

## Assessing the Role of Population Size on GDP Growth Rate: A Concise Review with Lessons from China

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### **ABSTRACT**

*While population size can determine the size of human capital of a country which is essential for economic growth. It may not necessarily be a major factor to influence GDP growth rate. Malthusian theory of population postulates that increase in population size would create hunger, starvation and therefore stagnate economic prosperity. On the other hand, the Endogenous growth theory demonstrates the significance of population growth in facilitating economic growth via human capital development, entrepreneurial skills and innovation among others. China demonstrated during its rising economic prospects that the size of population significantly and directly influences economic growth. However, this review shows that over the past few years the dynamics has shifted with recent data indicating that China's growth is not dependent on its population size. Therefore, for population size to increase GDP growth rate, good policies that target human capital development must be put in place*

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### **INTRODUCTION**

The size of the population of a country can influence the rate of growth in that country. This view has been shared by many previous writers and empirical studies. However, the nexus between the size of population and the rate of GDP growth of an economy is controversial (Peterson, 2017; Yip and Zhang, 1996). According to (Linden, 2017; Pearce, 2011), large population size is a problem because it implies that more individuals compete for and utilise more of the limited available resources on the surface of the earth which is capable of slowing down growth potential in the long run. On the other hand, (Baker et al, 2005) argued that some high income countries (including the USA) may likely experience slow economic growth in the future due partly to the predicted considerable slowdown in population growth.

The rate of GDP growth which translates to economic growth tends to benefit from population expansion provided there are good policies including strong institutions. For instance, a rise in the population in China, the United States, or India is expected to improve the availability of and access to labour, which will boost productivity, and thereby raising the output of goods and services (Caballero and Fengler, 2023). The consequence will be a rise in the nation's output reflecting in higher GDP growth rate. However, this does not seem to be obvious Economic growth

will result from increased production and demand for products. According to (Caballero and Fengler, 2023), China and India have the largest population and therefore the largest consumer class. However, statistical evidence has shown that the GDP growth rate of China has been on the decline over past few years from about 10 percent between 2001 and 2010 to less than 6 percent in 2021 to 2022 (World Bank, 2023).

## **BACKGROUND OF CHINA**

Since 1978, when China started to open up and restructure its economy, the GDP has grown by an average of nearly 9% annually, and more than 800 million people have been pulled out of poverty (World Bank, 2023). Over the same time span, access to health, education, and other services has also significantly improved. China has witnessed considerable economic expansion during the last three decades (Fang and Leong, 2014). By virtue of its population size and good policies, the annual rate of GDP growth of China averaged 9.7 percent between the period of 1978 and 2007 as compared with just 3 percent, 2.5 percent, 2.2 and 6.5 percent for the United States of America, United Kingdom, Japan and India respectively (World Bank, 2023; Fang and Leong, 2014).

However, China's fast growth, which was built on exports, low-cost manufacturing due to enormous labour resulting from large population, and investment, has essentially hit its limits and produced unbalances in the economy, society, and the environment (World Bank, 2023). Changes in the economy's structure—from manufacturing to high-value services, from investment to consumption, and from high to low carbon intensity—are necessary to address these imbalances.

In recent years, growth has slowed due to fundamental limitations such as decreasing productivity growth, reducing labour force growth, and deteriorating investment returns. Future economic drivers must be found while also addressing the social and environmental consequences of China's historical development trajectory (World Bank, 2023).

## **POPULATION SIZE'S ROLE IN CHINA'S GDP GROWTH RATE**

Some scholars have argued that the population size has unquestionably played a significant role in the rate of GDP growth of China (Fadanelli, 2022). The arguments are based on the following factors:

**Population and work force:** China has a sizable population, which has resulted in a sizable labour force. China's economy has grown significantly as a result of the plentiful availability of inexpensive labour, which has allowed it to develop into a manufacturing giant (Fadanelli, 2022; World Bank, 2023). China has become a centre for global manufacturing because to its vast worker population, which enables it to create products and services on a gigantic scale.

**Consumption and home market:** It is undeniable that a nation's enormous population also helps to create a significant local market (Srinivasan, 1988). China has a sizable customer base with a population of over 1.4 billion, which has fuelled domestic consumption and aided in economic development (World Bank, 2023). Additionally, the growing middle class and higher earnings have enhanced and increased consumer spending, boosting economic activity and accelerating GDP growth (Caballero and Fengler, 2023). According to (Caballero and Fengler, 2023), the “world's consumers live in Asia, led by the Momentum in India and China.” The two nations constitute the third of the global population and the third of the world consumer class and roughly a quarter of world's consumer spending (Caballero and Fengler, 2023; World Bank, 2023).

**Urbanisation:** China's enormous population has accelerated urbanisation. Millions of people from rural areas have moved to urban areas throughout the years in quest of better work prospects and a higher quality of life and the country is now the largest urban nation in the World (Kamal-Chaoui et al 2009; Baum-Snow et al 2015). The creation of metropolitan regions, the development of infrastructure, and an increase in industries as a result of this urbanisation process have all contributed to the growth of the country's economy.

**Human capital:** China has a vast source of talent and human capital thanks to its enormous population (Peschel and Liu, 2022). Due to the country's large labour population, there is a surplus of both skilled and unskilled employees, which has facilitated economic growth and technical innovation (Peschel and Liu, 2022). This human capital has been crucial in a number of industries, including manufacturing, technology, finance, and services, which has further accelerated GDP development (World Bank, 2023; Peschel and Liu, 2022).

### **THEORETICAL FRAMEWORK: MALTHUSIAN THEORY OF POPULATION**

The English economist and demographer, Thomas Malthus, proposed the Theory of Population (also called Malthusian Theory) in his 1798 work, "An Essay on the Principle of Population." Where he contended that population growth ultimately overtakes the growth of food production, resulting in widespread poverty, starvation, as well as social turbulence (Malthus, 1993). His believe was that, population would follow an exponential growth pattern, whereas food production would only increase marginally. According to the Malthusian Theory, there is an inverse relationship population size and economic growth due to limited available land, resources as well as technological advancements (Srinivasan, 1988).

Within the framework of Malthusian theory, it is essential to emphasise that China's large population present certain difficulties that may be detrimental to economic growth. These difficulties include (Fang and Leong, 2014):

**Strain on Resources:** A big population puts a lot of pressure on resources including housing, food, energy, and water. It may be challenging to meet the requirements of such a large population and requires significant management and investment. China's population increase has accelerated industrialisation and urbanisation, which has resulted in resource depletion and environmental problems that must be resolved for sustainable development.

**Ageing Population:** China is currently struggling with the effects of an ageing population, which first spurred economic expansion due to the country's enormous workforce. The number of old people is rising due to the one-child policy and rising life expectancy, which is causing a drop in the working-age population. This demographic shift puts strain on the economy, especially the healthcare and pension systems, and may eventually affect GDP growth.

However, according to the Endogenous Growth Theory, the size of the population can have a big impact on the rate of GDP growth by influencing things like of accumulation of knowledge, innovation as well as technological advancement (Garza-Rodriguez et al 2016; Peterson, 2017). The Endogenous Growth Theory contends that an increase in population might result in higher economic growth via the following mechanisms:

**Knowledge spillovers and innovation:** A greater population always translates into a larger pool of human capital and prospective innovators. There is a greater chance of idea cross-pollination and knowledge spillovers since there are more people involved in research, development, and innovation (Petchko, 2018). This may hasten technical progress, resulting in higher output and faster economic expansion.

**Division of labour and specialisation:** A bigger population increases the potential for specialisation and division of labour. Specialisation enables people to concentrate on certain jobs or sectors, which boosts productivity and increases effectiveness (Doepke and Zilibotti, 2014). Due to the increased production of products and services, this may help the economy flourish.

**Market size and demand:** As population grows, so does the size of the market and the level of demand for products and services (Caballero and Fengler, 2023). Businesses may invest in boosting output in response to this rising demand, which might result in economies of scale and improved efficiency. Larger local market may also encourage local entrepreneurship and draw international investment, further boosting and accelerating the rate of GDP growth.

**The accumulation of human capital:** A growing population may result in a bigger labour force, which will raise spending on training and education (Pelinescu, 2015). A greater degree of human capital may advance technology, boost output, and promote economic expansion resulting in higher GDP growth.

**Social and cultural factors:** A bigger population may encourage social networks, cultural variety, and teamwork, all of which may be supportive to creative and entrepreneurial endeavours (Arestis et al 2021). These elements may support more economic development and dynamism resulting in higher rate of GDP growth.

It is important to emphasise that the Endogenous Growth Theory does not rely just on size of the population to fuel GDP growth rate. Instead, it focuses on how institutions, technology, human capital, and population interact. The idea emphasises how investment in institutions fosters innovation, research and development, and education may be essential to maximising the benefits of population expansion on economic growth.

However, figures coming out from the countries with large population size cannot explain the fact that the size of population significantly improve the rate of GDP growth in these countries.

## **EVIDENCE ON THE ROLE OF POPULATION SIZE ON GDP GROWTH RATE**

Several empirical studies have provided evidence in support of the role of population in the growth rate of GDP. In the case of China, (Fang and Leong, 2014) contend that, one of the main drivers of the China's GDP growth rate over the years is the size of its population. Some empirical findings pointing to the positive impact of population on economic growth were found in countries not necessarily having large population size. For example, Alemu (2014) investigated the nexus between population growth and GDP growth in Ethiopia and found evidence of a long run positive effect. This implies that in the long run, population growth increases the rate of GDP growth. In the case of Pakistan, Ali et al (2013) also found evidence in support of the claim that population increases the rate of GDP growth because their result showed that population growth has a positive impact on economic growth. Furthermore, a positive relationship was also found by Furuoka

(2010) in the case of Philippines. This corroborates the findings of Ozgur et al (2009) who provided evidence of a strong positive relationship between population growth and GDP growth in Turkey.

The figures in table 1 presents a summary of the trends in population and GDP growth rates of China over the last four decades indicating that as the size of the population of China increases over time, its GDP growth rate decreases.

**Table 1: Average Population Size and GDP Growth Rate in China (1961 – 2022)**

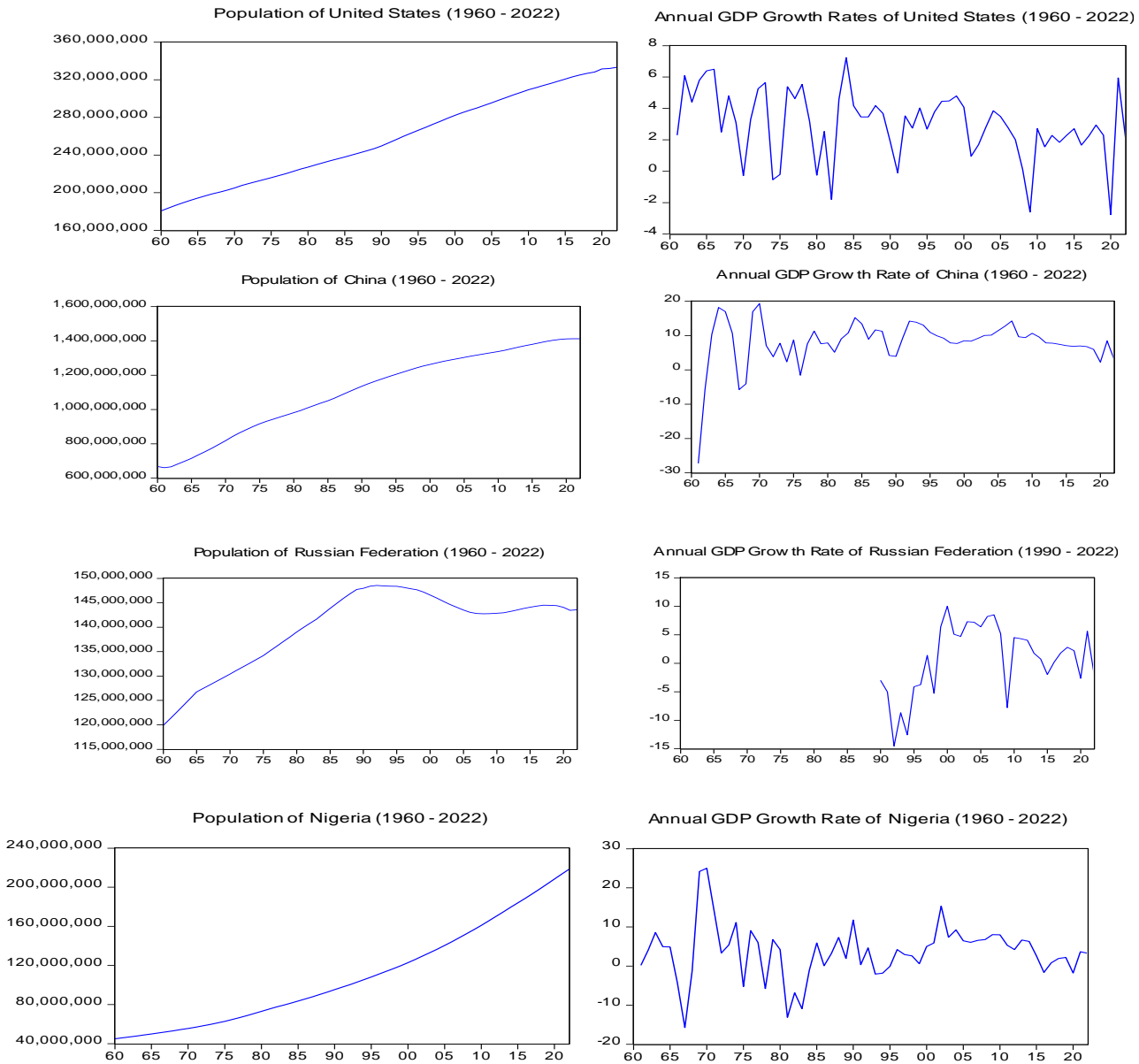
Year	Population Size	Population Growth	GDP Growth Rate
2021-2022	1,425,817,385	0.02%	5.719141446
2011-2020	1,395,469,064	0.56%	6.83826872
2001-2010	1,309,632,724	0.65%	10.56527002
1991-2000	1,220,819,491	0.92%	10.45188393
1981-1990	1,072,301,289	1.62%	9.347886532
1971-1980	918,003,784	1.79%	6.241144768
1961-1970	734,051,089	2.32%	4.96

Source: Extract from the World Bank Database (2023).

Based on the ten year averages of population size and GDP growth rate of China from 1961 to 2022, the pattern of the increase in the population appears to correspond to the pattern of the increase in GDP growth especially from 1961 to 2010. The data show that China experienced a rapid GDP growth from the average of 4.96 percent between 1961 and 1970 to about 9.348 percent between 1981 and 1990 which appears to be consistent with the increase in population from 734million people to about 1.1billion period during the same periods. The upward trend in both the population size and the GDP growth continued throughout 1991 to 2010 when the size of the China’s population increased to 1.31billion and the GDP grew to 10.56 percent during the two decades’ period. While the size of the population has been increasing, such appeared to be at a diminishing rate as the growth rate of population continued to decline from 2.32 percent in 1961-1970 to just 0.02 percent in 2021-2022 period. In line with this decrease in the rate of population growth, the GDP growth rate of China witnessed a decline to 6.838 percent in 2011 -2020 down to 5.719 percent in 2021 – 2022. Hence, the size of China’s population does not seem to play a significant role in the GDP growth of the country over past few years (Fang and Leong, 2014).

Figure 1 below provided the graphical analysis of the relationship between population size and GDP growth rates for four largest countries taken from four regions. These are the United States from America, China from Asia, Russian Federation from Europe and Nigeria from Africa. The graphs show that while the countries’ size has been growing over time (from 1960 to 2022), the GDP growth rates did not follow the pattern of the increasing population. In fact, in the case of the United States, as population increases from about 197million in 1966 to over 330million in 2022, GDP growth rate decreases from 6.5% to 2.1%, with series of fluctuations between these periods where the country recorded negative GDP growth of -2.6% and -2.8% in 2009 and 2020 respectively. Although these periods correspond to the global financial crisis of 2009 and the Covid-19 pandemic in 2020, it is clear that the size of the population does not seem to play a significant role in facilitating GDP growth.

Figure 1: Trends of Population Size and GDP Growth Rates of Four Largest Countries



Source: Plotted using Data from the World Bank (2023).

Similarly, the relationship between the population size of China and GDP growth rate does not appear to be in the same direction. Although the population size of China has provided huge domestic market for the country, it does not seem to explain much about the GDP growth rate over the years especially as indicated by the graphs. The trend shows that as population increases from about 698million in 1964 to 1.4billion in 2022, the annual GDP growth rate declines from 18% to just 3%. In fact, it can be observed that as population increases, GDP growth rate decreases.

In the case of Europe, Russian Federation appears to have the largest population size of about 144million (World Bank, 2023) but this population size is not commensurate with the annual GDP growth rate in the country. Although the country's GDP growth increased from negative -14.5%

in 1992 to 10% in 2000, it cannot be necessary linked to the virtually constant population during the period.

Also, the size of population does not seem to show any significant role in the GDP growth rate of Nigeria over the years. As the population increases from 55.6million in 1970 to 218.5million in 2022, the GDP growth rate decreases from 25% in 1970 to 3% in 2022. Hence, it can be argued that population size does not really play a significant role in the GDP growth rate of Nigeria.

## CONCLUSION

This essay provides a theoretical framework in support of the view that population size does not play a much significant role in the GDP growth rate of a country using China as a case study. While the endogenous growth theory was used as the basis for the argument that the size of population has been essential in the growth of China over the years. The role of population size in a GDP growth rate of a country has been acknowledged among scholars, although with varying viewpoints. Thomas Malthus was one of the earlier scholars who believed that population growth can be detrimental to the growth of an economy because of the limited available resources and slower food production as compared to rapid increase in population. However, proponents of endogenous growth theory contended that economic growth is endogenously or internally determined and population size which is an essential component of human capital, constitutes the internal factors of growth. Within the framework of endogenous growth theory, population size plays a significant role in the GDP growth of a country such as China through various channels which include knowledge spillovers and innovation, accumulation of human capital, market size and demand, division of labour and specialisation as well as social and cultural factors (Ozgun et al 2009; Caballero and Fengler, 2023). These factors had obviously played significant role in the GDP growth of China over the past few decades (Caballero and Fengler, 2023).

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