China's Impact on Sustainable Economic Growth in Central Asian Countries in the Context of the Silk Road Economic Belt

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Abstract. This paper examines how the economic relations between China and the Central Asian countries affect the economic development of the Central Asian countries in the context of the Belt and Road economy. China has come up with the global economic strategy initiative known as "One Belt, One Road" as a way of incorporating and expanding its economic activities around the world into this initiative. The article argues that China's economic activities in Central Asia are part of its global economic strategy. China's global "Belt and Road Initiative" is aimed at realizing its political aspirations through economic dominance, which then leads to a virtuous cycle. Of course, we all know that every country in the world needs to develop its economy, and Central Asian countries are no exception. Central Asian countries have the need and desire to cooperate with China to develop their own economies, which is the basis of this article. The method of argumentation in the article is to analyze the development needs and relations of cooperation between the two sides in terms of economic indicators, trade cooperation, economic dependence, infrastructure investment, geopolitical pattern of energy, and transportation of goods of Central Asian countries, respectively, and at the same time, data from World Energy Statistics Yearbook, World Bank, China Statistical Yearbook, and China's Outward Foreign Direct Investment Statistical Bulletin are used as the basis. This provides a clear understanding of the patterns of economic cooperation between China and Central Asian countries, and how they interact with each other. Despite the end of the Cold War and the collapse of the Soviet Union, Central Asia remains a central element of the People's Republic of China's (PRC) security strategy, a strategic location that creates a continuum between China's internal and external security. The guiding principle of China's policy towards Central Asia is primarily stability, which is the main theme of current Chinese politics, with the goal of ensuring continuity from domestic stability to the stabilization of border regions and surrounding areas. Throughout their independent existence, the Central Asian states have had different perceptions of Russia, the United States, China, and European countries, which is one of the prerequisites for the formation of multidirectional foreign policies in Central Asian countries. The balance of interests among Russia, the United States, China, and European countries in the region is of vital importance for Central Asian countries, which ensures the independent foreign policy and development paths of Kazakhstan, Uzbekistan, Kyrgyzstan, Turkmenistan, and Tajikistan, as well as contributes to the stability of the region.

Key words: Central Asia; China; GDP growth; economic dependence; trade; oil; gas

1   Introduction

After the collapse of the Soviet Union, five former Soviet republics in Central Asia declared their independence, namely Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, with a total current population of over 74.2 million. Although the definition of Central Asia is not universally recognized, the region has some distinctive features and geographically refers to a vast area stretching from the Caspian Sea in the west to Xinjiang in China in the east, to Afghanistan in the south, and to Russia in the north (Figure 1). Since the collapse of the Soviet Union in 1991, the political systems of the five Central Asian countries have not undergone a good democratic transition, and Turkmenistan, in particular, has been called the North Korea of Central Asia. According to the Economist Intelligence Unit's Democracy Index for the past 10 years, only Kyrgyzstan has a mixed regime, while the rest have authoritarian regimes. Similarly, according to the Freedom House Freedom Level of Freedom data for the last 10 years, only Kyrgyzstan among the five Central Asian countries is more than partially free. Naturally, the reform of the political system does have a great impact on the degree of openness and long-term development of the economy.

This paper focuses on the five countries mentioned above. The region occupies an important place in global geostrategy because of its abundant energy reserves. BP's Statistical Yearbook of World Energy 2022 states that Central Asia has approximately 4.1 billion tons of proven oil reserves, accounting for about 1.8% of the world's total proven oil reserves, and 22 trillion cubic meters of proven natural gas reserves, accounting for about 9% of the world's total proven natural gas reserves. These hydrocarbon reserves are primarily located in three countries: Kazakhstan, Turkmenistan, and Uzbekistan. Kazakhstan possesses the largest oil storage and development capacity in Central Asia, with proven oil reserves of about 4 billion tons in 2020, ranking 12th in the world (Chakeeva et al. 2023). Turkmenistan possesses the largest natural gas storage and development capacity in Central Asia, with 19.5 trillion cubic meters of natural gas reserves, the fourth largest in the world, and a reserve-to-production ratio of more than 300 years (Chungang 2022). Although Uzbekistan's oil and gas reserves are slightly lower than those of Kazakhstan, its gas production is second only to that of Turkmenistan, and the country has a relatively complete pipeline network. In addition to oil and gas, Central Asia is also rich in non-ferrous mineral resources and occupies an important position in the world market, which is mainly located in Kazakhstan and Uzbekistan.

Owing to its unique geographical location and abundant energy reserves, Central Asia has become increasingly important in recent years in the global supply and demand of hydrocarbon resources and in the geopolitics of energy. Nevertheless, there is still a generally low level of oil and gas refining capacity in Central Asian countries, and consumption in these countries remains relatively low compared to the abundant reserves and steadily growing production capacity, with most of the product being exported. Prior to the collapse of the Soviet Union in 1991, Central Asia's oil supply capacity stabilized at around 50 to 60 million tons; since 2000, however, production of oil and gas has continued to rise with the assistance of multinational companies. While Central Asian countries possess oil and gas reserves, they lack the capital and technology required to put them into production alone, which is a fact that gives Central Asian countries and foreign companies a share in the production and revenues. Thus, an important geopolitical consequence of the collapse of the Soviet Union was the intense political and commercial competition among the newly independent states of Central Asia for control of vast energy resources (Arvanitopoulos 1998, Zhou et al. 2020). With regard to economic cooperation between China and Central Asian countries, it is necessary to explain China's "One Belt, One Road" initiative. "One Belt" is the abbreviation for the "Silk Road Economic Belt," which refers to the land route of road and rail transportation through the interior of Central Asia along the historically famous East-West trade routes, and "One Road" is the abbreviation for the "Maritime Silk Road of the 21st Century," which refers to the Indo-Pacific maritime route through Southeast Asia to South Asia, the Middle East, and Africa. The Initiative has worked with more than 150 countries and international organizations (Gao 2020). China has also established

Notes: Figure drawn by the author

Figure 1: Schematic representation of countries in the traditional Central Asian region

the Asian Investment Bank and the Silk Road Fund to provide financial support for the Belt and Road Initiative. Infrastructure investments under the Belt and Road Initiative include ports, skyscrapers, railroads, highways, bridges, airports, dams, coal-fired power stations, and railway tunnels. Central Asia, where the Belt and Road Initiative was first proposed, is the core region, home to the world's largest landlocked and doubly landlocked countries, the first stop on China's westward journey, and one of the key targets for China's economic cooperation on the Silk Road Economic Belt, which connects Asia and Europe.

As a neighboring country to Central Asian countries and one of the first countries to establish diplomatic relations with them, China is also an important channel for Central Asian countries to access the sea, Southeast Asia, and Northeast Asia. The 30 years since the establishment of diplomatic relations between China and Central Asian countries have been a period of fluctuations in the world economy, during which Central Asian countries have become more and more deeply integrated into the world economic system, gradually synchronized with the development of the world economy, and have shown an upward momentum of development with ups and downs (Cieślik, Gurshev 2023).

2 Methodology and Data

In studying Chinese factors influencing the economic growth of Central Asian countries, the methodology used in the article is to measure the degree of economic dependence by utilizing the value of economic transactions between the two parties (foreign trade dependence = total foreign trade/GDP) and the value of investment (foreign investment dependence = investment flows/GDP). A greater economic dependence or a higher weight indicates a higher degree of dependence. In order to make the article more convincing, we supplement this method by separately analyzing the demand and dependence of both sides on some special resources and commodities, because the irreplaceability of these special resources and commodities can also affect the degree of economic dependence between the two sides. For example, a particular commodity imported from another country is a key input in the production process, and the lack of similar substitutes makes this part of the country's production highly dependent on imports of this particular commodity. The metrics are multifaceted since this measurement relates to specific transactional behaviors (Wang 2018).

According to the needs of the article, we performed several grouping and aggregation operations on the base data, which allowed us to specify the most relevant trends in the dynamics of economic growth indicators of Central Asian countries for the period from 2013 to 2022. We chose the indicators that characterize the economy's sustainable development as a basic parameter for comparative analysis, namely:

- Gross domestic product (GDP)

- GDP per capita and national income (GNI) per capita measures

- GDP growth rate

- Inflation

- Unemployment rate

According to World Bank data, the total economic volume of the five Central Asian countries in 2022 was 373.9 billion U.S. dollars. The main industries in Central Asian countries are energy and mineral extraction and processing, transit transportation, agriculture and livestock, textiles, and the two major religions, Islam and Christianity. Central Asia is rich in reserves of oil, natural gas, coal, uranium, and other mineral resources, and the distribution of energy resources is relatively concentrated, known as the strategic base for energy and resources in the 21st century. China borders the Central Asian region and territorially shares borders with Kazakhstan, Kyrgyzstan, and Tajikistan. Central Asian countries have shown strong growth in the trade sector and have made remarkable leaps in the last decade, with real GDP growing at an average annual rate of 6.2%. Export earnings, remittances from migrant workers, and foreign direct investment have contributed to rising incomes and declining poverty in Central Asia. Total foreign trade in goods of Central Asian countries in 2021 amounted to $165.5 billion, a six-fold increase over the past two decades; GDP per capita in purchasing power parity (PPP) terms tripled; and the stock of inward foreign direct investment (FDI) reached $211 billion (Vinokurov et al. 2022).

Although the five Central Asian countries are geographically close to each other and have similar patterns of economic development and institutions, there are marked differences in the degree of economic development in each country. In terms of population size, Kazakhstan is the second largest country after Uzbekistan. In addition, Kazakhstan is the largest of the five countries in terms of land area, and its economic development is the best of the five. According to the economic scale (GDP), the five Central Asian countries can be divided into three gradients: Kazakhstan can be listed as the first gradient, Uzbekistan and Turkmenistan as the second gradient, and Kyrgyzstan and Tajikistan as the third gradient. Kazakhstan's economic strength far exceeds that of the other four Central Asian countries, with Kazakhstan's GDP accounting for more than 60 percent of the GDP of the five Central Asian countries (combined) from 2013 to 2022 (Figure 2). In particular, Kazakhstan's GDP share among the five Central Asian countries was 64.9% in 2013. However, in 2014, international oil prices dived all the way from a high of $110 (bbl) in July, down nearly 60%, and by 2015, international commodities as well as oil prices continued to fall, with the average annual price of Brent crude oil dropping from $98.9/bbl to about $53 (bbl). In addition, in 2015, Kazakhstan's main trading partner, Russia, fell into a crisis as a result of the recession in the world economy due to low growth and shrinking external demand, and Kazakhstan's exports fell sharply in the same year (by 42.5% year-on-year). Subsequently, Kazakhstan adjusted its exchange rate policy, however, not very successfully, with a sharp depreciation of the tenge (Kazakhstan's currency) (88% for the year), which resulted in a slowdown in Kazakhstan's GDP growth and a year-on-year decline in its share among the five Central Asian countries. In 2016, Kazakhstan's GDP fell sharply to $137.28 billion, 20 times that of third-tier Kyrgyzstan and Tajikistan, and its share of the GDP among the five Central Asian countries dropped to 50.2%. From 2017 to 2022, Kazakhstan's economy was gradually getting back on track, accounting for more than 59% of the GDP of the five Central Asian countries each year (Sodiqova et al. 2023).
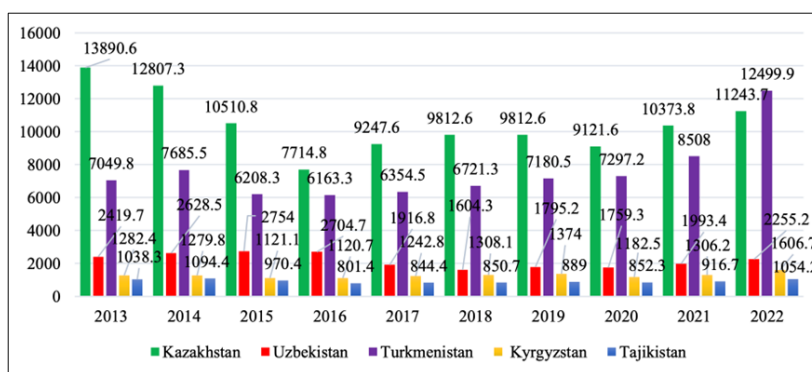
The five Central Asian countries exhibit notable variations in the extent of the wealth gap when assessed by GDP per capita and GNI per capita.

First, according to the comparison of GDP per capita, Kazakhstan and Turkmenistan are at the first level among the five Central Asian countries, and Kyrgyzstan, Tajikistan, and Uzbekistan are at the second level. In 2013-2015, Kazakhstan's GDP per capita was nearly equal to the combined GDP per capita of the remaining four Central Asian countries. Kazakhstan's GDP per capita was above $9,000 from 2013 to 2022, except for 2016, when it was only $7,714.8, which was primarily caused by the depreciation
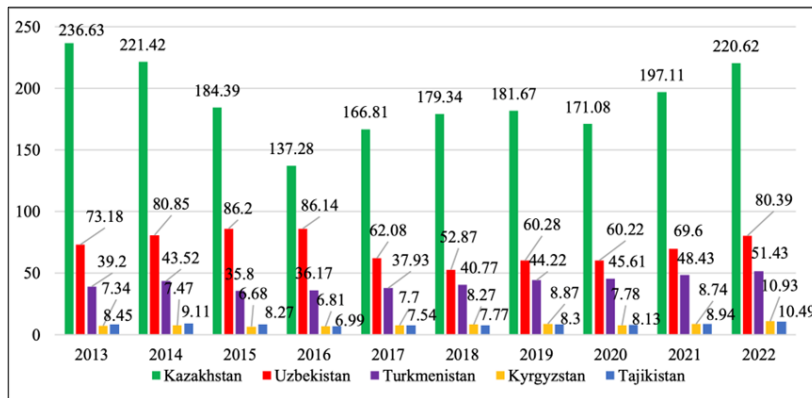
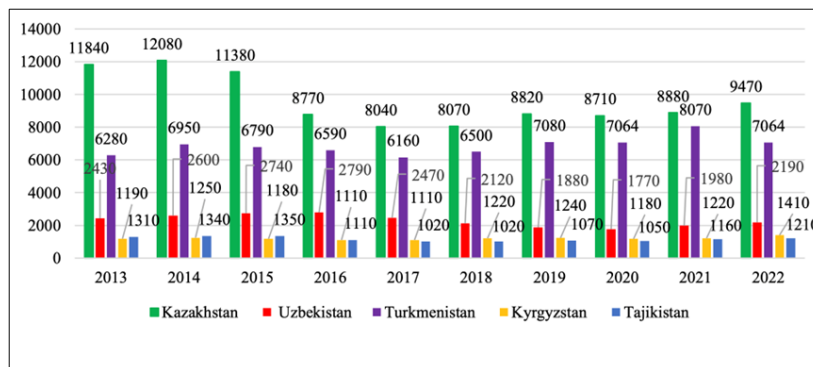Figure 2: Comparison of GDP of the five Central Asian countries (in billions of dollars)

Figure 3: Comparison of GDP per capita in five Central Asian countries (US$)

of Kazakhstan's exchange rate and the decline in economic growth due to the fall in international commodity and oil prices in 2015 (Zhang et al. 2017). It is worth noting that the dynamics of GDP per capita in Turkmenistan in the period 2013-2022 show mainly positive changes, with an average annual growth of 6.2%. Over the course of the decade, Turkmenistan's GDP per capita saw two notable fluctuations, with the biggest increases occurring in 2022 (+46.9%, +\$3,391.4) and the biggest declines occurring in 2015 (-19.2%, -\$1,477.2); on the whole, however, Turkmenistan's GDP per capita has been increasing gradually. The GDP per capita of the other three countries in the second tier remained essentially unchanged (Figure 3).

Second, according to the latest World Bank GNI per capita classification, Kazakhstan and Turkmenistan were upper-middle-income countries from 2013 to 2022, with a significantly higher level of GNI per capita compared to the other four Central Asian countries, while Uzbekistan, Kyrgyzstan, and Tajikistan were lower-middle-income countries (Figure 4). Kazakhstan's GNI per capita reached \$9,470 in 2022, which was 7.8 times higher than that of Tajikistan at the lowest level.

Due to a combination of factors such as downward pressure on the world economy, geopolitical tensions, and the cascading effect of the Russian recession, the economic growth rate of Central Asian countries slowed down from 2013 to 2016. As a result of the COVID-19 pandemic, each country's economic growth rate fell to its lowest points in a decade in 2020, with Kazakhstan, Turkmenistan, and Kyrgyzstan even experiencing negative growth rates of -2.5, -2.4, and -8.4, respectively (Figure 5). Oil production and the rise in global oil prices served as the main drivers of Kazakhstan's economic growth for a considerable amount of time. Due to several factors, including the decline in commodity prices, the cessation of oil production growth in the Kazakh economy, the country's

Data source: World Bank. https://data.worldbank.org.cn/

Figure 4: Comparison of GNI per capita in the five Central Asian countries (US$)

continued reliance on raw materials, and a lack of readiness for changes in both internal and external conditions, the GDP growth rate fell from 6.0% in 2013 to 1.1% in 2016 (Zhang et al. 2017). From 2013 to 2022, the economic situation in Uzbekistan remained generally stable, and even in the face of various crises during the COVID-19 pandemic, its economic growth rate remained positive, averaging 5.9%. According to economic experts in Uzbekistan, the country's economy has been able to maintain its high growth rate for three reasons: firstly, the economic situation of Uzbekistan's main neighboring economic partners has remained stable; secondly, Uzbekistan's inflation rate continues to decline; and thirdly, the growth rate of fixed investment has accelerated (Choriev 2022). Kyrgyzstan's GDP growth slowed significantly from 10.9% in 2013 to 4% in 2014, increased by 3.9% in 2015, and showed only modest growth of 4.3% in 2016. International financial institutions have ranked Kyrgyzstan as one of the poorest countries in the post-Soviet region. However, its relatively attractive investment climate and favorable business environment have contributed to the dynamic and, most importantly, effective development of the country's economy. The country's economic growth rate was also very impressive, coming in at 6.2% and 7.0% in 2021 and 2022, respectively. Industry was growing at a significant rate of 11.4%, construction at 8%, trade at 7.5%, and agriculture at 7.3% (Zheirenova et al. 2023). Despite the overall slowdown in global economic growth and three downward revisions of global growth expectations by the International Monetary Organization, Turkmenistan's economy was still able to buck the trend, with its GDP growth rate exceeding 10.2% for two consecutive years in 2013 and 2014, which was a leading position among the five Central Asian countries. However, in 2015, in the context of a complex international economic situation, the annual GDP growth rate decreased sharply to 6.5%. Over the next five years, Turkmenistan successfully implemented large-scale reforms to ensure continued socio-economic development, and its GDP growth rate remained above 6.0%. During the COVID-19 pandemic, various unfavorable factors led to a drop in Turkmenistan's GDP growth rate to -3.4% in 2020. However, over the next two years, against the backdrop of a decline in global economic growth from 6.0% in 2021 to 3.2% in 2022, Turkmenistan's economy showed very strong momentum, with its GDP growth rate remaining at 6.2% for the second consecutive year (Gogoberishvili, Bayar 2023, Trapeznikov 2023). Tajikistan's economic development trend is similar to that of Turkmenistan, with a slight decline in GDP growth from 2013 to 2015, to 6.0% in 2015. Tajikistan's economic growth rate was steady for a long time, remaining above 6.0% for seven consecutive years, and even during the COVID-19 pandemic, Tajikistan's GDP growth rate remained at 4.4%. With the end of the COVID-19 pandemic, Tajikistan's economy rebounded rapidly, becoming the fastest-growing country in Central Asia in the last two years, reaching 9.2% in 2021 and 8% in 2022. As in previous years, according to the authorities, the growth was mainly due to an increase in industrial and agricultural production (Chorshanbiyev 2023).

Higher inflation rates are one of the main challenges for Central Asian countries. The Asian Development Bank calculates the average inflation rate in Central Asian countries
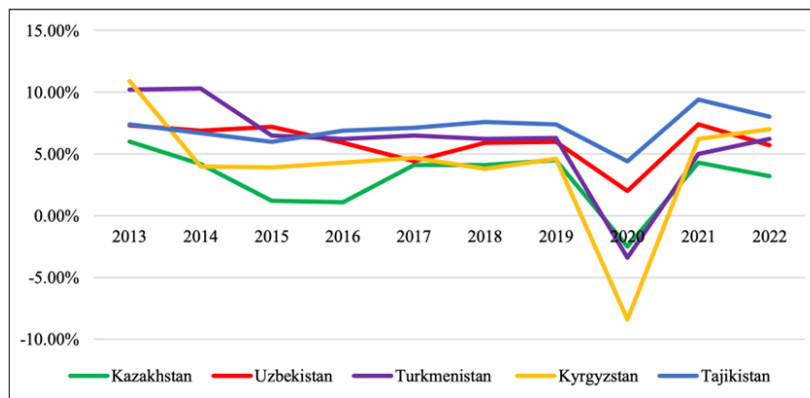
Figure 5: Comparison of economic growth rates of the five Central Asian countries (%)

based on data from the International Monetary Fund, which is a minimum of 7% in 2015, reaches 8.4% in 2020, increases to almost 13% in 2022, and predicts that it will decrease to 7.1% in 2023 (Khitakhunov 2022). Reasons for high inflation in Central Asia are (Chen 2021):

1. The impact of massive stimulus measures in developed economies ripples across the globe.

2. A mismatch between supply and demand pushes up inflation.

3. A continued rise in commodity prices.

Overall, Tajikistan's unemployment rate is the highest among the five countries, with a trend of decreasing and remaining flat from 2014 to 2023. In the other four countries, the trend is basically flat. It is noteworthy that the unemployment rate in Kyrgyzstan is essentially the lowest of the five countries (Figure 6). For more than a decade, Kazakhstan's unemployment rate has been in the range of 4.7-5.0%, remaining unchanged even as global unemployment rose sharply during the 2020 pandemic. The other four countries showed a slight upward trend during this period.

With regard to unemployment in the Central Asian countries, the reasons for this are as follows:

1. Shortage and uneven distribution of jobs.

2. Low competitiveness of the labor market.

3. Insufficient investment in the economy.

4. Lack of qualified specialists.

5. Rapid population growth, which puts additional pressure on the labor market.

6. Regional imbalances: market indices are much higher in economically developed regions than in other regions, leading to regional unemployment.

7. The shadow sector of the economy: informal work and lack of labor contracts create frictional unemployment and reduce tax revenues (Zhavmanov, Murodkulov 2023).

Khitakhunov (2022) suggests that in order to fight inflation, central banks need to normalize their balance sheets and raise the real discount rate above the neutral level fast enough and long enough to control inflation and inflationary expectations. Fiscal policy should also support monetary policy to moderate demand in countries with excess aggregate demand and overheated labor markets. Authorities should take into account
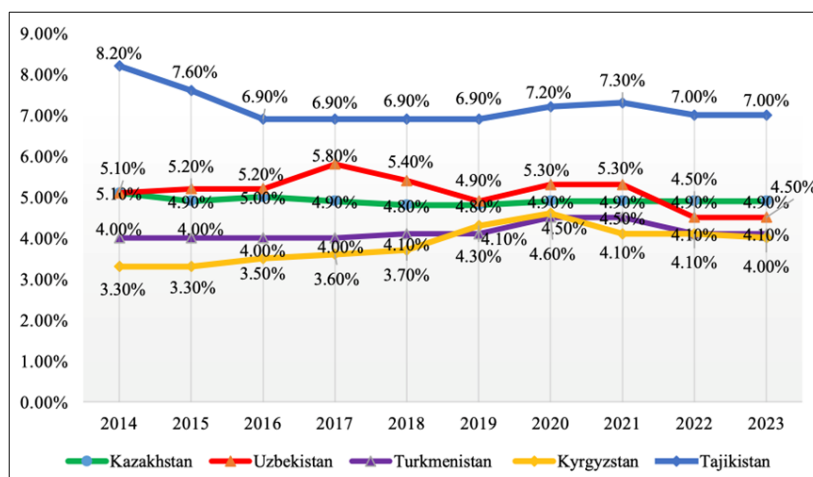
Figure 6: Comparison of Unemployment Rates in the Economies of the Five Central Asian Countries (%)

that efforts to stimulate supply can support monetary policy by reducing inflation. In a supply-constrained environment, increasing government spending or implementing tax cuts would only push up inflation further. Thus, price instability could jeopardize all government efforts to increase economic growth. In addition, rising costs of living can jeopardize the most vulnerable groups in society, as poor households tend to spend more than others on food, heating, and fuel, where price increases are particularly pronounced. When designing policies to protect vulnerable groups, policymakers should take care to avoid broad price caps or subsidies on food and energy, which can inadvertently increase demand by reducing or eliminating supply incentives. Almost all Central Asian countries have responded by raising interest rates, and fiscal authorities have also proposed and planned a variety of measures to counter inflation and mitigate its effects. Indeed, there is a need to first conduct a comprehensive study and assess the contribution of all factors and policy measures, including trade, monetary and fiscal measures, external shocks, and other relevant factors. Second, measures need to be coordinated between monetary and fiscal authorities and within fiscal policy. And third, policy implementation, including supply-side measures, should be based on analysis and empirical research (Khitakhunov 2022).

3   Results and discussion

Analysis of economic relations between China and Central Asian Countries. The article analyzes the trade and investment data between China and Central Asian countries from 2013 to 2022 based on data from World Bank, China Statistical Yearbook, and Statistical Bulletin on China's Outward Foreign Direct Investment. The trade and investment data between China and Central Asian countries from 2013 to 2022 have been statistically organized, and the trade dependence (total trade/GDP) and investment dependence (investment flow/GDP) of Central Asian countries on China during this decade have been calculated. Foreign trade dependence is an indicator of a country or region's economic dependence on import and export trade, and investment dependence is an indicator of a country or region's economic dependence on foreign investment.The sum of foreign trade dependence and foreign investment dependence can serve as an indicator to measure the degree of openness of a country or region to the outside world, which can reflect the degree of openness of a country or region and can also be used to measure the degree of dependence of a country or region's economy on the international market and foreign investment. Therefore, the degree of openness to the outside world has a great deal to
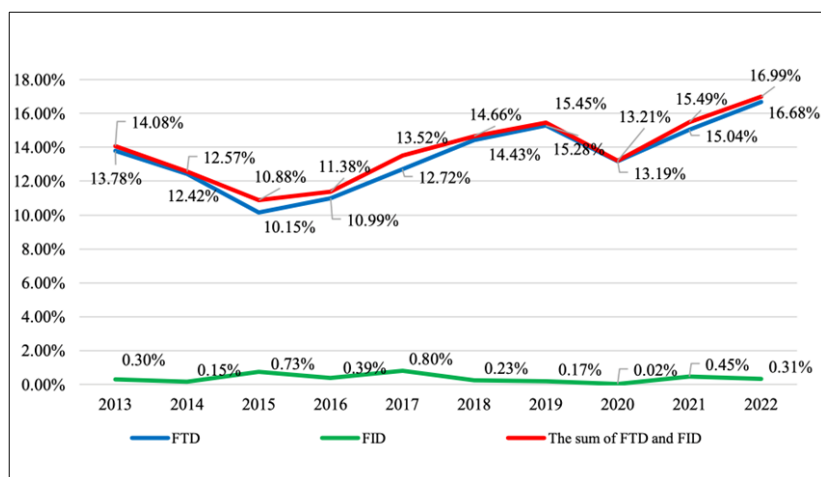
Figure 7: Trends in economic dependence of the five Central Asian countries on China

do with a country's or region's stage of economic development, economic structure, level of economic outward orientation, and even its choice of exchange rate.

We focus on the relationship between the economic dependence of Central Asian countries on China (sum of foreign trade dependence and foreign investment dependence) and the economic growth of the Central Asian region. Since the trade volume between China and Central Asian countries is significantly larger than the investment volume, we take trade dependence as the focus of our study. The trend of trade dependence can be divided into three stages: from 2013 to 2015 as the first stage, Central Asian countries' trade with China decreases; from 2015 to 2019 as the second stage, bilateral trade activities continue to rebound, and trade dependence on China reaches 15.28% in 2019; and from 2020 to 2022 as the third stage, which is due to the impact of the COVID -19 pandemic, bilateral trade is severely hampered in 2020 and then picks up steadily in the following two years, reaching the highest level of 16.68% in the last decade in 2022. There is no uniform and precise standard or conclusion regarding what level of foreign trade dependence should be considered reasonable, and the degree of external dependence varies greatly depending on the structure of the industry (Nuhanović, Nurikić 2021). Since China's investment in Central Asian countries accounts for a relatively small proportion of their total GDP, the trend of investment dependence is relatively flat, with fewer ups and downs. In fact, the sum of trade dependence and investment dependence of Central Asian countries on China is more representative of the degree of dependence and openness of Central Asian countries on China, and the trend of this indicator is generally showing a slow increase from 2013 to 2022 (Figure 7). To some extent, increased openness to the outside world also means an increased contribution to national economic development. In terms of investment, the cooperative relationship between China and Central Asian countries is dominated by one-way investment from China into Central Asian countries, which to a certain extent improves the capacity and level of economic development of Central Asian countries. In addition to investments in the fields of energy and minerals, water conservancy, power engineering, petrochemicals, and finance, China has also been actively promoting infrastructure construction in the five Central Asian countries and has already built a comprehensive interconnection system of highways, railroads, air transportation, and networks. At present, the China-Kyrgyzstan-Uzbekistan highway, the China-Tajikistan highway, the China-Central Asia gas pipeline, the China-Kazakhstan crude oil pipeline, and other projects are in safe and stable operation (Wang 2023b).

Before we analyze the relationship between the dependence of Central Asian countries on China's economy and the economic growth rate of Central Asian countries (the average of the growth rates of the five countries), we calculate the correlation coefficient between

Table 1: Correlation coefficients between the economic dependence of the five Central Asian countries as a whole on China and the economic growth rates of the five countries from 2014 to 2022

Year	Change in economic dependence (in years)	Change in GDP growth rate (in years)	Correlation coefficient	Average correlation coefficient
2014	-1.51	-1.94	0.78	
2015	-1.69	-1.46	1.16	
2016	0.50	-0.08	-6.25	
2017	2.14	0.48	4.46	
2018	1.14	0.16	7.13	0.86
2019	0.79	0.24	3.29	
2020	-2.24	-7.34	0.31	
2021	2.28	8.04	0.28	
2022	1.50	-0.44	-3.41	

Data sources: World Bank (https://data.worldbank.org.cn/), China Statistical Yearbook (https://www.stats.gov.cn/sj/ndsj/), and China's Outward Foreign Direct Investment Statistical Bulletin (http://images.mofcom.gov.cn/hzs/202310/20231007152406593.pdf)
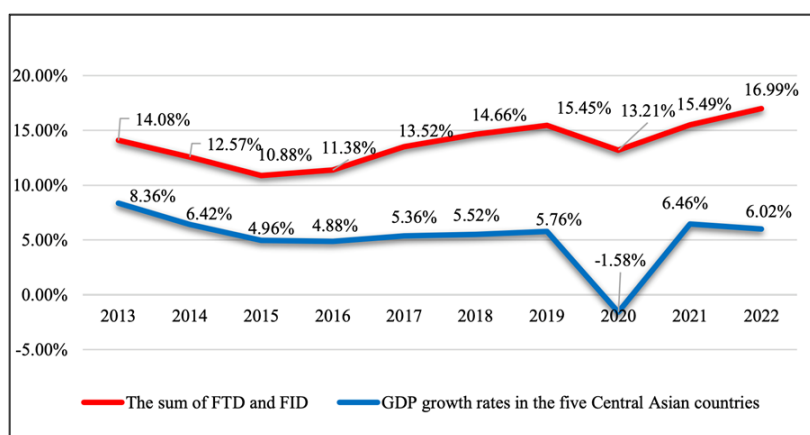

Figure 8: Comparison of trends in the economic dependence of the five Central Asian countries on China with trends in the GDP growth rates of the five Central Asian countries

them, which is the ratio of the change in the sum of trade dependence and investment dependence to the change in the GDP growth rate (in years). The economic dependence here refers to the degree of economic dependence of the five Central Asian countries as a whole on China, and similarly the economic growth rate refers to the economic growth rate of the five Central Asian countries as a whole. In other words, if the correlation coefficient between them is closer to 1, it indicates a higher degree of correlation, and a higher degree of correlation implies a greater influence of trade and investment on GDP growth. Consequently, we can conclude that the correlation coefficient generally represents China's economic influence on Central Asian nations.

The average correlation coefficient was calculated to be 0.86 for the period from 2013 to 2022. (Table 1). We could also find that the trend of economic dependence of Central Asian countries on China (the sum of trade dependence and investment dependence) is approximately similar to the trend of economic growth rate of Central Asian countries (Figure 8). By analyzing the two in combination, it can be shown to a certain extent that trade and investment from China have a great effect on the economic development of Central Asian countries; that is to say, when China's trade and investment with

Central Asian countries changes, the economic growth of Central Asian countries will also be changed accordingly. For example, if China increases or decreases the amount of investment and trade in the five Central Asian countries, then the GDP growth rate and total GDP of the five Central Asian countries will change accordingly, and this correlation can be expressed by the correlation coefficient. At the same time this expresses the degree of influence of the Chinese factor on the economic development of the Central Asian countries. In addition, we must also consider some special energy, resources, and other dependent commodities in bilateral trade, which are essential for both sides to rely on. For example, China's net exports to Central Asia are mainly manufactured goods in labor-intensive and capital-intensive commodities, including high-grade commodities and high-tech products, and people's consumption of ordinary goods, which forms a typical pattern of international trade in the division of labor exchange of primary commodities and manufactured goods. On the other hand, the commodities exported to China by the five Central Asian countries are mainly energy, mineral products, and primary processed products, which shows the obvious trade characteristics of the ladder division of labor (Rasoulinezhad et al. 2022).

With the establishment of the Shanghai Cooperation Organization (SCO) in 2001, China's cooperation with Central Asian countries expanded from bilateral to multilateral. With the opening of the crude oil pipeline between China and Kazakhstan and the China-Central Asia natural gas pipeline in 2006 and 2009, respectively, China imported large quantities of oil and gas from Kazakhstan, Uzbekistan, and Turkmenistan, which marked the beginning of the great development of oil and gas cooperation between China and Central Asian countries. Oil and gas and other bulk strategic resource commodities have become one of the most important trade commodities between China and Central Asian countries, and the dependence on each other's trade has been increasing (CCTV 2022). In 2013, China imported 11.98 million tons of crude oil from Kazakhstan, reaching the largest amount ever. It dropped directly to 6.27 million tons in 2014, and crude oil deliveries remained stable in the following years. The China-Kazakhstan crude oil pipeline delivered 10.88 million tons of crude oil to China in 2019, second only to 2013. In 2022, the main export destinations of Kazakhstan's crude oil were Italy (18.2 million tons), the Netherlands (6.1 million tons), South Korea (5.8 million tons), and China (5.3 million tons). By 2022, Central Asian countries have transported a cumulative total of 150 million tons of crude oil to China through the China-Kazakhstan crude oil pipeline. (Source: China General Administration of Customs and PetroChina West Pipeline Company)

In 2017, Central Asian countries transferred 38.7 billion cubic meters of gas to China through the China-Central Asia Gas Pipeline, with Turkmenistan being the largest importer of pipeline natural gas to China, with an import volume of 26.9 billion square meters, accounting for 84.6% of the total volume of pipeline natural gas imported by China. Natural gas exports from Central Asia to China totaled 47.49 billion cubic meters in 2018. In 2021, China's gas imports from Central Asia were 44.1 billion cubic meters, while gas from the Sino-Russian Eastern Route was about 10 billion cubic meters in the same year, which made Russia China's second-largest pipeline natural gas importer after Turkmenistan from 2021 onwards. In 2022, China imported 43.2 billion cubic meters of natural gas from Central Asia, accounting for about 30% of China's total natural gas imports. By 2022, Central Asian countries have transported a cumulative total of more than 400 billion cubic meters of natural gas to China through the China-Central Asia Gas Pipeline (PetroChina West Pipeline Company 2022). (Source: China General Administration of Customs, PetroChina West Pipeline Company)

Besides, small entrepreneurs in Central Asian countries are also more dependent on China due to the region's high demand for the Chinese market and the wide range of co-operation with China. These small entrepreneurships mainly operate in the fields of engineering, chemicals, building materials, green economy, artificial intelligence, e-commerce, water reservoirs, processing industry, automobiles, electricity, transport, medical care, education, daily necessities, food and oil, etc., which cover almost all the fields needed for people's daily life.

Although none of Central Asian countries has access to the world's oceans, the re-

gion's location at the intersection of trade routes between Asia, the Middle East, and Europe gives it the advantage of a geostrategic position, and like the Silk Road, which once connected the five major economic centers of Greater Eurasia (China, India, Persia, the Middle East, and Europe), the region's modern transportation routes not only play a transit role but also contribute to the development of industry, services, and trade in all the countries of the region (Vinokurov et al. 2022). So, among the many factors to promote the economic development of Central Asian countries, the China-Europe railway is also a factor worth mentioning because the China-Europe railway passes through the Central Asian region, and there is a branch that we call the China-Central Asia Railway Express. From the perspective of transportation economic characteristics, the transportation cost of the China-Europe railway is about one quarter to one fifth of that of air transportation, and the transportation time is about one quarter to one third of that of sea transportation. Considering the cost of in-transit time for high value-added goods, the China-Europe railway can save 8% - 20% of the overall logistics cost compared with traditional sea-railway transportation, and it has a significant comparative advantage for specific logistics needs such as high value-addedness and strong timeliness. For example, it can facilitate the transportation of bulk e-commerce products, light industry and high-tech electronic products, and foodstuffs such as wines that require refrigeration, all of which have requirements on delivery time (Wei, Wang 2023). Compared to freighters, the China-Europe railway is more environmentally friendly; for example, for every 40-foot (12-meter) container transported, the trains produce only 4% of the carbon dioxide emissions of freighters (Josephs 2017). With the advent of the China-Europe railway, shipping large volumes of goods is no longer the only option, while the central and western parts of China and the central and eastern inland parts of Europe have become frontline windows for opening up. In this way, products no longer need to be transported from the inland hinterland to the coastal ports. Instead, inland cities such as Chongqing, Chengdu, Wuhan, Almaty, Budapest, Łódź, Warsaw, and Prague have become new import and export distribution centers, which makes the development of China's central and western regions have new growth points, while Central Asia has gradually become an emerging market for transnational logistics (Zhao et al. 2020).

A rail freight service from China to Central Asia, known as the Central Asia Railway, gathers commodities from all over China for export to Kyrgyzstan, Kazakhstan, Uzbekistan, Tajikistan, and Turkmenistan. All routes now offer railroad freight services to meet the expanding commercial demands of the China-Central Asia economic belt. Three routes make up the China-Central Asia Railway (Lin 2023) (Figure 9). The first route goes from Alashankou (China) to Aktau (Kazakhstan) via Astana (Kazakhstan), Aktobe (Kazakhstan), and Atyrau (Kazakhstan). The second route goes to Ashgabat (Turkmenistan) from Khorgos (China) via Sergali (Kazakhstan). The third route goes through Almaty (Kazakhstan), Bishkek (Kyrgyzstan), Shymkent (Kazakhstan), Tashkent (Uzbekistan), and Khujand (Tajikistan) on its way from Khorgos (China) to Dushanbe (Tajikistan).

Based on the above factors regarding China's influence on the sustainable economic development of Central Asian countries, the article predicts that the dependence of Central Asian countries on China will continue to rise in the future for three reasons: first, geographically, China and Central Asian countries are neighbors to each other, so they are easily influenced by each other. Second, China has achieved great success in the economy, science, and technology, while Central Asian countries are still weak. Third, economic globalization is the trend of world development, and regional economic and economic integration is a prerequisite for economic globalization.

4   Conclusions

The economic role and prospects of Central Asia are still not fully recognized by the world, and due to inertia, the international community does not yet see the region as an important player on the world economic map. However, the region is changing, and over the past 30 years, Central Asian countries have made significant progress in their development. As a neighbor of Central Asia, China has developed into a world eco-
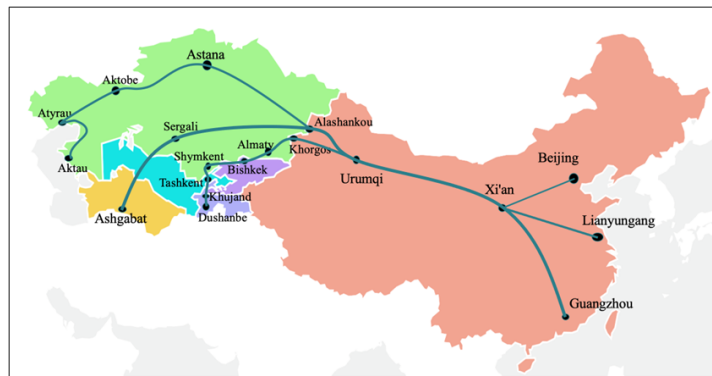
Notes: Figure drawn by the author

Figure 9: China-Central Asia railroad routes

nomic giant as a result of its large, advanced, and innovative economic policies. Overall, Central Asia has become the most important trade corridor and trade transit point for China along the Belt and Road, which is of strategic importance. For Central Asian countries, China, as the largest trading partner of Central Asian countries, has an important value and an increasingly irreplaceable role in the stable development of their economies. Therefore, both China and Central Asian countries have the common needs of expanding economic space, developing infrastructure, exploiting local potential, adjusting economic structure, and improving people's lives (Wang 2023a). The scale of trade cooperation between China and Central Asian countries is not exactly the same as the economic scale and development level of other countries, which depends on a variety of factors such as the degree of mutual strategic interface, geopolitics, economy, culture, development of international relations, and other factors. Central Asian countries are far more dependent on China's foreign trade than China is on Central Asian countries, particularly in recent past when the global political, security, and economic landscape is full of uncertainties. Since gaining independence, the Central Asian nations have peacefully settled their border conflicts with China, and traditional security concerns such as territorial disputes do not exist. Moreover, good relations have been maintained between successive Chinese leaders and the leaders of Central Asian countries, which has laid a good political foundation for mutual investment and cooperation in large-scale, longterm projects (People's Daily 2022). The WTO remains an important mechanism for international economic cooperation, and the accession of Central Asian countries to the WTO has established a more orderly environment and rules-based platform for regional cooperation. In the process of developing the world economy, regardless of the development of counter-globalization and trade protectionism, Central Asian countries, which are already fully enjoying the benefits of globalization of the world economy, have a clear attitude of opening up to the outside world, while at the same time actively integrating into the global economy. Economic and trade cooperation between Central Asian countries and China will appear more standardized, transparent, and predictable under the unified system of the WTO and other international rules.

References

Arvanitopoulos C (1998) The geopolitics of oil in Central Asia. *The Journal of Modern Hellenism* 15: 67–90. http://www.hri.org/MFA/thesis/winter98/geopolitics.html

CCTV (2022) Cumulative oil transfers to China from China-Kazakhstan crude oil pipeline exceeded 150 million tons. https://tv.cctv.com/2022/02/11/VIDErTt53Fcs-IjLFnU6d8WFq220211.shtml

Chakeeva K, Mombekova G, Kuzenbaeva E (2023) The current state of the oil and gas industry of the Republic of Kazakhstan. *State Audit* 2: 107–117. CrossRef

Chen LH (2021) Analysis of inflationary pressures in CAREC region Central Asia. Institute for regional economic cooperation (CAREC), 3-7. https://www.carecinstitute.org/wp-content/uploads/2021/12/CI-Economic-Brief-Inflationary-Pressures-CHN-Dec-2021.pdf

Choriev A (2022) Nexus of WTO accession and its impact on the economic growth of Uzbekistan. *European Journal of Humanities and Educational Advancements* 3: 120–129. https://www.neliti.com/publications/394028/nexus-of-wto-accession-and-its-impact-on-the-economic-growth-of-uzbekistan#cite

Chorshanbiyev P (2023) What do Central Asian economies live off? Asia-Plus, https://www.asiaplustj.info/ru/news/tajikistan/economic/20230310/za-schet-chego-zhivut-ekonomiki-tsentralnoi-azii

Chungang W (2022) *Country (Region) Guide for Foreign Investment Cooperation (Turkmenistan).* Institute of International Trade and Economic Cooperation, Ministry of Commerce. https://www.mofcom.gov.cn/dl/gbdqzn/upload/tukumansitan.pdf

Cieślik A, Gurshev O (2023) Trade policies in Central Asia after EAEU enlargement and after Russian WTO accession: Regionalism and integration into the world economy revisited. *Eurasian Geography and Economics*: 1–23. CrossRef

Gao MH (2020) Frames and facilitators by China in promoting the Belt and Road Initiative (BRI). *Thunderbird International Business Review* 2: 125–134. CrossRef

Gogoberishvili L, Bayar OE (2023) Reassessing GDP growth in countries with statistical shortcomings – A case study on Turkmenistan. *International Monetary Fund* 207: 5–27. CrossRef

Josephs J (2017) All aboard the China-to-London freight train. BBC News. https://www.bbc.com/news/business-38654176

Khitakhunov A (2022) Inflation risks in Central Asia. Eurasian research institute. https://www.eurasian-research.org/publication/the-risks-of-inflation-in-central-asia/?lang=ru

Lin B (2023) China-Central Asia railway express. Collicare. https://www.collicare.com/cn-zh/freight/rail/central-asia

Nuhanović S, Nurikić MB (2021) Examining the degree of foreign trade dependence and its influence on GDP growth. *International Business Research* 4: 71–80. CrossRef

People's Daily (2022) Joint statement by leaders of China and five Central Asian countries on the 30th anniversary of the establishment of diplomatic relations. https://www.gov.cn/xinwen/2022-01/26/content_5670478.htm. 002

PetroChina West Pipeline Company (2022) Central Asia gas pipeline transfers over 400 billion cubic meters of gas to China. https://www.cnfin.com/dz-lb/detail/20220619/3641767_1.html

Rasoulinezhad E, Sung J, Talipova A, Taghizadeh-Hesary F (2022) Analyzing energy trade policy in Central Asia using the intercountry trade force approach. *Economic Analysis and Policy* 73: 441–454. CrossRef

Sodiqova F, Nasriddinov D, Toxirov A (2023) Central Asian countries and their current economy. *Science and innovation* A6: 286–291. https://cyberleninka.ru/article/n/central-asian-countries-and-their-current-economy

Trapeznikov V (2023) Turkmenistan showed high macroeconomic development rates in 2022. Commonwealth of independent states. https://e-cis.info/news/567/107483/

Vinokurov E, Ahunbaev A, Babajanyan V, Berdigulova A, Fedorov K, Kharitonchik A, others, Zaboev A (2022) The economy of Central Asia: A fresh perspective. *Eurasian Development Bank* 2: 44–56. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=-4274678

Wang GN (2018) *A Study of Sino-American Economic Interdependence and Its Asymmetry.* Social Science Literature Press. https://cread.jd.com/read/startRead.action?-bookId=30446927&readType=1

Wang HY (2023a) Thirty-year economic and trade cooperation between China and Central Asian countries: Achievements and prospects. *Journal of Eurasian Economy* 4: 26–52. https://oyjj-oys.ajcass.com/UploadFile/SiteContent/FJList/201606070001/-2023/8//20230721102252WU_FILE_0.pdf?itemid=157492

Wang XL (2023b) The construction of China-Central Asia community with a shared future from the perspective of social cooperation. *Northern Series* 2: 5–13. http://-niis.cssn.cn/xscgnew/xslwnew/202303/P020230313313568398790.pdf

Wei JG, Wang YK (2023) Achievements, experiences and prospects of China-Europe railway express in the context of the belt and road initiative. *Journal of Beijing Jiaotong University* 4: 19–27. https://www.researchgate.net/publication/336827728_-yidaiyiluchangyixiazhongoubanliefazhanzhuangkuangdiaoyanbaogao

Zhang D, Dong L, Zheng HY (2017) Comparative analysis of economic, financial and investment development in the five Central Asian countries (2009-2016). *Russian Studies* 3: 162–191. https://xianxiao.ssap.com.cn/catalog/1488448.html

Zhao L, Stoeter J, Li H, Hu Q, Cheng Z, Wang X (2020) European hub location problem for China railway express in the context of the belt and road initiative. *International Journal of Logistics Research and Applications* 6: 561–579. CrossRef

Zhavmanov JA, Murodkulov JH (2023) Poverty factors in the countries of Central Asia. *Pedagog* 11: 247–254. https://bestpublication.org/index.php/pedg/article/-view/8223/8450

Zheirenova A, Ismailova N, Isaeva D, Sulaimanova A (2023) The impact of factors on GDP in Kyrgyzstan. *E3S Web of Conferences* 380: 01023. CrossRef

Zhou Q, He Z, Yang YU (2020) Energy geopolitics in Central Asia: China's involvement and responses. *Journal of Geographical Sciences* 30: 1871–1895. CrossRef