Does the Belt and Road Initiative promote industrial upgrading and rationalisation and adjustment along the route?

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Abstract. This study uses data from 30 provinces and cities from 2010-2019 to examine the role of the Belt and Road Initiative (BRI) on industrial restructuring and upgrading in Chinese provinces and cities along the route using the Difference-in-differences method. The results found that participation in BRI construction is mainly under favorable policies to ensure that the tertiary sector can be strongly supported for development by stabilizing the macroeconomic situation, improving infrastructure construction, attracting surplus labor to the tertiary sector and strengthening technological innovation. BRI makes the industries tend to be advanced, and the key provinces develop tertiary industries and high-end manufacturing industries when participating in BRI construction and development, take advantage of policies to strengthen foreign trade through various ways, accelerate high-quality development of service industries, and achieve innovation and upgrading. At the same time, BRI can promote the rationalisation of industrial structure, which as an inverse indicator, the initiative makes a significant reduction and promotes the industrial structure to be more in line with the local economic development. The findings of the study provide theoretical support for China's future comprehensive deepening reforms.

Keywords: Belt and Road Initiative; Advanced industrial structure; Industrial restructuring rationalisation; Difference-in-difference method.

1. Introduction

The world is undergoing complex and profound changes, with multipolarity and economic globalisation continuing, the deep-rooted effects of the international financial crisis continuing to be felt, and uncertainty increasing. As of March 2022, 146 countries or regions have endorsed the BRI. In the course of the implementation of the BRI, the regions and areas of cooperation are expanding, bringing new development opportunities for developing countries along the BRI (Zhang et al., 2021), and promoting the building of an open world economy.

As construction continues, the "Belt and Road" initiative (BRI) has entered a new phase of development. BRI is of strategic importance and has received extensive attention from scholars at home and abroad, with a large number of studies focusing on the role of the BRI in China itself, especially on the relationship between the initiative and industrial structure upgrading and the analysis of the reasons for this (Tian, Liu, 2008). A large number of studies have focused on the role of BRI in China itself, especially on the relationship between the initiative and the upgrading of industrial structure and the analysis of the causes (Tian, Liu, Y., & Yin, Z., 2020; Liao, Yang, L., Dai, S., & Van Assche, A. 2021; Kong, Chen, A., Shen, C., & Wong, Z. 2021). In fact, due to the different stages of economic development in different regions of China, there are still problems of inadequate and unbalanced upgrading of the industrial structure between regions, and the situation of a "large but not strong" industrial structure is difficult to change (Fu, J. Y., 2021), while at the same time, China's past model of pursuing high economic growth has become obsolete and the domestic. At the same time, China's past model of pursuing high economic growth has become obsolete and the competitive advantages it relied on at home have gradually weakened, leading to low productivity, waste of resources and serious environmental problems (Qunxi Kong, 2021), which has forced China to promote the optimisation and upgrading of its industrial structure. Theoretically, industrial structure refers to the production linkages and proportional relationships between industries formed in the process of social reproduction, while industrial structure upgrading is a process of evolution from lower to higher levels of upgrading. Yang Ying (2015), as the earliest scholar to study the effect of BRI on industrial structure, uses a VAR model to illustrate the interrelationship between OFDI and
the transformation and upgrading of domestic industrial structure. It can be seen that BRI, as a synonym for China's opening up to the outside world, is closely related to industrial structure, and at the same time, a country's economic development is often inseparable from the improvement of its financial level and industrial structure, and industrial upgrading has a driving effect on financial development and itself (Chen, 2017). The three relationships are progressive and influence each other.

As to whether the "Belt and Road" initiative can promote the upgrading of China's industrial structure, Zhang, Fenfan et al. (2019) take the coastal provinces of China as the starting point and propose that the "Belt and Road" strategy provides strategic support for the industrial restructuring and upgrading of the marine economy in coastal regions. Therefore, the "Belt and Road" initiative can adjust China's regional economic structure and guide industrial transformation and upgrading. Li, Sirui (2021) and others use a sample of listed Chinese manufacturing companies to test that BRI can significantly improve the level of corporate R&D. Therefore, this also indirectly verifies that BRI plays an important role in industrial upgrading. (2021), using a sample of Chinese listed manufacturing companies, found that BRI significantly increased R&D levels.

Using panel data of Chinese provinces from 2005 - 2018, Liao, Hongwei (2021) applies the joint cubic equation modeling technique and finds that Chinese OFDI has a significant positive impact on domestic employment, which is positively moderated by the "Belt and Road". Foreign direct investment is an important but unstable source of external financing for developing economies (xu shao, 2020). Lu et al. (2020) found that the BRI has driven increased OFDI from countries along the route and strongly encouraged strongly uninvested public companies to invest along the BRI. Using the GMM model, Wang et al. evaluated that BRI strengthens the promotion effect of OFDI on industrial upgrading, and improving infrastructure construction is beneficial to industrial upgrading in countries along the BRI.

In summary, there are still two shortcomings in the current study: first, the scope of BRI and the causes of industrial upgrading are too small, too single and not comprehensive. Secondly, there is insufficient research on the measurement of industrial upgrading indicators. Therefore, this study will also use macro statistics to assess (Zhou, 2005; Duflo, 2000) whether the Belt and Road Initiative directly contributes to the upgrading of industrial structure in the provinces and cities along the route, and further refine the indicators of industrial upgrading into two indicators, namely, advanced industrial structure and rationalized industrial structure. As the construction of the Belt and Road continues, foreign direct investment, infrastructure construction and education investment have been applied to China's industrial structure, resulting in an acquisition of intangible assets such as advanced technology and management skills, and fixed assets such as equipment and buildings, which have significantly improved the production development of Chinese enterprises. At the same time, China is making full use of foreign markets to promote exports and speed up the "going out" process, which ultimately promotes the transformation and upgrading of the domestic industrial structure. At a time when China's economy is undergoing continuous restructuring and optimisation of its industrial structure and deepening of reforms, it is important to study the relationship between the Belt and Road policy and the upgrading of China's industrial structure to provide theoretical support for future development.

2. Methodological framework

2.1 Model setting

This research uses DID to study the impact of the Belt and Road policy on China's industrial structure. DID is widely used in China and abroad and is based on the theory of using "counterfactual" research methods to eliminate "selective bias" (Abadie, A., 2005; Zhou, L.A., 2005).

Specifically, BRI is a quasi-natural experiment, and this study takes 30 Chinese provinces and cities as the study population (excluding Tibet, Hong Kong, Macau and Taiwan due to data availability), with a time horizon of 2010 to 2019. The year 2014 was taken as the time of the "Belt and Road" policy shock (time), taking a value of 0. The key provinces of the Belt and Road were used
as the experimental group according to the "Vision and Actions for Promoting the Construction of the Silk Road Economic Belt and the 21st Century Maritime Silk Road". Specifically: six provinces in the northwest such as Xinjiang, Shaanxi, Gansu, Ningxia, Qinghai and Inner Mongolia; three provinces in the northeast such as Heilongjiang, Jilin and Liaoning; three provinces in the southwest such as Guangxi, Yunnan and Tibet; five provinces in Shanghai, Fujian, Guangdong, Zhejiang and Hainan; and Chongqing in the inland region. The specific construction is as in equations (1) and (2).

\[
\text{high}_{it} = \alpha_0 + \beta_1 (\text{bri}_{it} \times \text{time}_{it}) + \beta_2 \text{control}_{it} + \gamma_i + \mu_t + \epsilon_{it} \tag{1}
\]

\[
\text{instr}_{it} = \alpha_0 + \beta_1 (\text{bri}_{it} \times \text{time}_{it}) + \beta_2 \text{control}_{it} + \gamma_i + \mu_t + \epsilon_{it} \tag{2}
\]

where i denotes province and city and t denotes time, denotes individual fixed effects, denotes time fixed effects and denotes random error terms. denotes the control variables, including the level of economic development, the length of actual roads at the end of the year, the area of roads owned per capita, the number of patents granted for inventions, etc. and denotes the level of industrial structure, which indicates the advanced industrial structure and the rationalisation of industrial structure. The regional dummy variables were set up, with the key provinces under the Belt and Road being set as the treatment group with a value of 1, and the other provinces not involved naturally constituting the control group for this experiment with a value of 0. The time dummy variables were set up, with a value of 1 if they were within the implementation time of the Belt and Road, and 0 otherwise. "The net benefits of the Belt and Road policy on the change of China's industrial structure were assessed by constructing interaction terms.

In this study, the DID test is used to describe the results with and without the control variables, so as to more comprehensively test the policy effects of the Belt and Road on industrial restructuring and industrial rationalisation.

2.2 Data description

The data for this study are obtained from the National Bureau of Statistics of China, the China Statistical Yearbook and the China Environment Statistical Yearbook, and the number of employed persons in the three industries is obtained from the Wind database. The existing studies on the impact of industrial restructuring and upgrading mainly focus on two aspects of industrial rationalisation and industrial advancement. This study will use the share of tertiary industries in GNP to represent industrial rationalisation, using the Thiel index [Theil, H. (1967). Economics and Information Theory. Chicago: Rand McNally and Company.] to calculate industrial structural rationalisation.

(1) Advanced industrial structure

The history of economic development of various countries shows that with the development of economy and the increase of per capita income level, the distribution of labour and capital among the three industries undergoes regular changes, which is not only reflected in the change of industrial structure from labour and capital-intensive to knowledge and technology-intensive, but also the change of products from low value-added to high value-added, which is a gradual and dynamic process. The share of tertiary sector in GNP is an important indicator of the value added of a country's tertiary sector as a percentage of GNP, reflecting the stage of economic development of a country where a well-developed tertiary sector is the main driver of economic growth. This paper uses the ratio of the two to measure the contribution of the tertiary sector to the economy of a region, as a reflection of the degree of advanced industrial structure, i.e. the share of the tertiary sector in GNP.

(2) Rationalisation of industrial structure

For the measurement of industrial structure rationalisation, this indicator can reflect the impact of the Belt and Road Policy on the rational layout of the primary, secondary and tertiary industries, which is calculated through the Thiel Index in this study. Rationalisation of industrial structure refers to the coordinated development and high degree of interrelationship between industries based on the existing economic base, consumption level and allocation of production factors. The transition from an "unreasonable" to a "reasonable" industrial structure is a process of static optimisation. The principle of industrial structure rationalisation is the principle of coordinated development and
maximum efficiency among industries, and its objective is to achieve effective allocation of resources and maximise macroeconomic benefits.

The Thiel index is able to decompose the total differences between regions into two parts, with the formula

$$\text{Industry}_{it} = \sum_{i=1}^{n} \left( \frac{Y_i}{Y} \right) \ln\left( \frac{Y_i/L_i}{Y/L} \right)$$  \hspace{1cm} (3)$$

where Y denotes output and L denotes labour. If the economy is in equilibrium, then $\gamma = 0$, the larger the value the more irrational the industrial structure, and vice versa.

Based on theoretical analysis and the actual situation, the control variables selected for this study include: (1) the number of patents granted for inventions (patent). In this study, the number of patents granted by the patent administration department is used to represent the number of patents granted for inventions. (2) Economic level (pgdp): This study used the value of GDP per capita for measurement. (3) Urbanisation rate (urban), this study uses the percentage of urban population to express the urbanisation rate (4) Total population (population): this study uses the average value of total population over a period of time to express. (5) road area per capita (proadarea): this study uses road area per capita to express the road construction capacity. (6) Urban planning level (roadlength): This study uses the actual road length at the end of the year to express the urban planning level. (7) Third population employment (thirdlabor): This study uses the number of people working in the tertiary sector and earning wages to measure this. The variables are described in Table 1.

### Table 1. Description of the definition of variables

<table>
<thead>
<tr>
<th>Types of variables</th>
<th>Variable name</th>
<th>Symbol</th>
<th>Variable definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explained variable</td>
<td>Advanced industrial structure</td>
<td>high</td>
<td>The value added brought by the tertiary industry accounts for the gross national product</td>
</tr>
<tr>
<td></td>
<td>Rationalize the structure of production</td>
<td>instr</td>
<td>On the basis of the existing economic foundation, consumption level and production factor allocation, the coordinated development and high correlation among various industries will be realized</td>
</tr>
<tr>
<td></td>
<td>Experimental group</td>
<td>bti</td>
<td>The key provinces under BRI were set as the treatment group with a value of 1, and the other provinces that did not participate in the experiment naturally constituted the control group with a value of 0</td>
</tr>
<tr>
<td></td>
<td>Policy shock time</td>
<td>time</td>
<td>In the Belt and Road implementation time, the value is 1; otherwise, the value is 0</td>
</tr>
<tr>
<td></td>
<td>Number of invention patents authorized</td>
<td>invg</td>
<td>Number of patent rights granted by the patent administration department</td>
</tr>
<tr>
<td></td>
<td>Economic level</td>
<td>pgdp</td>
<td>Use per capita GDP (yuan) to measure</td>
</tr>
<tr>
<td></td>
<td>Urbanization rate</td>
<td>urban</td>
<td>Use the proportion of urban population in the total population (%) to express</td>
</tr>
<tr>
<td></td>
<td>Mean total population</td>
<td>population</td>
<td>The average of the total population over a period of time (person)</td>
</tr>
<tr>
<td></td>
<td>Per capita road area</td>
<td>proad</td>
<td>Size of road area occupied by urban population per capita (square meters)</td>
</tr>
<tr>
<td></td>
<td>Level of urban planning</td>
<td>roadlength</td>
<td>Using the actual road length at the end of the year (meters)</td>
</tr>
<tr>
<td></td>
<td>Number of employed persons in the tertiary industry</td>
<td>thirdlabor</td>
<td>The number of persons engaged in tertiary industry and earning wages</td>
</tr>
</tbody>
</table>

Table 2 shows the descriptive statistics of the core variables. As can be seen from Table 2, the mean values of the core explanatory variables for the experimental group during the sample period were 2.36 (advanced industrial structure) and 0.22 (advanced industrial structure).

The mean values of the control variables such as the number of patents granted for inventions, GDP per capita, urbanisation rate, total population, road area per capita, actual road length at the end of the year, and the number of people employed in the tertiary industry were 7165, 36011, 0.58, 4544,
15.33, 12164.07 and 1017 respectively. The above control variables all showed large differences and satisfied the randomness requirement of the variables.

Table 2. Descriptive statistics

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Mean value</th>
<th>Standard deviation</th>
<th>Minimum value</th>
<th>Maximum value</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>high</td>
<td>2.36</td>
<td>0.13</td>
<td>2.13</td>
<td>2.83</td>
<td>300</td>
</tr>
<tr>
<td>instr</td>
<td>0.22</td>
<td>0.13</td>
<td>0.02</td>
<td>0.66</td>
<td>300</td>
</tr>
<tr>
<td>invg</td>
<td>7165.39</td>
<td>10075.56</td>
<td>41.00</td>
<td>46091.00</td>
<td>300</td>
</tr>
<tr>
<td>pgdp</td>
<td>36010.59</td>
<td>20918.29</td>
<td>7341.04</td>
<td>107387.00</td>
<td>300</td>
</tr>
<tr>
<td>urban</td>
<td>0.58</td>
<td>0.13</td>
<td>0.34</td>
<td>0.89</td>
<td>300</td>
</tr>
<tr>
<td>population</td>
<td>4544</td>
<td>2712</td>
<td>563</td>
<td>10849</td>
<td>300</td>
</tr>
<tr>
<td>proad</td>
<td>15.33</td>
<td>4.68</td>
<td>4.04</td>
<td>26.20</td>
<td>300</td>
</tr>
<tr>
<td>roadlength</td>
<td>12164.07</td>
<td>10710.19</td>
<td>710.80</td>
<td>49269.22</td>
<td>300</td>
</tr>
<tr>
<td>thirdlabor</td>
<td>1017</td>
<td>624</td>
<td>110</td>
<td>3378</td>
<td>300</td>
</tr>
</tbody>
</table>

3. Pre-analysis preparation

3.1 Comparative analysis

(1) Advanced industrial structure: The two tables of advanced industrial structure show how the industrial structure of provinces along BRI changed in terms of advanced values before and after the implementation of the policy. In general, before the implementation of the policy, the values for coastal areas were generally higher than those for inland areas, with the highest values in the east, followed by those in the centre and the lowest in the west. In addition, some provinces have higher advancedization indicators than their neighbours, both before and after the implementation of the policy. For example, in Shanxi Province, this may be due to the fact that its early development relied on the highly polluting, energy-consuming coal industry, but after a long period of exploitation, it caused resource depletion and environmental pollution problems, so that after strict air treatment [Information on: http://www.gov.cn/zwgk/2013-09/12/content After rigorous air control], the output value of the tertiary industry in Shanxi has been growing, resulting in a "three, two, one" industrial structure in Shanxi province, which has been continuously adjusted, thus improving the index of advanced industrial structure. At the same time, almost all the provinces along the route have seen an increase in industrial structure sophistication indicators after the implementation of the "Belt and Road" policy, although the extent of the increase varies, including Xinjiang, a large province in western China, where the primary industry was the pillar of GDP before the implementation of the policy and the secondary and tertiary industries had a weak industrial base. Xinjiang's secondary and tertiary industries have developed rapidly since the policy was implemented, with a focus on tourism, electronics and textiles, accelerating the construction of a modern industrial system and achieving significant results. It can be inferred that the "Belt and Road" initiative has had a positive effect on the advanced industrial structure of the provinces and cities along the route.

(2) Rationalisation of industrial structure: The two tables on the rationalisation of industrial structure show the changes in the rationalisation indicators of the industrial structure of the provinces along BRI before and after its implementation. This is probably due to the fact that the eastern and coastal regions have developed earlier and have accumulated a good industrial and economic base thanks to their excellent geographical location and the strong support of the state. Guangdong Province, for example, is located in the Pearl River Delta, and its advantageous geographical location has facilitated the absorption of capital and technology brought by Hong Kong and overseas Chinese, while the reform and opening up in the 1980s made Guangdong the first special economic zone to open up and develop gradually. At the same time, most of the provinces along the route have seen
their industrial structure adjusted after the implementation of the policy, as can be seen from the graph, the largest value range has been reduced from five provinces to one, and the number of provinces in the middle range has been increasing, with each province's industry tending to be rationalised. For example, in the process of rationalising the industrial structure of the Inner Mongolia provinces, the rationalisation index of Inner Mongolia decreased from 0.45 before the implementation of the policy to 0.34 after the implementation of the policy. This may be due to the fact that earlier Inner Mongolia had a developed animal husbandry industry and a single production process, with a large number of factories producing in the form of family handicraft workshops, after promoting the standardisation of production processes, Inner Mongolia adopted large machines to produce and increase the commercialisation of dairy products. This has led to a decrease in the proportion of the primary sector and an increase in the proportion of the secondary and tertiary sectors, resulting in a more rational industrial structure in Inner Mongolia.

3.2 Parallel trend test

The experimental group and the control group have the same growth trend before the occurrence of the policy (before the implementation of the policy) is a necessary condition for estimating the effectiveness of the policy using the DID method. Conversely, if there is a certain difference between the experimental group and the treatment group ex ante, it is very likely that there are other factors affecting the variation of the explanatory variables, so this paper needs to conduct a parallel trend test on the explanatory variables.

After the parallel trend test, it was found that before 2014, the degree of advanced industrial structure in the experimental group was higher than that in the control group, and the trend of change was the same, indicating that the hypothesis of the parallel trend test was basically satisfied, and both the experimental group and the control group were not subject to policy intervention before the implementation of the policy. However, after 2014, the experimental and control groups gradually showed different trends, and the gap narrowed. Before 2014, the degree of rationalisation of industrial structure in the experimental group was higher than that in the control group, and the trend was the same, indicating that the hypothesis of the parallel trend test in this paper was basically satisfied, and
both the experimental group and the control group were not subject to policy intervention before the implementation of the policy. However, after 2014, the experimental group and the control group gradually showed different trends, and the preliminary judgment is that this gap may be caused by the implementation of BRI.

4. Results and analysis

4.1 Basic regression test

According to Table 3, without considering the control variables, the impact of Belt and Road on the advanced industrial structure (HIGH) is insignificant, and the impact on the rationalisation of industrial structure (instr) is significant, but for both indicators, after adding the control variables of year-end actual road length, road area per capita, number of patents granted, and CDP per capita, the impact of Belt and Road on the rationalisation of industrial structure (instr) is significant. The "Belt and Road" policy has a significant policy effect on China's industrial structure. Belt and Road significantly reduces instr, but as an inverse indicator, it is Belt and Road that drives the rationalisation of industrial structure.

Table 3. Underlying regression tests

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>high</th>
<th>instr</th>
</tr>
</thead>
<tbody>
<tr>
<td>( b_{\text{bri} \times \text{time}_{it}} )</td>
<td>0.00839</td>
<td>-0.0198**</td>
</tr>
<tr>
<td>(0.00538)</td>
<td>(0.00916)</td>
<td></td>
</tr>
<tr>
<td>Control variable</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Time fixed effect</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Individual fixed effect</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Constant</td>
<td>0.400***</td>
<td>0.265***</td>
</tr>
<tr>
<td>(0.00413)</td>
<td>(0.00704)</td>
<td>(1.416)</td>
</tr>
<tr>
<td>Observations</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

"As an advocate, China has sought to set an example by deepening industrial reform from the top down, based on the current industrial situation. (1) BRI has provided impetus for enterprise development and industrial structure optimisation. This study evaluates the policy effects of the Belt and Road on the advanced and rationalised industrial structure, taking into account GDP per capita, and finds that various policy communication mechanisms have been established between key provinces along the Belt and Road, which have had a positive impact on enterprises' This has had a positive impact on enterprise restructuring and industrial upgrading. Moreover, the rational circulation of resource allocation factors between industries has led to the optimal allocation of resources, as the study concluded that the Belt and Road has promoted the rationalisation of industrial structure. (2) After incorporating several control variables such as technological innovation, economic development and infrastructure construction, the Belt and Road has had a positive policy effect on industrial restructuring and industrial rationalisation. "In the process of implementing the Belt and Road, innovative technologies and highly qualified personnel have been introduced, providing technical support for industrial upgrading. Moreover, the "Belt and Road" has provided policy advantages to key provinces along the route (pilot), promoting local economic development and infrastructure construction, enabling the development of enterprises with the support of advanced technology and equipment, creating a favourable environment, which is more conducive to upgrading and adjustment, further improving the industrial structure, while this adjustment This is rationalised and in line with local economic development facts. (3) In the process of assessing the effects of the "Belt and Road" policy, the number of people employed in the tertiary sector, the total population and the proportion of the urban population are included in this study, indicating that after taking into account the population and employment factors, a large number of surplus rural labourers have moved to the cities and towns, which, driven by the urbanisation rate, has provided a long term guarantee for the upgrading and adjustment of the industrial structure. The labour force is guaranteed in terms of
quantity. Moreover, talents are the human capital for the construction of the Belt and Road, and training high-quality talents will solve the technical problems of construction implementation. The quality of the workforce will also be met.

4.2 Placebo test

To further verify the robustness of the previous findings, a counterfactual placebo test is constructed here. In this study, 2 placebo tests are used, the first one is based on the original data by removing the data after the policy shock year 2014, retaining the data during the period when the Belt and Road Policy was not implemented and adding the data from 2005-2009, i.e. using the data from 2005-2013 and selecting 2008 as the spurious policy shock year and continuing to use DID for the test. The second approach is to use data from 2010-2019, removing all pilot areas from the sample and retaining the non-pilot area sample. Some regions near the original pilot were selected as the spurious experimental group. The spurious experimental groups constructed in this study were Beijing, Tianjin, Sichuan, Shandong, Jiangsu and Hubei, and the DID test was used. According to Table 4, all the test results are insignificant when considering the control variables, i.e. the test results are consistent with the baseline test results. This indicates that the conclusion that the "Belt and Road" initiative promotes the upgrading of China's industrial structure is robust.

Table 4. Placebo test

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>high</th>
<th>indtr</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>bri _it = time _it</td>
<td>-0.00759</td>
<td>-0.000495</td>
<td>-0.00661</td>
</tr>
<tr>
<td>(0.00490)</td>
<td>(0.00917)</td>
<td>(0.00943)</td>
<td>(0.0117)</td>
</tr>
</tbody>
</table>

Control variable

Time fixed effect

Individual fixed effect

Constant

Observations

5. Conclusions and policy recommendations

The BRI has provided sufficient impetus for industrial upgrading and rationalisation after strengthening policy communication and cooperation in the regions along the route, as shown by the following:

(1) Participation in the "Belt and Road" construction is mainly through stabilising the macroeconomic situation, improving infrastructure construction, attracting surplus labour to the tertiary industry, researching and investing in advanced products and technologies, etc. to ensure that the tertiary industry can be strongly supported to develop under favourable policies, taking into account the influence of economic development, urbanisation and other factors. Belt and Road and then achieve industrial structure upgrading and promote the advanced industrial structure, and this conclusion has passed the empirical test.

(2) BRI has significantly reduced the rationalisation of industrial structure, but as an inverse indicator, it is the Belt and Road that has driven the rationalisation of industrial structure. By improving and adjusting the industrial structure, the industrial structure is set more in line with the advantages and actual situation of local economic development, indicating that the Belt and Road has achieved an increase in the rationalisation of industrial structure in the process of concrete implementation.

(3) The Belt and Road project has not only upgraded the industrial structure, i.e. the industrial structure has tended to become more advanced, but also rationalised the industrial structure. This means that this industrial restructuring and upgrading is in line with the characteristics and extent of economic development and the current development situation of the pilot provinces and cities, and
that it is not a policy formulation that only pursues industrial upgrading regardless of rationalisation. In the implementation of BRI, the key provinces, when participating in the development of "The Belt and Road Initiative" construction, develop the tertiary industry and high-end manufacturing, give full play to their policy advantages, strengthen foreign trade through a variety of ways, accelerate the high-quality development of service industries, and make full use of BRI has been used to adjust the industrial structure and achieve innovation and upgrading.

Based on the above research findings, this paper puts forward the following recommendations.

(1) Prioritise optimisation and adjustment of industrial structure and promote production capacity cooperation

If the industrial structure of a certain region is out of balance for a long time, its industrial structure will not achieve the improvement of the overall level of industry or the increase of added value. Capacity cooperation should be used as a path to promote the rational and orderly transfer of enterprises, specifically by transferring some industries with excess capacity from various countries along the route, including the gradient transfer of industrial regions and the transfer of high-energy-consuming and high-polluting industries, so as to further optimize the industrial structure of provinces along the route and drive industrial structure upgrading.

(2) Stabilising the national macro economy and introducing targeted favourable policies

The state plays a pivotal role in economic construction, and its policy regulation is aimed at providing a healthy environment and security for economic growth. To promote BRI, it is necessary to shift from a pragmatic to a pragmatic approach, with policies that are focused on promoting infrastructure, trade and economic projects for enterprises in the tertiary sector, such as tax breaks for enterprises and adjustments to land prices by local governments, to ensure the development of enterprises.

(3) Further promote infrastructure development and increase investment in transport construction

In terms of hardware, the provinces along the route should continue to invest more in land, water and air routes, increase the number of transport media and improve the transport capacity of the three routes by land, sea and air. At the same time, they should also strengthen the connection of transport hubs such as roads, ports and airports to enhance the intermodal transport capacity of the three routes by sea, land and air. In terms of software, the establishment of a modern intelligent transport system is particularly important, i.e. to solve the problems of inefficiency and waste of transport resources caused by different transport standards and rules in each city along the route, and the introduction of information technology to improve efficiency and all-round accessibility.

References


