9043
				Adj R-squared	0.8660
				Root MSE	.16157

urbpopgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
watersrcpercent	.6749309	1.15388	0.58	0.572	-1.896073	3.245935
sanitfacilpercent	-.289958	.5564332	-0.52	0.614	-1.529768	.9498525
fuelenerconsump	-.0297765	.0985963	-0.30	0.769	-.2494627	.1899096
elepwrconsump	-.0004657	.0007103	-0.66	0.527	-.0020482	.0011169
_cons	-31.08698	56.07881	-0.55	0.592	-156.0384	93.86439

The indicators tested for exerting influence on the urban population growth were people using at least basic drinking water services (% of the population with access), people using at least basic sanitation services (% of the population with access), fossil fuel energy consumption (% of total), and electric power consumption (kWh per capita). The results of the regression analysis can be interpreted as follows: a 1% increase of the population with access to basic drinking water sources determines an urban population growth of 67%; at the same time, a 1% increase in the population with basic sanitation services determines an urban population drop of 28%. Moreover, if fossil fuel consumption would increase by 1%, the urban population growth would decrease by 2.9%. The H3 of the study is accepted, confirming that the indicators of development and consumption determine superior living standards, and exert a direct influence on the overall urban population growth, with a 95% confidence-level, although the correlation between the independent variables and the dependent variable is generally negative.

Table 5. The Overall Development and Consumption influence on Urban Development

```
. reg urbpopgrowth netuserspercent co2emtransp co2em mobcelsubs100 physiciansper1000 if year>=1990
```

Source	SS	df	MS		
Model	3.67157303	5	.734314605	Number of obs	20
Residual	.389782007	14	.027841572	F(5, 14)	26.37
				Prob > F	0.0000
Total	4.06135503	19	.213755528	R-squared	0.9040
				Adj R-squared	0.8698
				Root MSE	.16686

urbpopgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
netuserspercent	-.0286195	.0193368	-1.48	0.161	-.0700928	.0128538
co2emtransp	-.0548803	.0724375	-0.76	0.461	-.2102432	.1004827
co2em	-.2043299	.2042108	-1.00	0.334	-.6423185	.2336586
mobcelsubs100	.0150378	.0199368	0.75	0.463	-.0277223	.0577979
physiciansper1000	.150004	.374152	0.40	0.695	-.6524723	.9524803
_cons	4.715142	1.142979	4.13	0.001	2.263696	7.166589

After 1990, the development and consumption indicators had an impact on urban development, according to the registered p-value of 0, accepting H3. The R-squared was 0.904, thereby underlining the almost perfect linearity of the data. A negative effect on the urban population growth has had Internet users (per 100 people), the CO2 emissions from transport, and the CO2 emissions in general. The highest influence is triggered by the CO2 emission; thus, a 1% increase in the CO2 emissions determines a 20% drop in the urban population growth. H3 can be accepted, the development and consumption variables are overall positively correlated to the urban development, as depicted in Table 5.

Table 6. The Economic Impact on Urban Development

```
. reg urbpopgrowth household expend healthexpendpercent randdexpendpercent nni nnipercap industr manuf expg
> oodsserv if year>=1990
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Source	SS	df	MS	Number of obs =	22
				F(8, 13) =	29.35
Model	5.06206704	8	.63275838	Prob > F =	0.0000
Residual	.280300815	13	.021561601	R-squared =	0.9475
				Adj R-squared =	0.9152
Total	5.34236785	21	.254398469	Root MSE =	.14684

urbpopgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
household expend	.0004669	.0007376	0.63	0.538	-.0011266	.0020604
healthexpendpercent	-.2647664	.2408942	-1.10	0.292	-.7851866	.2556539
randdexpendpercent	.4505339	.3183262	1.42	0.180	-.2371681	1.138236
nni	.0006184	.0024923	0.25	0.808	-.0047658	.0060026
nnipercap	-.0013711	.0032911	-0.42	0.684	-.0084812	.0057389
industr	-5.61e-08	9.81e-07	-0.06	0.955	-2.18e-06	2.06e-06
manuf	3.61e-07	4.83e-07	0.75	0.468	-6.82e-07	1.40e-06
expgoodsserv	-7.13e-07	5.44e-07	-1.31	0.213	-1.89e-06	4.63e-07
_cons	4.968708	.9567178	5.19	0.000	2.901845	7.035571

Even after the urban population growth entered a slow-paced growth period after 1990 (see Table 6), the economic impact was still relevant to urban development. R-squared is 0.947, which shows almost perfect linearity; thereby the data fit the statistical model. The health expenditure (% of GDP), the net national income per capita, the industry value-added, and the exports of goods and services have a negative impact on the urban population growth. The influence of R&D expenditure (% of GDP) on urbanization in China is relevant. A 1% increase in the R&D expenditure determines a 45% increase in urban population growth. As the household final consumption expenditure increases by USD 1, the urban population growth increases by 0.046%. After 1990, H1 can be accepted, underlining a positive and direct influence of economic indicators on the urban population growth.

Table 7. The Population Effect on Urban Development

```
. reg urbpopgrowth rurpop lifeexpectfem lifeexpectmale popgrowthpercentage if year>=1990
```

Source	SS	df	MS	Number of obs =	29
Model	9.59903553	4	2.39975888	F(4, 24) =	104.06
Residual	.553484393	24	.02306185	Prob > F =	0.0000
				R-squared =	0.9455
Total	10.1525199	28	.362589997	Adj R-squared =	0.9364
				Root MSE =	.15186

urbpopgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
rurpop	.0090175	.0018463	4.88	0.000	.0052071	.012828
lifeexpectfem	.0074633	.0825596	0.09	0.929	-.1629314	.1778581
lifeexpectmale	.302985	.0982042	3.09	0.005	.1003015	.5056684
popgrowthpercentage	1.660312	.5681008	2.92	0.007	.4878101	2.832815
_cons	-26.55876	10.85126	-2.45	0.022	-48.95465	-4.162865

After 1990, the population indicators have shown a stronger influence on urban development. R-squared resulted in a value of 0.945, demonstrating an almost perfect statistical model. All the independent variables have a positive influence on the dependent variable. As the population growth percentage increases, so does the urban population. Moreover, increases in the life expectancy of both males and females will trigger increases in the urban population. Therefore, after 1990, H2 is accepted, showing a generally negative but direct influence of population indicators on the urban development in China.

Table 8. The Labor Effect on Urban Development

```
. reg urbpopgrowth totlabour totunemplpercent emplagricpercent if year>=1990
```

Source	SS	df	MS	Number of obs =	28
Model	9.38588197	3	3.12862732	F(3, 24) =	248.89
Residual	.301686904	24	.012570288	Prob > F =	0.0000
				R-squared =	0.9689
Total	9.68756888	27	.358798847	Adj R-squared =	0.9650
				Root MSE =	.11212

urbpopgrowth	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
totlabour	1.37e-09	1.28e-09	1.07	0.296	-1.27e-09	4.01e-09
totunemplpercent	-.100226	.1054842	-0.95	0.352	-.3179348	.1174828
emplagricpercent	.0624139	.0050169	12.44	0.000	.0520594	.0727683
_cons	.3479394	1.426607	0.24	0.809	-2.596433	3.292312

Within the group of variables related to the labor effect, the measured indicators – total labor, and employment in agriculture (%), have showcased a positive correlation to urbanization in China. Alternatively, total unemployment (%) has presented a negative correlation to urban development. R-squared is 0.968, which means that the data is linear, while P-value is 0; therefore, H2 is accepted, the independent variables have a direct and positive effect on the urbanization process in China.

Consequences of Urban Development in China after 1990

Among the consequences of urbanization in China were considered the following variables: FDI, GDP, rural population, employment in agriculture, NNI, household expenditures, health expenditures, total unemployment rate, CO2 emissions, the number of Internet users, and mobile cellular subscriptions. The findings on the consequences of urban development in China, after 1990, have demonstrated that a growing urban population is correlated to the majority of economic, population, and development and consumption indicators. The growing population in urban regions of China has a positive effect on foreign direct investments, GDP, and the net national income. Moreover, the growing overall population in China has determined increases in rural settlements, but with negative, direct effects on the employment rates in agriculture. The internal migration towards metropolitan areas in China determined increases to the household and health expenditures but rejected the existence of correlations between the total unemployment rate and the urban population growth. Ultimately, the number of mobile cellular subscriptions and Internet users generally grew due to the larger urban population. Therefore, the urbanization process influences positively the economic, population-related variables and the living standards in China, determining for the acceptance of H4, H5, and H6.

Conclusions

When undergoing urbanization, the internal migration of a country's population represents one important variable (DeWind, Holdaway, 2008). As demonstrated by the regression analysis, urban development in China is influenced by several different indicators such as economic, social, and consumption variables. The foreign direct investments, trade, exports of goods and services, and even gross national expenditures have influenced the urban population growth after 1990, accepting H1. China presents, as any other developed country would, a negative correlation between population growth and GDP (Samuelson, Nordhaus, 1998). The economic indicators prove to be represented also as consequences of the urbanization process in China, accepting H4.

A country's development is always central to the representation of human capital (Samuelson, Nordhaus, 1998). Considering the labor indicator's influence and consequences on urban development as a result of the regression analysis, H2 was accepted, stating that there is a direct correlation between the population and labor-related variables and the growth of the urban population of China. At the same time, the urbanization process in China was consistent with positive influences on the labor and population indicators, showcasing that those variables can be interpreted as both causes and consequences of urbanization, accepting also H5.

From the regression results before 1990, urban population growth was caused by FDI, manufacturing, population density, people with access to basic sanitation facilities, and fossil fuel energy consumption. After 1990, urban population growth was determined by R&D expenditure, household final consumption, people with access to basic water sources, and CO_2 emissions, accepting H3. As Eisenstein (2013) mentioned, an economy aligned to the expectations and technological advancements of the 21st century must produce less CO_2 emissions. Apparently, with the data from the World Bank, China seems to have adhered to this principle. A growing urban population in China was not

positively correlated to CO_2 emissions. Nevertheless, the rest of the development and consumption indicators were relevant to the category of consequences of urban development in China, accepting H6.

In its totality, urbanization is a process much more complex than any research paper could demonstrate. China experiences today an urban development movement without precedent, with vast implications on both social and economic indicators (Fook, & Gang, 2010). As a consequence, the findings of this paper must represent the first step in the process of identifying the true nature of urbanization in China, ultimately transforming the knowledge into a journey towards sustainability and alternative urban development (Maheshwari, Singh, & Thoradeniya, 2016). To arrive at such heights, the basic principles are those that adhere to sustainable and progressive public policies, fostering ethical, productive/efficient, ecological and economical directives (Wheeler, Wheeler, & Beatley, 2014), terraforming the metropolitan regions of the world and transforming the latter into a much more efficient and better place of existence.

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