Proceedings of the 2nd International Conference on Financial Technology and Business Analysis
DOI: 10.54254/2754-1169/52/20230707

The Impact of Economic Development on Environment and Local Redisdent's Living Standard in Beijing and Harbin

Ruihan Qi[1,a,*]

[1]*Shenzhen College of International Educaton, Shenzhen, Guangdong, China*
a. s20620.qi@stu.scie.com.cn
**corresponding author*

Abstract: China experienced rapid economic growth in the past few years. Governments and citizens in developing countries are concerning about the environmental issues and people's living standard in developing countries. Different areas respond differently to the impact of growth in the entire economy. The close relationship between economic development and environment and people's living quality can be explored from multiple perspectives. This paper uses data from cities of mainland China to investigate the impact of different levels of economic development by comparing various economic and environmental factors. Factors such as gross domestic product, education availability and employment rate are included to consider the economic development of Beijing and Harbin in China. In this case, environment and living standard are represented by PM2.5 level, public transportation provision, life expectancy, as well as urban green area. Majority of the gaps in the data sets are the result of inequality in their economic growth. Problems of unequal distribution of wealth and geographical locations can be explained through the results from this topic.

Keywords: economic development, living standard, environment, inequality

1. Introduction

Achieving rapid economic development had always been a target for majority of the developing countries. The original aim for developments is to improve living standard and achieve as much independency as possible. However, every division made creates opportunity cost. Economic developments are not always good in all perspectives. Due to the prediction of United Nations, over a half of the world's population will live in urban areas [1]. Following the increase in economic activities, problems such as the uneven distribution of income, poor preservation of the environment and population loss have become increasingly severe. Policies on trades and taxations are established to reduce the negative effect brought by rapid economic developments. However, the consequent impacts brought by the changes in economic structure are also important for local government and the society.

Research shows that economic and social development and environmental protection have obvious characteristics of mutual restriction and mutual dependence [2]. Economic development depends on the environment in a large scale; however, the degree of environment preservation may also rely on the financial state of the area.

To find out the relationship between economic development, environment and local resident's living standard, this paper compared the data two different cities in mainland China. Beijing, as the

DOI: 10.54254/2754-1169/52/20230707

capital city of China, it possessed high standard of education and economic strength thus it is a constantly developing city. However, the problems of air pollution and high cost of living had lowered the happiness index of Beijing. Harbin, a provincial capital of the sixth largest province with rapid developments in heavy industries at north-east China. In the period of Covid-19 virus outbreak, Harbin experienced serious economic stagnation and leakage of talents. As a middle-low leveled economy, Harbin is still in the state of repair and reinforcing its infrastructure [3]. The collection of data sets on the education level, employment rate and gross domestic product can represent the overall economic development of an area. Meanwhile, the comparison on PM2.5 concentration, urban green space percentage, convenience of transportation and life expectancy can be used to show the disparity of environment and living quality of Beijing and Harbin. The results would be able to demonstrate wether economic development has relationship with the environment and living standard of a place.

2. Case Study on Beijing and Harbin

2.1. Economic Development

Figure 1 illustrates the gross domestic products of Beijing and Harbin in billion Yuan between the years 2012 and 2022. GDP is a fundamental measure of a city's economic state, within this 10-year period, both cities had experienced economic development in different scale. Beijing's rise in GDP is constant and stable before the year of 2019. Since then, Beijing faced an economic stagnation until the end of 2020. The impact of Covid-19 outbreak is non negligible economically. However, Beijing overcame the difficulties and got back on the track of rapid developments. Unlike Beijing's fast pace of economic growth, Harbin's GDP rises slowly. From 2012 to 2017, economic development is the most obvious, by the end of 2017, Harbin's GDP reached 500 billion Yuan for the first time. Then, the GDP of Harbin rises slightly each year.

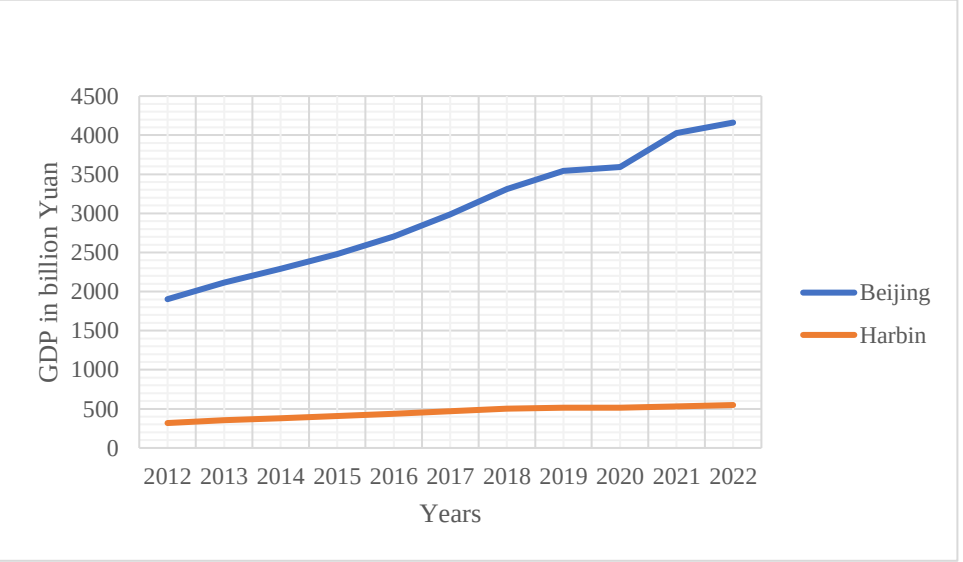


Figure 1: GDP of Beijing and Harbin in billion Yuan 2012–2022 (Source: statista.com).

In 10-year's time, Beijing achieved rapid economic developments while Harbin grows slowly. The advantage of Beijing is undoubted. Beijing has better geographical location, reputable colleges, comfortable climate and more job opportunities. In the past years, Beijing had been attracting a massive number of working populations to immigrate. Harbin is one of the cities in North-east China with severe problem of outflow of talents and Beijing is the ideal destination for majority of them. The lack of economically active population had caused Harbin to suffer from economic depression

DOI: 10.54254/2754-1169/52/20230707

and corruption. Although Harbin owns large land area and a river that flows through the city, resources weren't utilized in the past years. Based on Figure 1, Beijing's economic state is much better compared to Harbin.

Education's provision can impact both the economic and people's living standard. In Jiangxi Province of China, 60 hundred million Yuan had been invested in the education system. The subsequent result of this move is astonishing. The transportation system near the schools constructed had been improved. This changed people's lifestyle and promoted economic activities in a great scale. Soon after the project is completed, resident's happiness index increased [4].

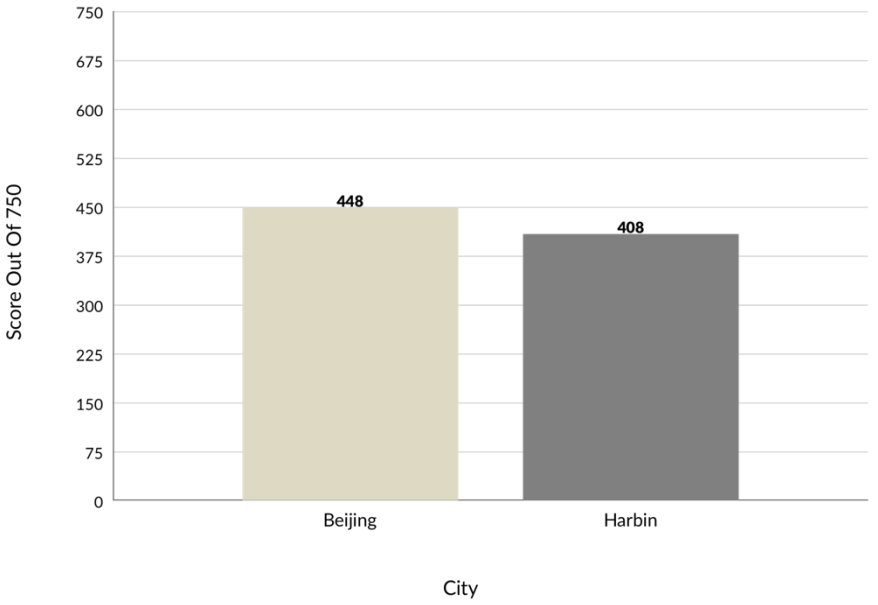


Figure 2: Undergraduate admission line in 2023 (Source: Provincial Education Examination Institute).

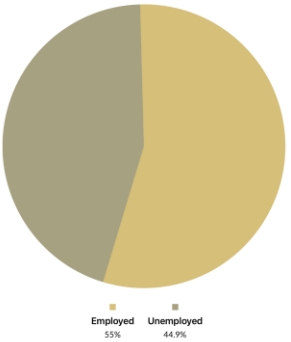
Figure 2 is a direct comparison of the minimum score to achieve in National College Entrance Examination in order to receive undergraduate education in China 2023. The higher this minimum score, the heavier the competition to enroll in a university in the area. It also means that the average score of the students who took the examination in this area is higher. Harbin is 40 points lower than Beijing in 2023, this reveals the difference in student's average and education system.

Inequality in government's provision of education is the sole reason of this large gap in the undergraduate admission line. Beijing owns public and private universities that amounts of 67 in total whilst Harbin has only 27. The difficulties of getting into a university is about the same for students from Harbin and Beijing. However, the quality of education can be very different. Majority of the high school graduates in Harbin will apply for universities outside of Heilongjiang province for better career prospect and living environment. This results in the loss of educated population and talents in Harbin which has a direct link with its economic stagnation in recent years. In addition, the availability of high standard universities in Harbin is relatively low. Only 2 universities in Harbin enrolled in the QS Chinese Universities Ranking. As for Beijing, 14 universities in total are in the QS ranking. 'Qinghua university' and 'Peking university' in Beijing attract students from the entire country or even overseas students for their reputation and resources.

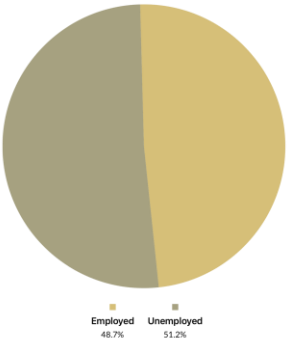
The quality and availability of education in Beijing and Harbin are totally different, meanwhile the average of the admit students in the two cities are also unlike. Education level is also a factor that contributes to the measurement of an area's economic development [5], thus Beijing's developments still appeared to outdistance Harbin.

DOI: 10.54254/2754-1169/52/20230707

Employment rate of a city is very important as it indicates the degree of utilization of Human Resources within an area. When applying the concept of production possibility curve, the most ideal position for every city is to get as close to the curve as possible. In 2022, Beijing's employment rate is 55% ranked in the middle and lower reaches in China. However, Harbin has the second lowest employment rate in 2022 of only 48.7%. As shown in Figure 3 below, each city is far away from reaching their maximum market efficiency. The problem of unemployment is more serious in Harbin as not even half of the working population have a legal job. This also led to the problem of economic stagnation and lack of development.



Panel A: Beijing



Panel B: Harbin

Figure 3: Employment rate of Beijing and Harbin in 2022 (Source: State statistics Bureau, provincial statistical yearbook).

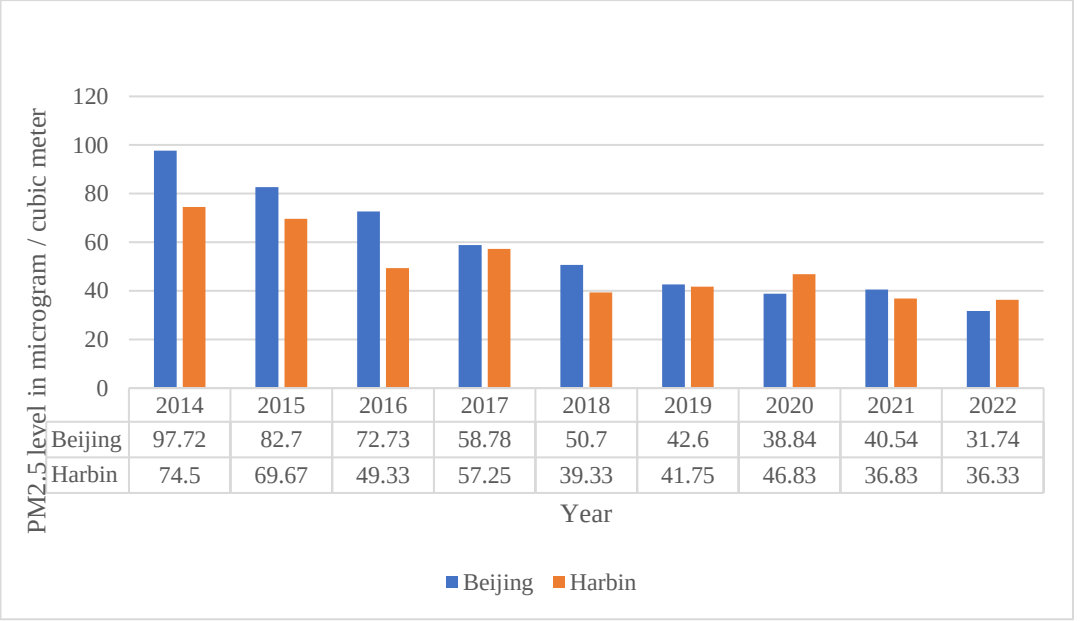
Comparing the two cities horizontally, Beijing is closer to its maximum use of resources which is an important factor that contributes to its fast speed of economic developments. In addition to this concept, the higher percentage of people having a job means the smaller amount of government budget will be used as unemployment benefits. The subsequent benefit of government having a larger budget is that the surplus resources can be used to develop the infrastructure and invest in new technologies. Beijing results in a better economic environment than Harbin.

Considered all the three factors that determine the overall economic development in Beijing and Harbin in recent years, conclusion can be made that Beijing's economic is developing faster than Harbin. This difference in economic development should be able to link with the gap in living standard and environment preservation in Beijing and Harbin.

2.2. Living Standard and Environment

Air quality of an area can be measured by various scales. CO2 emission and PM2.5 level are the most common scales of measurement. Real GDP's increase will lead to a rise in CO2 emissions and eventually a decrease in a long term.

DOI: 10.54254/2754-1169/52/20230707



	2014	2015	2016	2017	2018	2019	2020	2021	2022
Beijing	97.72	82.7	72.73	58.78	50.7	42.6	38.84	40.54	31.74
Harbin	74.5	69.67	49.33	57.25	39.33	41.75	46.83	36.83	36.33

Figure 4: PM2.5 level in micrograms per cubic meter in Beijing and Harbin 2014-2022 (Source: statists.com, aqistudy.cn).

PM2.5 level is another representative example of an area's air quality and environment. The higher the PM2.5 level, the more serious the environmental pollution within an area. Both Beijing and Harbin are well known of their poor air quality in China and the rate of air pollution relevant illnesses such as pulmonary diseases are very high. Using the information from Figure 4, Beijing's initial position of air pollution is very high that reached 97.72 which can be considered as serious contamination. After 8 years of rapid economic development, Beijing successfully lowered its PM2.5 level to 31.74 only in 2022. On the other hand, Harbin started with a relatively low level of air pollution. However, the trend of its PM2.5 level fluctuated over the period of observation. Although Harbin also successfully reduced the problem of air pollution by the end of 2022, it ends up has a higher level of PM2.5 than Beijing. Trace back to the discussion before, Beijing developed faster than Harbin during these years, then result appeared that Beijing protects its environment in a larger scale.

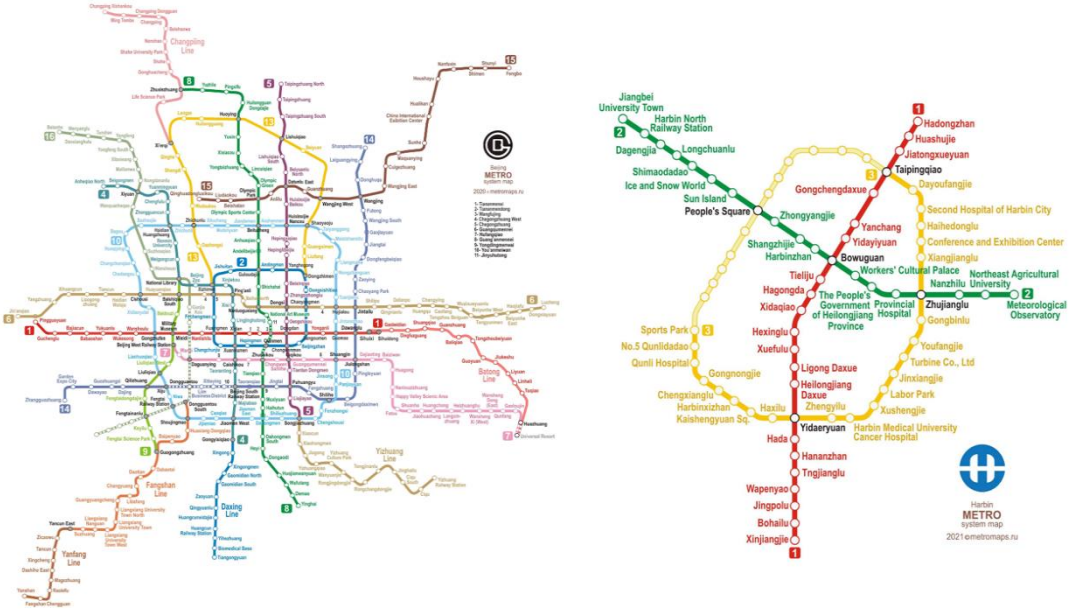
Environment is a very important factor when considering the living standard of the citizens. When air quality is high, visibility in the city increases. This lowers the rate of traffic accident and uncovers many sceneries which all contributes to the high happiness index of a city. In addition, respiratory diseases can be reduced when the quality of air is improved which sustained people's health and lowered the pressure on city's health care system.

Beijing is keen on reducing the level of PM2.5 in these years, many policies and infrastructure had been established to improve the environment. Starting from 2012, Beijing devotes its heart into forestland construction, by the end of 2022, 2419000 acres of forestland was built. On contrast, Harbin's effort on environment preservation is relatively poor. The number of vehicles that use petrol is ever increasing due to the increased availability of purchasing a car. Harbin's PM2.5 level then results to be exceeding Beijing at the end of 2022.

From the data collected conclusion on the impact on environment of Beijing and Harbin after economic development can be made. Economic development does not necessarily harm the environment, instead, it helps an area to reduce the level of pollution. However, the faster rate of economic development, the better the government and citizen preserves their environment. While the environment is improved, people's living standard can also be increased a different scale.

DOI: 10.54254/2754-1169/52/20230707

Railway developments are supported by government in a great scale. An investigation showed that the government investments on rail system is as if government budget has no constraints [6]. China, as an example, had obeyed this idea in a large scale. It's development on public transportation, especially metro lines, are worth mentioning.



Beijing Harbin

Figure 5: Metro maps of Beijing and Harbin (Source: metromaps.com).

Beijing has 27 metro lines working in 2023 in Figure 5. Public transportation is highly available for its citizen. The application of metro lines effectively solves the problem of traffic jams in weekdays. Meanwhile the cost of living in Beijing is reduced as the fee of taking metros are cheaper than owning a car. In addition, this promotion of 'green travel' contributes to the reduction in PM2.5 in recent years in Beijing. The convinience of transportation also played an important role in calculating economic development and living standard. The provision of public transportation reveals the adequate budget of Beijing's government which tightly linked with GDP and taxation.

Harbin has only 3 metro lines by the year of 2023 in Figure 5. Although Harbin's government had determined to develop the transport system, the resources available is not capable to support the metro development. Taking taxis or traveling by bus is still the most convenient way for Harbin citizen. This results in the increasing number of vehicles on the road and increases the tension on the sustainability on air quality. When convenience of traveling in a city is low, the living standard of citizens is also expected to be poor. Yet the problem of traffic jams is still unsolved in Harbin, people have to spend hours on their way to destination. In fact, the heavy traffic congestion is a sole reason for the low happiness index of Harbin.

The level of economic development determines the size of government budget, as for Beijing, government is capable of developing the transport infrastructure and increases the living standard of people living in Beijing. However, Harbin with lack of economic growth cannot support its government to construct more functioning metro lines and the cost of commute is high.

Life expectancy as one of the components of human development index can reflect the health care system and living standard of an area in a great scale. The higher the life expectancy, the longer its citizens are expected to live. To achieve high life expectancy, countries required to have positive

DOI: 10.54254/2754-1169/52/20230707

integrations in economic, social and political perspectives of government and societies [7]. Figure 6 illustrates the average life expectancy of Heilongjiang, the province where Harbin is located.

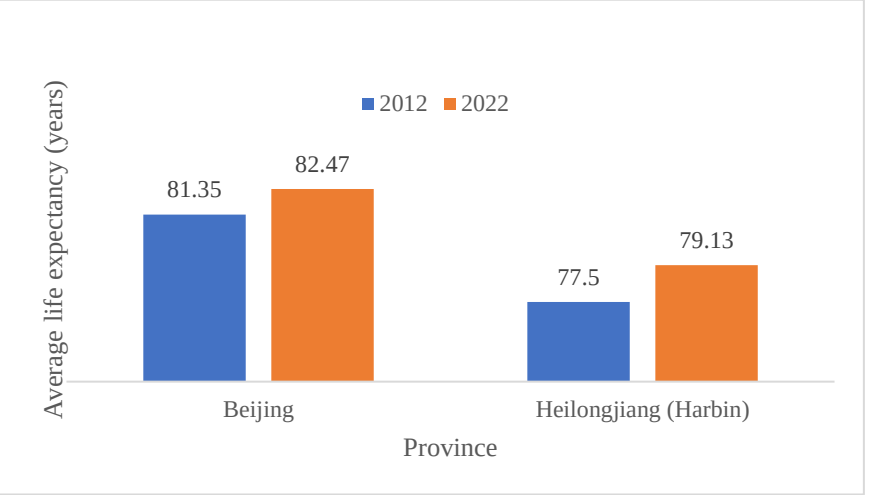


Figure 6: Average life expectancy in Beijing and Heilongjiang in 2012-2022 (Source: cfgw.net.cn).

Beijing has a higher initial life expectancy while Heilongjiang is below 80 years. After 10 years of rapid developments, Beijing had increased its life expectancy to 82.47. In addition to the improved health care that decreased the death rate, Beijing citizens had become more aware of the importance of being fit. The lifestyle of people had changed a lot which reduces the level of deficiency diseases, to achieve this, government had devoted many of their budget on advertising and social welfare. Moreover, the increased availability of education had raised the educational level of Beijing's citizen which reduces the crime rate and misdiagnose.

Heilongjiang had also increased its life expectancy by the end of 2022. Although 79.13 is still lower than the initial value of Beijing in 2012, Heilongjiang's jump in life expectancy is astonishing. The rate of increase had already exceeded the rate of Beijing. For Heilongjiang, the stagnation in economic growth did not affect the general health level in a large scale hence there is no direct relationship that can be concluded based on the data in figure 6. However, the average length of life is still less than other major provinces. This might be caused by various social and environment factors. Heilongjiang has the culture of high consumption of alcohol, majority of the adults in Heilongjiang are accustomed to drink alcohol in very meal which can easily bring illnesses. In addition, Heilongjiang's climate is not as suitable as Beijing for living. In winter, areas in Heilongjiang can reach the temperature of minus-40-degree-celsius. Elderly people especially suffer from this extreme low temperature and worsened sicknesses of them.

Considering the growth rate of economic and change in life expectancy in Beijing and Heilongjiang, Harbin, there is no strong relationship between these two components. Life expectancy can be affected by many other factors such as living habits and environmental conditions. However, people in Beijing tend to live longer than the people living in Heilongjiang, this might be able to reflect some other fundamental problems such as availability of health care. In a general view, Beijing's citizen is expected to have a better living standard than a Harbin's citizen. Combined with some other research examples, there is a short run linkage between economic growth and life expectancy, however, this relationship can be affected by the arising problem of aging population [8].

Urban green area is one of the most important factors when considering the environment of a city. Green space in cities especially is crucial to the quality of air [9]. Meanwhile it provides entertainment for citizens and reduces visual pollution. Due to an investigation with multiple samples, urban green space such as parks is strongly associated with citizen's mental health. People who live alone respond

DOI: 10.54254/2754-1169/52/20230707

more intense than the ones who lived with partners [10]. As the country gets developed, government's attention on citizen's mental health grows larger. Beijing's government had been investing heavily in green space construction and green industries in recent years to ensure the air quality and social wellbeing of its citizens.

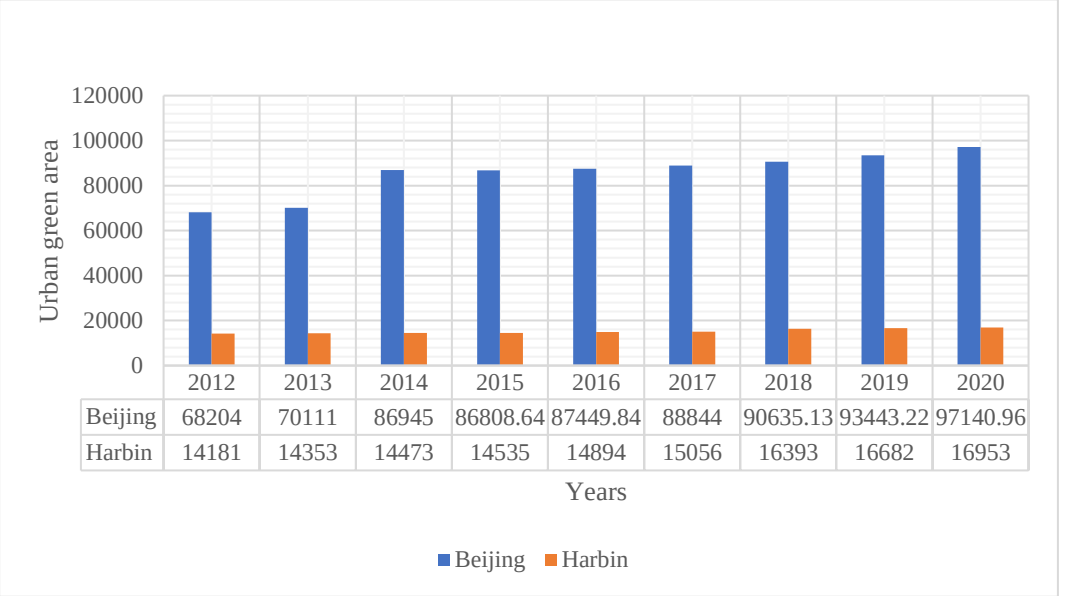


Figure 7: Urban green area of Beijing and Harbin in hectares from 2012-2020 (Source: State Statistics Bureau, Provincial statistical yearbook).

Figure 7 shows a comparison of urban green area of Beijing and Harbin in these years. After experiencing a series of events and developments, Beijing indeed achieved high level of afforestation. Since Beijing had gone through a period of rapid economic growth, the power devoted on urban landscaping is more consistent. By the end of 2020, Beijing achieved 97140.96 hectares of urban green area. For a city that has 1641000 hectares, this statistic is already commendable. Based on Beijing's sample, the increase in GDP brought a rise in the quality of environment.

On the other hand, Harbin has similar air quality with Beijing but its rate of increase in urban green area is way behind. From 2012 to 2020, while Harbin experienced economic stagnation, its government is all but wiped out in environment reinforcement. In 2012, the urban green area is 14181 hectares whereas in 2020 it increased to 16953 hectares. Although the environment indeed gets better, the rate is still very slow compared to Beijing. This can be associated with the economic state of the city. When government budget is available, reconstruction of parks and afforestation can be completed. However, during the period of Covid-19, Harbin's government experienced high pressure on healthcare system and society. Majority of the budget is used on sustaining citizen's normal life rather than infrastructure's development. Hence there were no spare money for afforestation.

Base on the statistics from Figure 7, both cities had improved their urban green areas, however Beijing's improvement is more outstanding. The relationship of environment preservation and economic growth is further explored when the statistics of urban green area are analyzed.

3. Conclusion

Base on the data collected and all the analysis made, Beijing, a city with rapid economic growth in the past 10 years had improved its environment and living standard of its citizens. The trend of its growth is extremely helpful for the entire city both environmentally and socially. On the other hand, had also achieved improvements on these two areas. However, due to the economic stagnation,

DOI: 10.54254/2754-1169/52/20230707

Harbin's rate of accomplishing these goals is way slower than Beijing. It's urban green area and GDP especially are very low compared to other cities in China. This cannot ensure the economic developments and society's living standard in the future. The comparison of data in multiple dimensions can demonstrate the difference of Beijing and Harbin.

This investigation arises the problem of regional growth and inequality. Although geographical factors are crucial in this case. Beijing has a mature transportation system with better climate whilst Harbin has extreme cold winter and locates further away from the center of China mainland. The huge differences between cities are still getting intense. Governments had applied policies in different scales to control the inequality and tried to redistribute the wealth. Taxation and restrictions on property purchases are examples of government regulation. However, government has tiny power in front of the macroeconomics. The foundation of Beijing and Harbin's economic state is very different thus the trend of their future developments is already addressed.

To reduce these issues and prevent further depressions, Harbin's government can start from building strong base for the city. Including reinforcement of education system that decreases the leakage of talents, reducing corruption to ensure the availability of government's budget for developments, and establishing policies for vehicles that emits greenhouse gases.

References

[1] *Mo, L., Chen, J., and Xie, Y. (2023). Wetlands conservation in Beijing of China: Present status and development strategies. Watershed Ecology and the Environment, 5, 73-79.*

[2] *Wang, X.Y., and Li, X.M., 2022. Sustainable research on environmental protection and economic and social development. Environment Engineering,40(7), 3.*

[3] *Liu, J., Zhai, X., Yan, W., Liu, Q., Liu, M., and Liang, W. (2023). Long-term impact of the COVID-19 pandemic on health services utilization in China: A nationwide longitudinal study. Global Transitions, 5, 21-28.*

[4] *Lei, J.N., 2021. 6 billion yuan behind the education of the people's livelihood - Jingdezhen City to accelerate the development of education to improve the people's happiness index. Jiangsu Education, 000(013), 46-49.*

[5] *Hamda, A., Sarea, A., Khamis, R., Anasweh, M., 2020. Hamdan, A., Sarea, A., Khamis, R., and Anasweh, M. (2020). A causality analysis of the link between higher education and economic development: empirical evidence. Heliyon, 6(6).*

[6] *Hensher, D. A., Ho, C., and Mulley, C. (2015). Identifying preferences for public transport investments under a constrained budget. Transportation Research Part A: Policy and Practice, 72, 27-46.*

[7] *Guzel, A. E., Arslan, U., and Acaravci, A. (2021). The impact of economic, social, and political globalization and democracy on life expectancy in low-income countries: are sustainable development goals contradictory?. Environment, Development and Sustainability, 1-18.*

[8] *He, L., and Li, N. (2020). The linkages between life expectancy and economic growth: some new evidence. Empirical Economics, 58, 2381-2402.*

[9] *Liu, H., Kong, F., Yin, H., Middel, A., Zheng, X., Huang, J., Xu, H., Wang, D. and Wen, Z. (2021). Impacts of green roofs on water, temperature, and air quality: A bibliometric review. Building and Environment, 196, 107794.*

[10] *Pasanen, T. P., White, M. P., Elliott, L. R., van den Bosch, M., Bratman, G. N., Ojala, A., Korpela, K. and Fleming, L. E. (2023). Urban green space and mental health among people living alone: The mediating roles of relational and collective restoration in an 18-country sample. Environmental Research, 116324.*