

## Avoiding Middle-Income Trap: Case of China

Mário Zeman<sup>1</sup>

<sup>1</sup> University of Economics in Bratislava, Faculty of National Economy/ Department of Banking and International Finance, Dolnozemska cesta 1 Bratislava 852 31 Slovak republic

mario.zeman@euba.sk

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**Abstract.** The middle-income trap is a relatively new concept that became very popular after the financial crisis in 2008. It describes countries that have managed to develop economically from low-income countries to middle-income countries. However, the initial determinants of economic growth have exhausted their potential, and therefore these countries have stagnated economically. China is also currently one of the middle-income countries that a middle-income trap could potentially threaten. We used various absolute and relative methods to determine whether China is in the middle-income trap. However, we did not reach unambiguous conclusions, as the individual methods generated mixed results. The development of other factors such as composition of exports, the enrolment of universities, and the number of patents received over time suggest that China will transform into a modern economy based on services and innovation. However, further reforms are likely to be necessary. Middle-income trap stays as a potential threat for Chinese economy.

**Keywords:** China, middle-income trap, economic growth,

**JEL classification:** I 25, O10, O 40

### 1 Introduction

The World Bank introduced the concept of the middle-income trap in 2006. When researching middle-income countries, World Bank analysts realized that there was no comprehensive theory of economic growth that the World Bank could recommend to middle-income countries whose growth is slowing. The Solow growth model stands on the efficient use of physical and human capital. The World Bank usually recommended the Solow growth model to low-income countries (especially ASEAN countries), focusing on exporting products using cheap labour-power. However, this policy only worked for ASEAN countries until to end of millennium, when Chinese exports began to gain ground, built on even cheaper labour. ASEAN countries, which have since been among the middle-income countries, could not compete with China, and so their

economic growth began to stagnate. Thus, a policy based on cheap labour, especially in the textile industry, was no longer possible.

In the 1990s, alternative endogenous growth theories were developed, which derive economic growth from technological maturity and innovations. As a result, ASEAN countries have started to consider the possibility of changing their public policies in order to promote so-called knowledge economy. However, the World Bank was sceptical. According to them, the then economic development of ASEAN countries was insufficient and therefore did not recommend applying the conclusions of the theories of endogenous growth, which are primarily intended for high-income countries. ASEAN countries have thus fallen into the middle-income trap. Twenty years later, China faces a similar problem as the ASEAN countries. Economic growth based on cheap labour is beginning to reach its limits, which is reflected in a slowdown in economic growth. China will therefore have to prepare a plan to avoid the middle-income trap.

## 2 Theoretical Background

The concept of a middle-income trap became very popular during the 2008 financial crisis, what we can confirm through Google Trends. Moreover, we can see a similar increase in popularity after the outbreak of the Covid-19 pandemic. [9]

The middle-income trap expresses that past economic success is no guarantee for future economic growth. In essence, the middle-income trap should alert policymakers that constant reforms are needed to sustain economic growth. However, empirical observations show that changing the country's economy based on cheap labour towards a service-based economy and high value-added industries is particularly challenging.

The World Bank defines middle-income countries as those with a gross national income (GNI) per capita at a level ranging from \$ 1,036 to \$ 12,535. Thus, middle-income countries divide into lower-middle-income countries (GNI between \$ 1,036 and \$ 4,046) and upper-middle-income countries (GNI between \$ 4,047 and \$ 12,535). More than 75% of the world's population and 62% of the people we consider poor currently live in middle-income countries. Moreover, middle-income countries produce a third of the world GDP. Their economic and social development will thus be critically important. [13]

The definition of a middle-income trap is not exact. Empirical definitions of the middle-income trap can be divided into absolute and relative. However, the researcher's subjective assessment is also essential. In essence, we can look at the middle-income trap as a trap in which the country falls when public policies have failed to fulfil its potential for economic growth. Therefore, the middle-income trap is primarily the failure of a government that has been unable to prepare the country for transposition into high-income countries.

Felipe [4] brought one of the absolute approaches to the definition of middle-income countries, when researched the shift of middle-income countries to high-income countries. Felipe first divided the countries into four income categories based on GDP per capita (these categories were low income, lower-middle-income, upper-middle-

income, and high-income). Then, based on an empirical analysis of 124 countries, Felipe concluded that a country is in a middle-income trap if it cannot move from lower-middle-income to upper-middle-income in 28 years. The second case of the middle-income trap occurs when an upper-middle-income country cannot advance into the high-income category in 14 years. For a country to become one of the upper-middle-income countries in 28 years, its average economic growth must be at the level of 4.7% per year. The upper-middle-income country needs annual economic growth of 3.5% per year to become a high-income country in 14 years.

Eichengreen [3] looks at how the slowing of economic growth occurs in middle-income countries. Based on empirical observations, Eichengreen states that the slowdown in economic growth usually comes in several waves. Built on the given assumptions, he also sets three rules that must be fulfilled by country to be in a middle-income trap:

- a) The average gross domestic product per capita growth must be at least 3.5% per year over the last ten years.
- (b) The difference between the average growth of GDP per capita over the last ten years and the value of GDP in researched year must be at least two percentage points.
- c) GDP per capita must be higher than \$10,000 in the examined year.

However, Eichengreen also notes factors that can help avoid middle-income traps, such as expanded tertiary education, higher exports of technologically demanding products or quality human capital. Technology and innovation are essential in the process of migrating from middle to high-income countries.

The relative approach to the middle-income trap is based on the developed country (most often the USA), which is set as a benchmark for the examined middle-income countries. In particular, the catching-up process is monitored. A country is in a middle-income trap if it fails to maintain gradual convergence to a benchmark country. [6]

Woo et al. [12] constructed the CUI (Catch-Up Index), which monitors the relative convergence of middle-income countries to the United States, which acts as a benchmark. CUI expresses a ratio between GNI of middle-income countries and the USA. According to Woo, middle-income countries account for 20% to 55% of US GNI. That said, the country is in the middle-income trap if it is within the stated range for more than 50 years after country gained middle-income status.

A very similar approach was chosen by Agénor et al., [1] who took the value of income per capita in the USA as a benchmark. They set the range for middle-income countries between 5% and 45%. Countries are in the middle-income trap if they cannot move from this range for 50 years (1960 - 2010). As we can see, Agénor has chosen fixed date range.

Bulman et al., [2] to some extent, disagree with the concept of a middle-income trap. Instead, they distinguish between the so-called escapees and non-escapees. Escapees are countries that have economically grown since they were among the low-income countries. On the other hand, non-escapees have a problem with economic growth, regardless of whether they belong to low- or middle-income countries. Thus, according to Bulman, if a country failed to exceed the benchmark (stated as 50% of US GDP per capita between 1960 to 2010), we can say that this country is in the middle-income trap.

### 3 Literature review

China's potential possibility to be in the middle-income trap has been studied quite extensively, especially after 2008. Glawe et al. [6] focus on a more noticeable economic decline in China's GDP growth after 2011. However, the examined indicators show good economic and social development in the country. Nevertheless, political and economic reforms are crucial to make China one of the high-income countries. Glawe and Wagner [7] examined whether the middle-income trap could be avoided based on empirical observations. According to their calculations, China will not fall into the middle-income trap if it can maintain economic growth at 3-4% per year. The transformation of Chinese industry will be needed. Cheap labour will no longer be enough, so the emphasis must be on developing human capital.

Liu et al. [10] stress that technology, innovation and education are drivers for future Chinese economic growth. In the past, Chinese innovations have been implemented in a top-down manner. The Chinese central government controlled the whole process. This approach has enabled China to move from a low-income country to a middle-income country. Nevertheless, this type of policy may not be sufficient in the context of China's move between high-income countries. Greater institutional decentralization with an emphasis on the private sector will be needed. To some extent, this process has already begun.

Zhou [14] examined the problem with a historical approach. The author traces how other countries have economically developed in the past and have moved from low-income countries to middle-income or even high-income countries. South Korea is an example of a country that has avoided the middle-income trap due to its emphasis on innovative industries. On the other hand, Zhou presents Argentina as a country that has specialized in exporting agricultural products and has also fallen into the middle-income trap. In addition, the author deals with different approaches in middle-income countries such as Mexico, Thailand or the Philippines. Finally, Suehiro [11] summarizes the research carried out so far on the middle-income trap issue in Asia's countries. It emphasizes innovation and the school system, which can ensure an easier transition between high-income countries.

### 4 Methodology

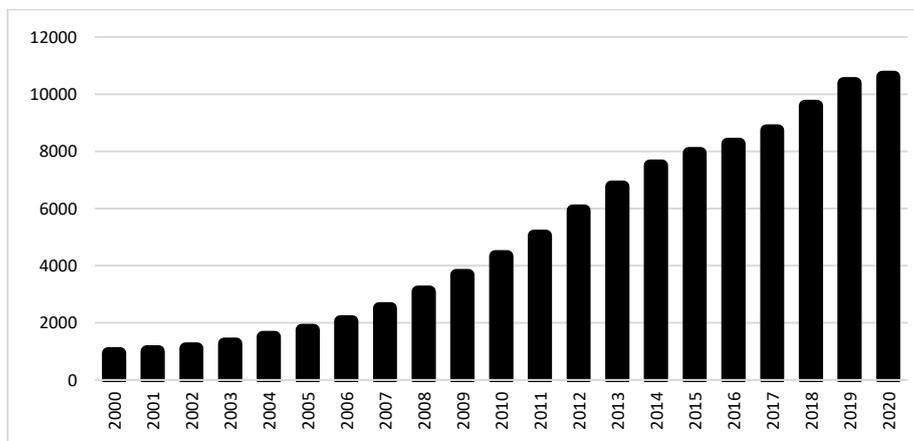
We will empirically test whether China is currently trapped in a middle-income trap based on absolute and relative methods. First, we try the absolute methods from Felipe and Eichengreen. Subsequently, we will focus on the relative methods provided by Woo, Agénor and Bulman. Later, we analyse selected indicators, the development of which will help us predict the economic future of China. We will focus on tertiary education, the quality of education, the composition of exports and the pace of innovation. Eichengreen has defined these indicators as key to avoiding the middle-income trap. Finally, based on the results, we will evaluate whether China is currently in a middle-income trap.

In our research, we will primarily use freely accessible World Bank databases. We will use other internet resources to a lesser extent. We will follow the period from 2000 to the present. This period indicates the time when China moved from low-income countries to middle-income countries. At the same time, it is a period in which China has significantly opened to the world financially and economically.

In the research, we will use standard empirical and explanatory research methods. However, we are aware that some of the opinions presented in this paper may be based on the subjective assumptions of the author. The reason is that the very definition of a middle-income trap is not exact. Therefore, part of the work is relatively polemical.

## 5 Empirical analysis of China

Based on the World Bank's definition, we can consider China as a middle-income country. According to the Atlas method, Chinese GNI per capita in 2020 is \$ 10,610 (Fig. 1). Thus, we currently place China among the upper-middle-income countries. However, if China maintains its current economic growth rate, it may become a high-income country in the next 3 to 5 years. Thus, China will likely move from a low-income country to a high-income country in about 20 years. From this point of view, we cannot speak of a middle-income trap, as the growth rate of GNI is high throughout the whole reviewed period.



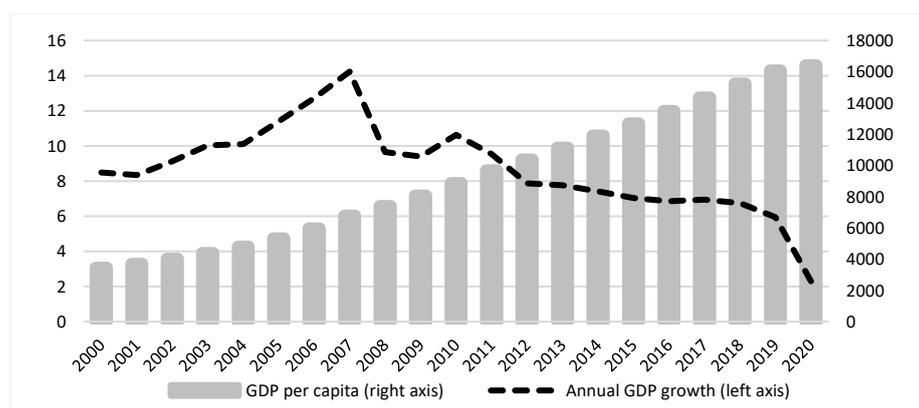
**Fig. 22.** Gross National Income per capita, Atlas Method (current US\$). Data (World Bank Database, 2021)

GDP growth in China peaked in 2007. Even after the outbreak of the financial crisis, China was able to maintain GDP growth above 6%. However, the growth rate of GDP per capita gradually decreases over time (Fig. 2). Due to the Covid-19 pandemic, we can see a significant decline in economic growth in 2020. According to the Felipe methodology (2012), China is among the high-income countries since 2015. Thus,

China successfully avoided the middle-income trap in which it would have fallen if it had not become a high-income country for 14 years.

Eichengreen set three conditions that define a country in a middle-income trap. Its first condition was met, as China never had economic growth lower than 3.5%. The exception is the year 2020, which was significantly affected by the Covid-19 pandemic. From the overall point of view, we cannot, therefore, consider this year to be relevant. Consequently, we will assess the issue of the middle-income trap from the perspective of the year 2019. Second, China's average growth between 2008 and 2018 was 8.17%. In 2019, China's economic growth was 5.95%. The decline in economic growth in the year under review is thus higher than two percentage points from the 10-year GDP growth average. The third condition (GDP per capita is higher than \$ 10,000 in the observed year) has been fulfilled. Based on this approach, we could therefore assume that China is in the middle-income trap. However, Eichengreen also notes other factors that may affect the economic growth of the countries, which we will discuss in the next section.

Based on two absolute methods (Felipe and Eichengreen), we can conclude that Felipe's approach confirms that China has avoided the middle-income trap. On the other hand, Eichengreen method suggests that China was in a middle-income trap since 2019.



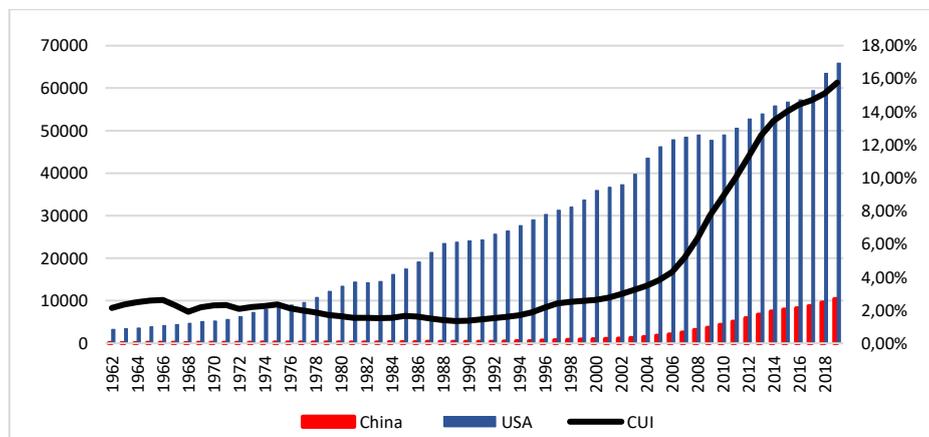
**Fig. 2.** Annual GDP growth in % and GDP per capita in constant 2010 US\$. Data (World Bank Database, 2021)

In the following section, we analyse the relative approach to the middle-income trap. Based on the Woo approach, we can say that China has not yet become a middle-income country. The limit for low-income countries was set by the author probably too high - up to 20%. Despite dynamic growth in the last decade, according to this method, China has not yet become a middle-income country.

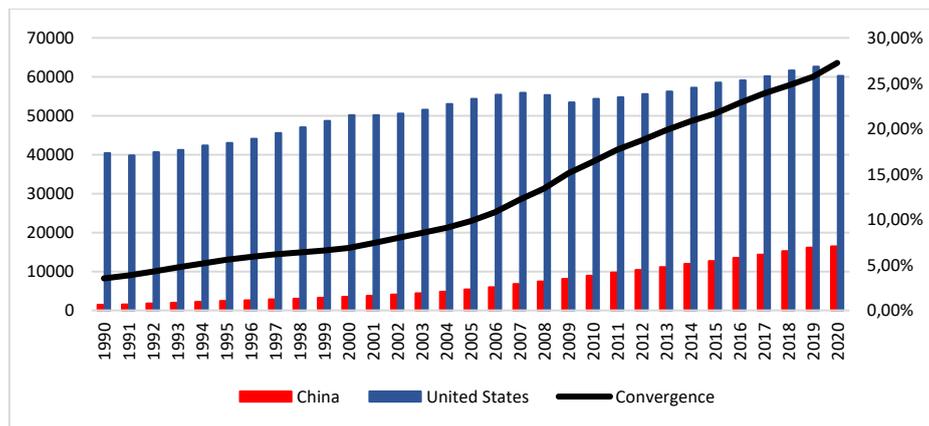
According to the Agénor approach, China became a middle-income country in 2007. However, so far, it has not reached the level of 45%, which the author considers to be the threshold for exiting the middle-income trap. The dynamics of China's convergence with the United States is relatively good. However, the pace of convergence has slowed in recent years. China is approaching the US at a rate of half a percentage point per

year. It would mean that China needs about 60 years to reach the 45% benchmark of the US gross national income.

Bulman came up with a relatively simple condition. The country would be escapee if it reached 50% of GDP per capita in the US by 2010. From this point of view, we can move the benchmark to 2020. We see that China is relatively dynamically approaching the US (Fig. 4), especially after the outbreak of the financial crisis in 2008. In 2020, China's GDP per capita was at 27.24% of the US GDP per capita. The 50% benchmark has not yet been surpassed. China is approaching the USA at a rate of 1-1.5 percentage points per year. By this speed, China would reach 50% of GDP per capita of the US around 2030.



**Fig. 3.** Gross National Income per capita of China and USA, Atlas Method (current US\$). Data (World Bank Database, 2021). Catch-Up Index (Own processing).

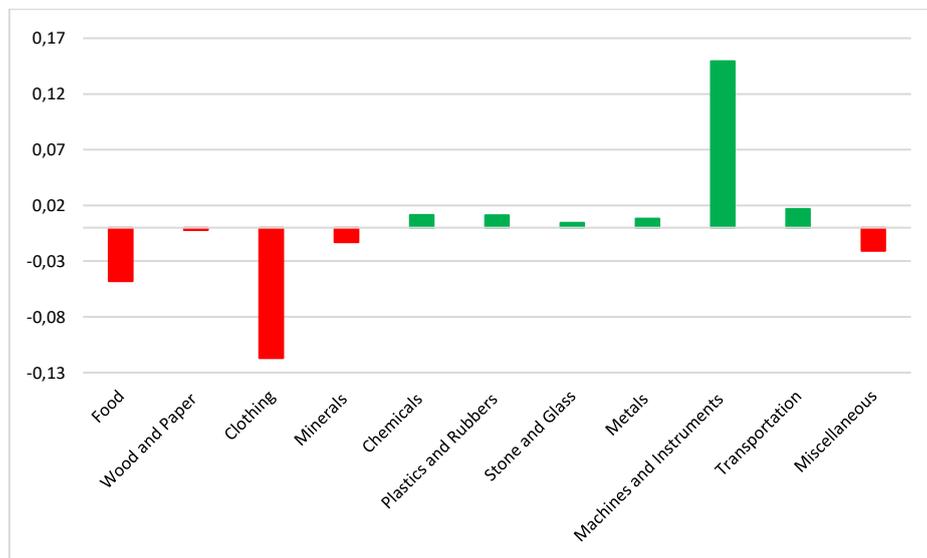


**Fig. 4.** GDP per capita in constant US\$ for USA and China (left axis) and Convergence of chinese GDP per capita to the GDP per capita of the USA (in %). Data (World Bank Database and own processing, 2021).

The relative approach to the middle-income trap shows that China has not averted the possibility of falling into the trap. Based on the Woo and Agénor methodologies, China has only recently become a middle-income country. On the other hand, the Bulman method predicts that China could avoid a middle-income trap during 2030.

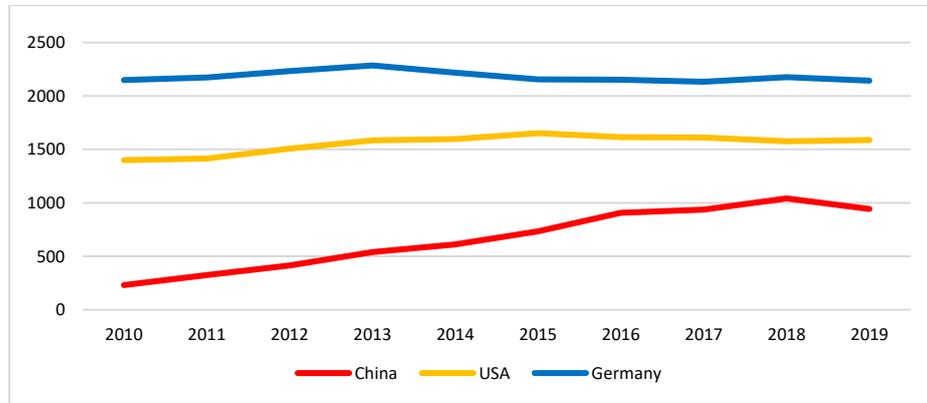
The following section will focus on other indicators that can predict whether China will avoid the middle-income trap. In his work, Eichengreen defines factors such as education, innovation, or the quality of the export mix, which can be very important in overcoming the middle-income trap.

China's export mix remained significantly unchanged for most product groups. However, the categories of clothing, food, and machinery (primarily electronics) are an exception. Therefore, we can see a particular shift to a higher value-added industry in the case of a significant decline in exports of clothing and food. On the other hand, the volume of exports of electronics and tools increased significantly. Thus, with gradual economic growth, we can see the transition to more sophisticated production.



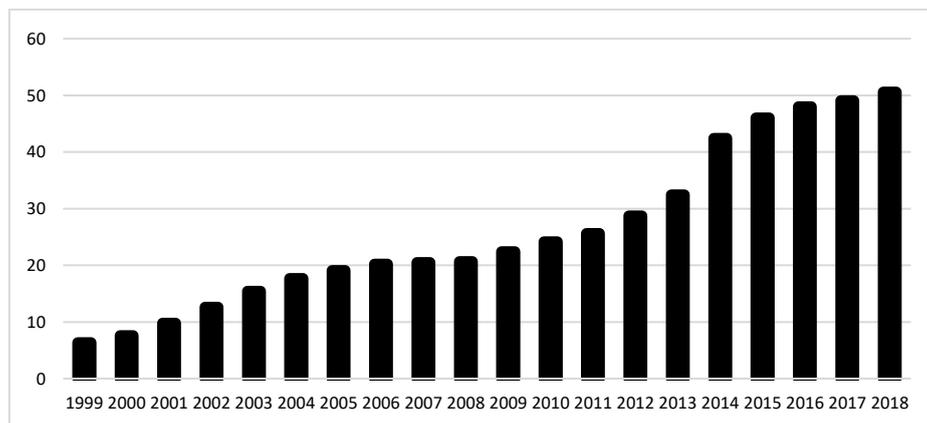
**Fig. 5.** Change in the composition of Chinese exports between 2000 and 2020 (in percentage points). Data (OEC.WORLD and own processing, 2021).

The country's innovation potential is relatively difficult to measure. Technological sophistication following the level of research can be monitored by the volume of patents accepted. We decided to compare the number of patents accepted per 1 million inhabitants in the two developed countries (USA and Germany) and China. We see that the volume of patents accepted is growing significantly in China. In this context, China is catching up with developed countries, which have been stagnant for a long time. Therefore, we can assume that the Chinese economy will become more and more based on technology and innovation.



**Fig. 6.** Number of accepted patents (per 1 million inhabitants) Data (Wipo.int and own processing, 2021)

The basic premise of the knowledge economy is quality education. In the case of China, we can see a fundamental shift in the number of enrolled students in tertiary education. Currently, more than half of all graduates opt for tertiary education. Over the last 20 years, the proportion of students continuing their tertiary degree has increased fivefold. The quality of Chinese universities is also significantly increasing. There are currently 4 Chinese universities in the Top 50 universities in the world. If we add the universities of Hong Kong to the given number, we are talking about a total of 7 universities in the Top 50. At the same time, indeed, Chinese universities are generally moving upwards within the given ranking.



**Fig. 6.** School enrolment, tertiary (in %), Data (World Bank Database, 2021)

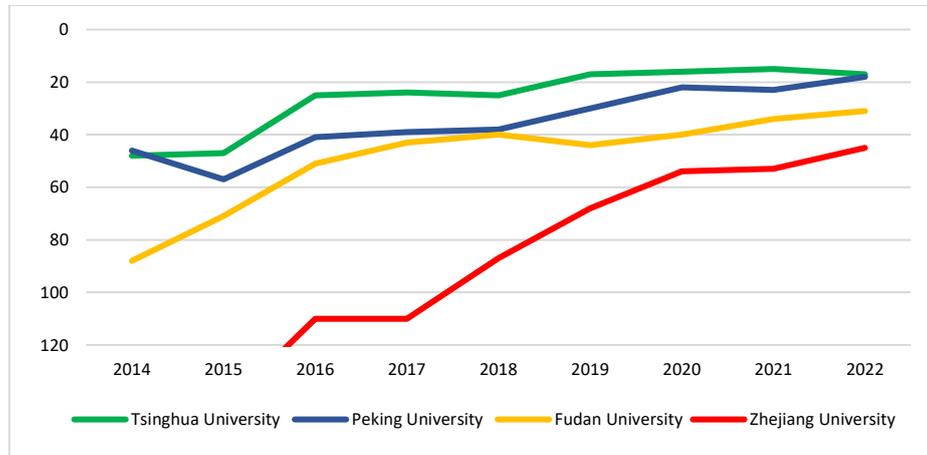


Fig. 7. Top universities in the world. Data (QS World University Ranking, 2021).

## 6 Conclusions

There is no clear answer as to whether China is currently in a middle-income trap. Absolute and relative methods bring mixed results. However, the current slowdown of Chinese economic growth may indicate that the Chinese economy built on cheap labour has exhausted its potential.

The Eichengreen method has placed China among the countries that are in the middle-income trap. On the other hand, according to Felipe's approach, China is not in a middle-income trap. Relative methods suggest that China has only recently become a middle-income country, and therefore we cannot determine whether it is already in a middle-income trap. Economic and social development in the next 20 years will be crucial.

Indicators regarding education, the composition of exports, and the number of patents accepted suggest that China can gradually transform into an economy based on an educated workforce and innovation. If the trend is confirmed in the incoming years, China will likely avoid the middle-income trap.

China has adopted reforms over the last two decades that have transformed and modernised the country. For example, the Made in China 2025 project concerns modernising China's industry, emphasising technology and innovation-intensive sectors. A similarly ambitious project is the Belt and Road Initiative, which aims to create new maritime and land trade routes between countries in Asia, Africa, and Europe. In this way, China wants to deepen trade between countries and thus ensure that current economic growth is maintained. Based on the monitored indicators, we can say that the Chinese economy is gradually modernising, so China will likely avoid the middle-income trap.

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