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Does the Belt and Road Initiative facilitate China's corporate overseas investment: Based on a sustainable development perspective

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ABSTRACT

Corporate overseas investment is a pivotal element of the Belt and Road Initiative (BRI). As an all-round opening-up strategy, the BRI has brought new ideas to international cooperation, and Chinese enterprises should seize this opportunity to promote global sustainable development. Adopting the data of Chinese listed enterprises from 2011-2020, this paper investigates the impact of the BRI on corporate overseas investment (COI) and its mechanisms via exploiting the difference-in-differences model (DID). Results show that the BRI has significantly facilitated the COI along the routes. We observe that the findings still hold after a series of robustness tests. Mechanism analysis verifies that tax incentives and credit environment improvement are the main channels by which BRI enhances COI. Heterogeneity results reveal that this initiative is more prominent for small and medium-sized enterprises and enterprises in dominant industries. The extensive analysis suggests that from a sustainable development perspective, the BRI facilitates more overseas investment of enterprises in polluting or high energy-consuming industries; the COI is more affected by BRI in regions with more stringent environmental regulations. This study provides empirical evidence for BRI construction and regional development.

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1. Introduction

The Belt and Road Initiative (BRI) is a Chinese solution to achieve global sustainable development and common prosperity (Wang et al., 2021), and a critical public product contributed by China to the world. Chinese President Xi Jinping proposed the Silk Road Economic Belt and 21st Century Maritime Silk Road initiative in 2013. The objective of this initiative is to construct interconnection between Asia, Europe, and

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Africa as well as nearby seas. It aims to establish an international cooperation platform of extensive consultation, joint contribution, and shared benefits. The BRI provides a blueprint for China's trading partners and fosters trade cooperation among countries along this route (Du & Zhang, 2018). In March 2022, the National Development and Reform Commission (NDRC), the Ministry of Foreign Affairs of the People's Republic of China (MFA), the Ministry of Ecology and Environment of the People's Republic of China (MEE), and the Ministry of Commerce of the People's Republic of China (MOFCOM) jointly issued the "Opinions on Promoting the Green Development of the BRI", which encourages enterprises to carry out investment cooperation in new energy industry, new energy vehicle manufacturing and other fields. They stimulate enterprises to set up overseas equity investment funds focusing on green and low-carbon sectors, and to carry out China's COI in various ways flexibly.[1] Statistics show that by 2022, China has signed more than 200 cooperation documents with 149 countries and 32 international organizations to construct the BRI.[2] In addition to promoting the economic development of countries along the route through investment in transportation infrastructure projects, the Chinese government has also provided the Country (Region) Guide for Foreign Investment and Cooperation to encourage Chinese enterprises to "go global" via strengthening financial support and establishing cooperation parks (Chen & Chen, 2021).[3] "Going global" is not only conducive to developing market space, optimizing industrial structure, acquiring economic resources and technology sources, and improving enterprise performance, but also in line with national development plans (Jiang et al., 2020; Tang et al., 2020; Li et al., 2021). In the "2022 Government Work Report," the Chinese government emphasizes the goal of expanding a high level of opening up and promoting the stable development of foreign trade and foreign investment, requiring all departments should orderly carry out foreign investment cooperation.[4] Therefore, a natural and realistic question is whether the BRI has encouraged Chinese enterprises to "go global"? In particular, the current global epidemic is still ongoing and the external political environment is more complex and uncertain, which leads to increased instability of overseas investment. Facing such a complex international environment, is this friendly cooperation mechanism established by the BRI conducive to breaking the current difficulties?

A large body of existing literature has analyzed the factors affecting overseas investment by using the BRI framework. Extant studies have mainly explored from two aspects: investee and investor. Based on the investee perspective, several studies report that per capita income (Shahriar et al., 2019), labor cost (Lee et al., 2022), institutional factors (Deng et al., 2019; Mohsin et al., 2021; Lee et al., 2022), the degree of governance (Wu & Zhang, 2021), cultural differences (Deng et al., 2019; Mohsin et al., 2021), socio-political situation (Yao et al., 2019), financial development (Bilir et al., 2019), infrastructural development (Rehman & Noman, 2021; Rehman et al., 2022), market demand (Pan et al., 2022), and exchange rate fluctuations (Latief & Lefen, 2018) have pivotal impacts on overseas investment. Based on the investor perspective, scholars observe that labor intensity (Cheng & Qi, 2021; Ricardo & Camargo, 2020), openness (Sun et al., 2015), export experience (Fariñas et al., 2018), the ownership system of investment enterprises (Zhao & Lee, 2021), export

sophistication (Rehman & Ding, 2020), productivity (Gulen & Ion, 2015), government participation (Huang et al., 2022; De Beule & Zhang, 2022) affect Chinese investment in countries along the trade route.

Literature on whether the BRI enhances overseas investment is controversial. One strand of studies suggests that the BRI is conducive to promoting Chinese overseas investment, which emphasizes that this initiative opens up new areas for Chinese overseas investment and establishes a series of policy support, which enhances Chinese investment in countries along this trade route (Li & Li, 2022; Liu et al., 2018; Razzaq et al., 2021; Shao, 2020; Wu et al., 2020). Moreover, the BRI will also actively contribute to investment risk. Qian and Wang (2019) find that the BRI reduces the investment risk of Chinese SOEs in countries along the route. Yin et al. (2021) observe that the implementation of the BRI significantly decreases the political risk of Chinese overseas investment. However, another strand of studies reveals that the BRI has a limited effect on facilitating Chinese overseas investment. Scissors (2018) argues that the impact of the BRI on Chinese overseas investment may not be significant due to various factors. Using industry-level data, Nugent and Lu (2021) discover that the BRI has not created sufficient political incentives for Chinese multinational firms. However, some scholars insist that the initiative impedes overseas investment. Saif and Zhao (2021) find that the quality of infrastructure in host countries along the BRI impedes Chinese overseas investment. Adopting firm-level data from 2005-2017, Jin et al. (2021) find that the BRI increases the probability of troubled Chinese overseas investments in the BRI countries.

In summary, the impact of the BRI on China's overseas investment is still inconsistent. Most studies mentioned above examine overseas investment from the macro level; meanwhile, the literature investigating corporate overseas investment (COI) either employs dummy variables or limits the sample to large firms, and there is little empirical evidence to evaluate the impact of the BRI on COI comprehensively. Moreover, the channels through which the BRI affects COI require further exploration.

Based on the above background and existing studies, this paper explores the impact of exogenous variation induced by the BRI construction on Chinese COI using the data from Chinese A-share listed enterprises from 2011 to 2020. The findings show that the BRI significantly enhances Chinese COI. Mechanism analysis suggests that tax incentives and credit environment are the main channels through which the BRI stimulates COI. The improvement of tax incentives and credit environment can alleviate firms' financial constraints, improve the investment environment faced by enterprises, and thus, enhance their OI. Heterogeneous analysis indicates that the impact of BRI on COI is more pronounced for small and medium-sized enterprises, while having no significant effect on large-scale enterprises; furthermore, this positive impact is more prominent for enterprises in dominant industries. From a sustainable development perspective, the extensive analysis indicates that the BRI enhances more overseas investment of enterprises in polluting or high-energy-consuming industries than non-polluting or low-energy-consuming enterprises. We further confirm that COI is more affected by BRI in regions with more stringent environmental regulations.

The marginal contributions of this paper are as follows: (1) it enriches the research on the BRI and COI. Existing studies have mainly measured COI by adopting whether enterprises invest under the BRI, and their findings are disputed. Since enterprises are the main body of overseas investment (OI) and the amount of capital can reflect investment intensity, this paper explores the impact of BRI on COI by employing the amount of overseas investment of enterprises, which can adequately depict the corporate response to this initiative. (2) From the perspective of improving the investment environment, this paper explores the mechanism through which the BRI affects COI. Exploring this channel is conducive to providing the direction for spurring firms to participate in the BRI construction. Studies have examined the impact of the BRI on COI via reducing policy uncertainty and political risk in host countries as well as reducing incomplete transactions and hostile takeovers, but there is a lack of research from the perspective of market environment improvement (Du & Zhang, 2022; Shao, 2020). The BRI advocates governments to motivate enterprises to invest abroad by reducing the tax burden and providing financial support. The easing of tax constraints and the increase of financing scale motivate enterprises to invest abroad.

2. Institutional background and research hypothesis

2.1. Institutional background

The BRI aims to borrow the historical symbols of the ancient Silk Road, and actively develop economic partnerships with countries along the route. The "Vision and Actions on Jointly Building the Silk Road Economic Belt and the 21st Century Maritime Silk Road" (hereinafter referred to as the "Vision and Actions") were jointly released by the National Development and Reform Commission,[5] the Ministry of Foreign Affairs of the People's Republic of China, and the Ministry of Commerce of the People's Republic of China (MOFCOM) on March 28, 2015, which shows that the route of the BRI covers the continents of Asia, Europe, and Africa, including 18 Chinese inland provinces.[6] The "Vision and Actions" specify the cooperation contents of the BRI, including policy coordination, infrastructure connectivity, unimpeded trade, financial integration, and people-to-people bond (abbreviated as the "Five-Pronged Approach"). The "Five-Pronged Approach" is dedicated to dovetailing with the development strategies of countries along the route, exploring the potential of the regional market, and promoting investment and consumption. Specifically, in terms of policy coordination, China has signed BRI cooperation agreements with more than 100 countries and international organizations worldwide; in terms of infrastructure connectivity, the construction of railroads, highways, ports, airlines, postal services, energy, information infrastructure, and quality and technology systems are conducive to opening up transnational communication channels and facilitating the transmission of investment information. In terms of unimpeded trade, investment and trade facilitation, as well as investment fields broaden, are being strived to realize through the network of free trade zones, international production capacity cooperation, construction of overseas parks, and China-EU trains. Regarding financial integration, the People's Bank of China promotes the establishment of new cooperation platforms, strengthens cooperation with multilateral banks, dovetails with financial cooperation

mechanisms, and encourages the participation of development agencies, policy, and financial institutions, which helps to reduce liquidity ties in investment. In terms of the people-to-people bond, strengthening cultural exchanges, tourism exchanges, education and science, ecological and environmental protection, and health help to enhance the sense of identity between countries, strengthen friendly relations, and create a stable investment and trade environment. The BRI has become the world's most popular global public good and one of the most promising platforms for international cooperation. With the gradual promotion of the "Five-Pronged Approach," China will further explore new areas of cooperation, and optimize the investment environment to create more investment opportunities.

2.2. Research hypothesis

The unimpeded trade in the "Five-Pronged Approach" is a key element of the BRI construction (Dai & Wang, 2022; Zhang & Wu, 2022). It focuses on solving investment and trade facilitation issues, eliminating investment and trade barriers, and constructing a good business environment in the region and countries to stimulate the potential of cooperation and make the cooperation "cake" bigger and better. Chinese provinces and cities along the route have actively responded to the call and introduced various policies to create a favorable external environment for enterprises to "go global." For example, Shaanxi and Qinghai Province released their focus and direction of BRI construction to show their advantages; Zhejiang Province has mobilized enterprises' investment enthusiasm by means of inspecting policy incentives; Xinjiang Uygur and Guangxi Zhuang Autonomous Region have strengthened foreign exchanges by building transportation interconnection infrastructure; Heilongjiang Province and Tibet Autonomous Region have held meetings to explain the security and taxation policies for enterprises going abroad to ensure safe and efficient investments abroad (see Appendix A for details of policies formulated by provinces along China's BRI). In the context of the slow recovery of the world economy, and the adjustment of the investment and trade pattern, the BRI has not only opened up new paths for Chinese overseas investment, but also enabled provinces and cities along the route to improve their own investment conditions. Therefore, under the improved internal and external investment environment, enterprises in the provinces and cities along the route may exploit this opportunity and choose to invest abroad to improve capacity utilization, promote rational allocation of resources, and improve the quality of economic growth (Luo et al., 2021; Kong et al., 2021; Zhang, 2022; Zhao, 2021). This leads to the following hypothesis.

> Hypothesis 1: The BRI may enhance the overseas investment of firms along China's BRI routes.

Adequate financial support is a prerequisite for enterprises to make foreign investments. To a certain extent, taxation will have a "squeezing" effect on the retained earnings and cash flow of enterprises. Moreover, since "going abroad" is characterized by large capital needs and difficulties in obtaining credit from local banks, it is especially urgent for "going abroad" enterprises to obtain domestic credit support. Therefore, taxation and the domestic credit environment will play a key role in enterprises' overseas investment.

The BRI received a positive response from the State Taxation Administration of the People's Republic of China (STA) and local governments at the beginning of its implementation. To ensure the BRI construction in the region, a series of tax incentives policies have been introduced to support relevant enterprises. For example, the STA has actively established and improved the relevant working system to provide tax incentives for Chinese enterprises investing overseas.[7] Local governments, such as the aforementioned Heilongjiang Province, have held special meetings to explain investment tax incentives policies to enterprises. The implementation of various tax incentives has reduced the operating costs of enterprises, increased their after-tax cash flow, and eased their tax and capital pressure. Furthermore, as an important tool for the government to allocate resources and achieve strategic goals, the BRI directly or indirectly changes the external environment faced by enterprises, which in turn affects their financing status. To promote the BRI construction, many banks, including policy banks, large state-owned commercial banks, and joint-stock commercial banks, have actively set up to serve foreign exchange enterprises and increase credit support for the BRI projects.[8] The Silk Road Fund set up by the government also provides medium and long-term financial support for enterprises to invest in the BRI projects. However, there are differences in the financing structure of enterprises due to the scale and geographical factors; meanwhile, the government, banks, and other financial institutions have limited funds, and they have preferences on supporting targets. Under this influence, commercial financing has become another important way for enterprises to seek funds (Aishan & Lou, 2019). The BRI can signal the government's support for the relevant enterprises and enhance investors' confidence on firms' future development, and thus, commercial credit resources will flow to the relevant enterprises. Therefore, enterprises in pilot regions encouraged by the initiative may face an excellent credit environment and have advantages in credit financing, which could provide a solid financial foundation for enterprises to invest abroad.

In summary, the BRI, as an important national strategic policy, has received full support and cooperation from government departments at all levels. Specifically, various tax preferences and credit policies have not only enabled enterprises to obtain more disposable funds, which could enhance their foreign capital investment. Furthermore, these initiatives could create a favorable policy environment to encourage enterprises to invest abroad. The policy environment can positively contribute to the growth of enterprises' overseas investment scale. The following hypothesis is proposed.

Hypothesis 2: the BRI may promote COI via improving the investment environment.

To visualize the analysis, we give a diagram of the mechanisms in Figure 1.

3. Empirical strategy and data

3.1. Empirical strategy

The BRI is used as a quasi-natural experiment to assess the impact of this policy on overseas investment of enterprises in Chinese provinces along the route. As the introduction of the BRI may be interfered with by some unobserved variables, we exploit the DID method to alleviate endogenous problems. Equation 1 demonstrates the logic

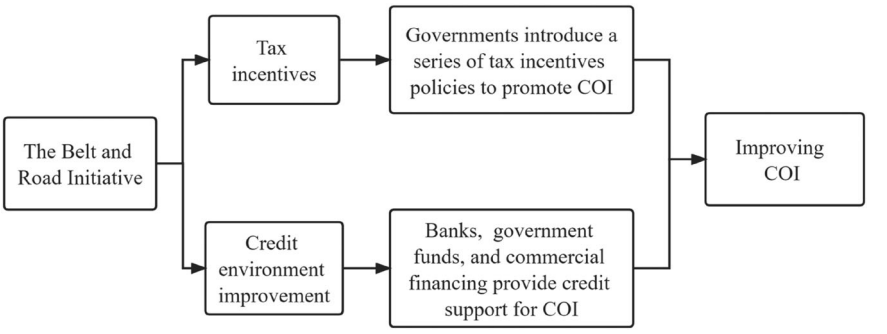

Figure 1. Influential mechanisms of the BRI.
Source: Authors.

of DID approach. By comparing the changes of COI in the treatment group (the first difference) with the changes of COI in the control group before and after the BRI policy (the second difference), we obtain the net policy effect of BRI on the COI.

$$\beta^{DID} = \underbrace{\underbrace{(\ln.COI_{\text{treat}=1,\text{post}=1} - \ln.COI_{\text{treat}=1,\text{post}=0})}_{\text{the first difference}} - \underbrace{(\ln.COI_{\text{treat}=0,\text{post}=1} - \ln.COI_{\text{treat}=0,\text{post}=0})}_{\text{the second difference}}}_{\text{difference-in-differences}} \tag{1}$$

Drawing on Beck et al. (2010), Wu et al. (2020), Chen and Lin (2020), and Wang and Lu (2019), the model is set as follows.

$$COI_{\text{it}} = \alpha + \beta Treat_i \times Post_t + \phi X_{it} + \lambda_i + \mu_t + yeartrend_m + \varepsilon_{it} \tag{2}$$

where COI_{it} is the amount of overseas investment of enterprise i in year t;$Treat_i$ represents whether an enterprise is located in the 18 provinces along the BRI route; if it situates in the pilot province, the value is 1; otherwise, it is 0. $Post_t$ is a policy time variable, which takes 1 for 2014 and the subsequent years, and 0 otherwise. X_{it} are a set of control variables that affect the COI; λ_i and μ_t denote firm fixed effects and year effects; $yeartrend_m$ represents city-specific time trend (to control for unobserved city factors that change over time), and ε_{it} is a random error term in equation (2).

Based on the method of Wen et al. (2004), this paper uses a mediating effect model to test whether the BRI promotes COI through tax incentives and the improvement of the credit environment. Specifically, first, based on model (2), we observe whether the coefficient β is significant, and if it is significant, we proceed to the second step. Second, based on model (3), we test whether the effect of the interest variable Treat × Post on the mediating variable M is significant; if the coefficient η is significant, the third step is performed. Third, the mediating variable is added to the model (2) as a control variable to test the significance of the coefficients δ and γ in the model (4). If at least one of the coefficients η and γ is insignificant, Sobel or Bootstrap test should be conducted; if both are significant, the mediating effect exists.

$$M_{\mathrm{it}} = \alpha_1 + \eta Treat_i \times Post_t + \phi X_{it} + \lambda_i + \mu_t + yeartrend_m + \varepsilon_{it} \quad (3)$$

$$CDI_{\mathrm{it}} = \alpha_2 + \delta Treat_i \times Post_t + \gamma M_{\mathrm{it}} + \phi X_{it} + \lambda_i + \mu_t + yeartrend_m + \varepsilon_{it} \quad (4)$$

where M_{it} is the mediating variable, representing tax incentives and credit environment variables, respectively; the rest of the variables are set in line with Equation (2).

3.2. Data and variable selection

3.2.1. Data

Using the data of A-share listed companies in China from 2011 to 2020 as the sample, and based on existing studies, the data are processed as follows (Thakolwiroj & Sithipolvanichgul, 2021; Xiong et al., 2020; Zhang & Yang, 2020). This paper removed the delisted companies and those serious missing values. Furthermore, we excluded financial enterprises and special treatment (ST) and (*ST) companies. Moreover, we winsorized all continuous variables at 1% and 99% levels to control the effect of extreme values on the results. After the above processing, a total of 15,052 samples are obtained. The data stem from the China Stock Market & Accounting Research Database (CSMAR) and annual reports of listed enterprises.

The core variable is the BRI policy, i.e., $Treat \times Post$. Drawing on Wang and She (2020), Post is set with the time of BRI introduction; that is, the value is 1 if the time is in and after 2014 (the policy implementation year), 0 otherwise; Treat is a dummy variable for whether the enterprise is situated along the BRI route. If the enterprise is registered in a province along the BRI route, Treat takes the value of 1, and 0 otherwise.

Referring to existing studies, this paper also controls the firm size, R&D intensity, asset structure, growth capacity, and accounting performance (Huang et al., 2022; Jiang et al., 2022; Liu & Wang, 2022; Thakolwiroj & Sithipolvanichgul, 2021; Yang, 2022). Firm size includes the number of employees (Staff) and total assets (Asset), and we use the natural logarithm of both variables. The logarithm of R&D cost expenditure plus one is used to measure R&D intensity (RD). The asset structure Lev is calculated by using the ratio of total liabilities to total assets. Growth is represented by the growth rate of operating revenue, which is obtained from (current operating revenue - previous operating revenue)/previous operating revenue. Accounting performance (ROE) is the return on net assets of the enterprise and the calculation formula is net income/shareholders' equity. The descriptive statistics of variables are displayed in Table 1.

4. Empirical analysis

4.1. Baseline results

In this paper, we use model (2) to study the impact of the BRI policy on the overseas investment of enterprises along the route. Firm and year fixed effects are controlled in the regressions to absorb the impact of firm characteristics and micro shocks on COI. Moreover, considering that many unobserved, city-time factors may affect COI,

Table 1. Descriptive statistics of variables.

Variable	Variable Name	Obs	Mean	Min	Max
COI	Corporate overseas investment	15052	0.706	0	6.327
Treat × Post	BRI	15052	0.376	0	1
Staff	Number of employees	15052	7.808	4.159	11.187
Asset	Total Assets	15052	22.398	19.563	26.366
RD	R&D Costs	15052	4.472	0	21.132
Lev	Asset-liability ratio	15052	0.444	0.050	0.956
Growth	The growth rate of operating revenue	15052	0.145	−0.632	4.070
ROE	Returns on net assets	15052	0.062	−0.759	0.368

Source: CSMAR database and authors' calculations.

Table 2. Baseline regression results.

	(1))	(2)	(3)	(4)
Variables	COI			
Treat × Post	0.339**	0.339**	0.339**	0.339***
	(0.146)	(0.161)	(0.141)	(0.103)
Staff	0.105***	0.105***	0.105***	0.105***
	(0.033)	(0.027)	(0.034)	(0.036)
Lev	0.215	0.215	0.215*	0.215
	(0.138)	(0.167)	(0.122)	(0.168)
Asset	0.152***	0.152***	0.152***	0.152***
	(0.047)	(0.053)	(0.052)	(0.052)
RD	0.013***	0.013***	0.013***	0.013***
	(0.003)	(0.002)	(0.004)	(0.004)
Growth	−0.036*	−0.036	−0.036	−0.036
	(0.022)	(0.029)	(0.023)	(0.025)
ROE	−0.141	−0.141*	−0.141*	−0.141*
	(0.094)	(0.076)	(0.084)	(0.081)
Constant	−3.786***	−3.786***	−3.786***	−3.786***
	(0.958)	(1.134)	(1.078)	(1.025)
Observations	14,290	14,290	14,290	14,290
Adjusted R-squared	0.712	0.714	0.712	0.714
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
City-Specific Time Trend	Yes	Yes	Yes	Yes
Cluster	Firm	Industry	City	Province

Note: *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; standard errors are displayed in parentheses; all regressions include firm fixed effects, year fixed effects, and city-specific time trend terms.
Source: Authors.

the city-specific time trend is also controlled. Columns (1)-(4) of Table 2 show the estimation results are clustered to the firm, industry, city, and province levels, respectively. All results indicate that the BRI significantly promotes COI, which verifies Hypothesis 1. Our findings are in line with Liu et al. (2018), Razzaq et al. (2021), Shao (2020), and Wu et al. (2020), which is a complement to the related studies on Chinese overseas investment.

4.2. Parallel trend test

A valid prerequisite for the DID estimation is to satisfy the parallel trend assumption, i.e., the control group and the treatment group should have a similar trend before the implementation of the BRI policy. We use the event study method to verify whether this study meets this assumption. That is, the interaction term between the dummy variable of the year and the dummy variable of the treatment group is generated and

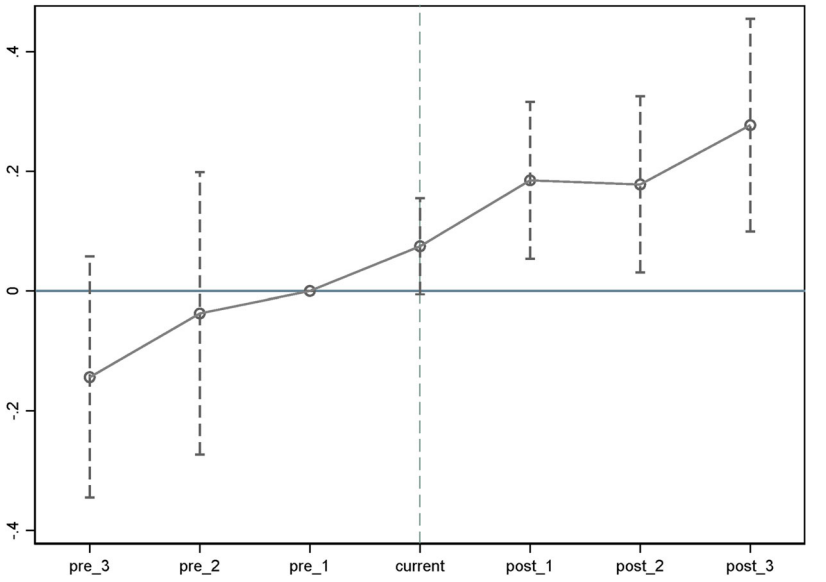

Figure 2. Parallel trend test.
Source: Authors.

used as the explanatory variable for regression. The interaction term coefficient reflects the difference between the treatment group and the control group in a specific year. If the coefficient contained zero in the confidence interval, it indicates that there is no significant difference between the treatment group and the control group. The horizontal coordinate in Figure 2 represents the adoption year of the BRI (2014); pre_1, pre_2, and pre_3 represent 1, 2, and 3 years before 2014. post_1, post_2, and post_3 denote 1,2 and 3 years after the BRI. Figure 1 illustrates that before the BRI initiative, there is no significant discrepancy between the treatment and the control group in COI, so the parallel trend assumption is satisfied.

4.3. Robustness check

4.3.1. Deleting the sample, controlling for industry factors, and replacing the dependent variable

To ensure the robustness of the benchmark results, first, we set the policy shock year to 2014. In fact, the BRI was proposed in October 2013. Therefore, considering that this initiative may affect the COI in 2013, we deleted the 2013 sample and re-estimated the results. Second, because the "Vision and Actions" clearly proposed 18 provinces along the BRI route in 2015, this paper sets the policy time to 2015 to confirm the robustness of the findings. Third, we substitute the dependent variable. Since enterprises have more control over subsidiaries, their investment behavior in subsidiaries could better reflect enterprises' investment intentions. Drawing on Ouyang et al. (2020), we retain only enterprises' investment in overseas subsidiaries. The re-estimated results are shown in columns (1)–(3) of Table 3, respectively. All the results

Table 3. Robustness checks.

	(1)	(2)	(3)	(4)
	Excluding years of initiative implementation	Initiative year pushed back one year	Replacement of foreign investment variables	PSM-DID
Variables		COI		
Treat × Post	0.340**	0.330***	0.307***	0.339***
	(0.128)	(0.094)	(0.086)	(0.102)
Constant	−3.719***	−3.765***	−2.704***	−3.897***
	(1.008)	(1.029)	(0.925)	(1.035)
Controls	Yes	Yes	Yes	Yes
Observations	12814	14290	14289	14280
Adjusted R-squared	0.718	0.714	0.720	0.714
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
City-Specific Time Trend	Yes	Yes	Yes	Yes

Note: *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; standard errors are displayed in parentheses; all regressions include firm fixed effects, year fixed effects, and city-specific time trend terms.
Source: Authors.

present that the direction and magnitude of the coefficients of the BRI do not change significantly, implying that the results of Table 2 are solid.

4.3.2. PSM-DID estimation

Although the DID method has the merit of overcoming self-selection bias, the initial differences caused by some unobserved factors still exist. Therefore, considering the COI is affected by firm-level unobserved variables, we use the PSM-DID method to mitigate this endogeneity problem. We aim to find a comparing non-BRI group that displays the same characteristics as the BRI group. Drawing on Heyman et al. (2007) and Stiebale and Vencappa (2018), we first selected covariates that simultaneously affect COI and the BRI introduction. Second, employing the BRI as the dependent variable and the covariates as independent variables, we used the logit model to estimate the propensity scores. Third, based on the estimated score, we exploited the nearest-neighbor matching within the caliper to match the sample. Then, using the matched sample, we re-estimated the DID model. The matching process and the estimated results are shown in Appendix B. The matched data pass the balance test, and the estimated results of PSM-DID are displayed in column (4) of Table 3. The result shows that the coefficient of the core explanatory variable fluctuates less and does not change in sign compared with the baseline result, implying that the BRI spurs COI.

4.3.3. Policy exogeneity test

To verify the policy exogeneity, referring to the method of Song et al. (2020), we explore whether the choice of being a treatment group is influenced by COI. Specifically, we select the years 2011 and 2012 before the policy implementation as samples. The Logit model is constructed with Treat as the dependent variable and COI as the independent variable, and the control variables were the same as the model (2). Columns (1) and (2) of Table 4 display that COI is not significant, indicating that the policy exogeneity test is passed.

Table 4. Policy exogeneity test.

	(1)	(2)
Year	2011	2012
Variables	Treat	
COI	0.223	0.136
	(0.148)	(0.093)
Controls	Yes	Yes
Observations	1654	1654
Pseudo R-squared	0.011	0.013
Year Fixed Effects	No	No
Firm Fixed Effects	No	No
City-Specific Time Trend	No	No

Note: *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; standard errors are displayed in parentheses; all regressions include firm fixed effects, year fixed effects, and city-specific time trend terms.
Source: Authors.

Table 5. Heterogeneity analysis.

	(1)	(2)	(3)	(4)
	Large size	Small and medium size	Key industries	Non-key industries
Variables		COI		
Treat × Post	0.042	0.202***	0.465***	−0.141***
	(0.060)	(0.033)	(0.119)	(0.025)
Constant	−0.166***	−0.863***	−5.352***	−3.671***
	(0.630)	(0.220)	(1.857)	(1.708)
Controls	Yes	Yes	Yes	Yes
Observations	6165	7566	8239	5329
Adjusted R-squared	0.767	0.688	0.731	0.723
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
City-Specific Time Trend	Yes	Yes	Yes	Yes

Note: *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; standard errors are displayed in parentheses; all regressions include firm fixed effects, year fixed effects, and city-specific time trend terms.
Source: Authors.

5. Heterogeneity analysis

From firm size, productivity, and industry type, this paper examines the impact of firm heterogeneity on the initiative. First, based on firms' financial strength and domestic status, the willingness of firms of different sizes to invest abroad varies dramatically, which may lead to different responses to this initiative. Second, discrepancies in firm productivity may affect COI, which can either strengthen or weaken their motivation to invest abroad. Finally, MOFCOM has listed the "going out" industries, which may have a differential impact on enterprises in different industries. Exploring the impact of enterprise heterogeneity on the COI under the promotion of the BRI will provide a direction for the BRI construction and develop new investment growth potential.

5.1. Firm size

Total enterprise assets (Asset) is used to define the size of an enterprise. If the value of an enterprise is greater than the average value of all enterprises, it is defined as a large-scale enterprise; otherwise, it is a small- and medium-scale enterprise (SMEs).

Large-scale enterprises have sufficient capital, strong domestic competitiveness, and stable operation, so their willingness to expand abroad is relatively low. Small and medium-sized enterprises are at a disadvantage in the domestic market, and this initiative can ease their capital constraints and provide a good opportunity for them to improve their product competitiveness and open foreign markets. The regression results in columns (1)–(2) of Table 5 show that the coefficient of BRI in the small and medium-sized enterprise group is significantly positive, but not significant in large enterprises. The findings suggest that BRI improves the investment environment along the route, which provides opportunities for SMEs to invest overseas, and enhance their competitiveness. Large-scale enterprises, especially state-owned enterprises, have abundant domestic survival resources, so they may be less motivated by BRI to seek external investment.

5.2. Industry type

In 2017, MOFCOM released the "Investment promotion study under the Belt and Road Initiative," which delineates the key docking industries, including emerging advantageous industries, surplus capacity industries, and supporting industries.[9] The enterprises belonging to the key industries are given preferential treatment in terms of resources, and even to a certain extent, the resources of non-key industries are compressed, which results in a great difference in the response of the two types of enterprises to the initiative. Columns (3) and (4) of Table 5 display that this initiative has a positive effect on the OI of enterprises in key industries, while having a significant negative effect on non-key industries. The government encourages priority development of key industries; for example, high-speed rail, nuclear power, machinery, electricity, telecommunications, and other advantageous industries are the strategic focus of the foreign investment. Therefore, these industries are more affected.

6. Mechanism analysis

As we can see from the above-mentioned findings, the BRI can significantly boost overseas investment by Chinese companies along the route. So, in what way does this initiative promote COI? We argue that the BRI has improved the investment environment of enterprises along the route via providing more preferential policies for them, so this paper will examine from two aspects: tax incentives and credit environment improvement.

6.1. Description of mediating variables

The paths that the BRI affects COI mainly include reducing the tax burden and optimizing the credit environment. Drawing on the approach of Xu et al. (2022), we use the natural logarithm of tax rebates received by enterprises plus one to represent tax benefits (Tax). Drawing on the method of Aishan and Lou (2019) the sum of a firm's commercial financing (the sum of accounts payable, notes payable, and deposit received) and bank financing (the sum of long-term and short-term loans) is used to

Table 6. Mediating effects.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	COI	Tax	COI	Credit	COI	COI
Treat × Post	0.339***	0.014***	0.316***	0.127***	0.316***	0.300***
	(0.103)	(0.003)	(0.096)	(0.025)	(0.010)	(0.093)
Tax			1.429***			1.359***
			(0.338)			(0.358)
Credit					0.231**	0.179**
					(0.085)	(0.084)
Constant	−3.786***	−0.441***	−3.169***	−11.853***	−1.225***	−1.293
	(1.025)	(0.071)	(1.069)	(0.311)	(1.299)	(1.349)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14290	14193	14193	14232	14232	14136
Adjusted R-squared	0.714	0.759	0.718	0.965	0.715	0.718
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
City-Specific Time Trend	Yes	Yes	Yes	Yes	Yes	Yes

Note: *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; standard errors are displayed in parentheses; all regressions include firm fixed effects, year fixed effects, and city-specific time trend terms.
Source: Authors.

measure the credit size (Credit). Tax incentives and credit environment enhancements reduce the investment pressure on enterprises, allowing them to have more funds for overseas investment and creating a favorable policy environment for foreign investment.

6.2. Mediating effect test

Columns (1)–(5) of Table 6 display the mediating effect results of tax incentives and credit environment. Column (1) shows the impact of the BRI on COI; columns (2) and (4) present the impact of the BRI on enterprises' tax incentives and credit environment, respectively; column (3) reports the estimated results of adding the tax incentive variable; column (5) controls for both the credit environment and the BRI policy variable. Column (6) includes tax incentives, credit environment, and policy effects variable. The results show that the BRI stimulates enterprises to invest abroad by increasing tax incentives and improving the credit environment. Hypothesis 2 is verified.

7. An extensive analysis: sustainable development perspective

7.1. Enterprises in different types of industries

The above results show that the BRI Initiative provides opportunities for Chinese companies to go global. Since 2011, the Chinese government has included green and sustainable development in the 12th Five-Year Plan. Therefore, enterprises have actively sought to transform and upgrade to meet this requirement. The difficulty of achieving green sustainability varies between polluting and non-polluting enterprises. In the face of stringent environmental regulations by the Chinese government, polluting enterprises are more aggressive in seeking commercial investment opportunities to survive and transform. Therefore, according to Tong (2022) and the "Statistical Report on National Economic and Social Development 2010,"[10] we classify the sample

Table 7. Enterprises in different types of industries.

	(1)	(2)	(3)	(4)
	Polluting industries	Non-polluting industries	High-energy-consuming industries	Low-energy-consuming industries
Variables			COI	
Treat × Post	0.390***	0.042*	0.339***	0.130**
	(0.063)	(0.022)	(0.099)	(0.062)
Constant	−5.717**	−4.243***	−7.368	−4.162***
	(2.164)	(0.893)	(4.563)	(1.151)
Controls	Yes	Yes	Yes	Yes
Observations	4261	9435	1912	11803
Adjusted R-squared	0.717	0.726	0.711	0.717
Year Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes
City-Specific Time Trend	Yes	Yes	Yes	Yes

Note: *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; standard errors are displayed in parentheses; all regressions include firm fixed effects, year fixed effects, and city-specific time trend terms.
Source: Authors.

Table 8. Environmental governance intensity.

	(1)	(2)
	High environmental governance	Low environmental governance
Variables	COI	
Treat × Post	0.275***	0.222
	(0.026)	(0.215)
Constant	−3.692**	−3.581*
	(1.318)	(1.841)
Controls	Yes	Yes
Observations	6608	7412
Adjusted R-squared	0.715	0.769
Year Fixed Effects	Yes	Yes
Firm Fixed Effects	Yes	Yes
City-Specific Time Trend	Yes	Yes

Note: *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively; standard errors are displayed in parentheses; all regressions include firm fixed effects, year fixed effects, and city-specific time trend terms.
Source: Authors.

into polluting and non-polluting industries, as well as high-energy-consuming or low-energy-consuming industries.

Columns (1) and (2) of Table 7 show that BRI promotes polluting and non-polluting enterprises to seek overseas investment. Compared to enterprises in non-polluting industries, BRI has a more prominent effect on polluting enterprises' overseas investment. This result may be accounted for by the greater transition and survival pressure on these enterprises in the face of environmental regulations. Therefore, they strive to seek more resources and space to support their development under the BRI. Similarly, columns (3) and (4) present that BRI increases COI in both high energy-consuming and low energy-consuming industries, and this positive effect is more pronounced in high energy-consuming industries.

7.2. Environmental governance intensity

Although the central government has imposed requirements on local governments for environmental governance, there are discrepancies in environmental enforcement

among local governments. Therefore, the environmental governance intensity of local government is a vital factor that affect the survival of local enterprises. If these enterprises, especially polluting enterprises, are subject to greater environmental governance constraints, they may seek overseas development opportunities under the BRI, resulting in the increase of COI. We further divide the enterprises sample into two categories: high and low environmental governance intensity, and substitute them into model (2) for regression. The results in Table 8 indicate that the impact of BRI on COI is more pronounced in regions with strict environmental enforcement, which confirms our argument.

8. Conclusions and recommendations

At this critical moment when the global political and economic landscape is undergoing profound changes, enterprises' "going out" activities are hampered; whether the BRI can effectively break the current dilemma and provide a key platform for enterprises to invest abroad is still uncertain. This paper examines the impact of the BRI on COI by using the DID model. The results show that the overseas investment of enterprises along the BRI route has increased significantly compared with that of enterprises along the non-BRI ones. Heterogeneous analysis indicates that small and medium-sized enterprises, and enterprises in key industries respond more strongly. The extensive analysis observes that enterprises in polluting industries or high-energy-consuming industries are more inclined to invest overseas; The COI is more susceptible to the BRI in regions with more stringent environmental regulations. Mechanism analysis observes that the BRI affects COI mainly through two paths: tax incentives and credit environment improvement.

The findings not only confirm the current achievements of the BRI construction, but also provide directions to promote the efficient and stable development of COI. Specifically, first, we observe that the BRI facilitates COI. Therefore, the government should further accelerate the BRI construction. By introducing incentive policies, the government could fully mobilize the enthusiasm of micro-economic agents, encouraging and guiding enterprises to invest overseas. Second, we conclude that small and medium-scale enterprises and enterprises in key industries have a prominent increase in overseas investment scale under the influence of BRI. Therefore, the government should pay attention to the characteristics of enterprises and industries, and clarify their status in participating in the BRI construction. The government should take targeted initiatives to give more inclined policies to small enterprises and key industries. Third, the mechanism analysis reveals that BRI promotes COI by improving the investment environment of enterprises. To continue promoting the BRI construction, governments should strengthen the policy support system, provide tax support and enhance the credit environment to ease the investment pressure enterprises face. Finally, the extensive analysis indicates that the BRI has a prominent role in promoting the OI of enterprises in polluting and high-energy-consuming industries. The government should facilitate the BRI construction to provide more investment opportunities for enterprises, and enterprises should seize these chances afforded by the BRI to seek survival paths and achieve transformation and development.

Due to the unavailability of detailed data on enterprises' overseas investment, we cannot conduct a more detailed study from the perspectives of investment types and modes. If relevant data are available, this can be studied in depth.

Notes

1. Documents are obtained from https://www.mee.gov.cn/xxgk2018/xxgk/xxgk10/202203/t20220329_972898.html
2. Data stem from https://www.ndrc.gov.cn/fggz/lywzjw/jwtz/202203/t20220331_1321378.html?code=&state=123
3. "Country (Region) Guide for Foreign Investment and Cooperation" is a public information service product for Chinese enterprises to download.
4. Source is collected from http://www.npc.gov.cn/npc/kgfb/202203/8d9a08243ba341e59ae61d600edc70bb.shtml
5. Source comes from https://www.mfa.gov.cn/web/zyxw/201503/t20150328_332173.shtml
6. The 18 Chinese provinces along the BRI route include Xinjiang, Chongqing, Shaanxi, Gansu, Ningxia, Qinghai, Inner Mongolia, Heilongjiang, Jilin, Liaoning, Guangxi, Yunnan, Tibet, Shanghai, Fujian, Guangdong, Zhejiang and Hainan.
7. Source is from http://www.chinatax.gov.cn/chinatax/n810219/n810744/n1671176/n2884609/c2884646/content.html
8. Source is obtained from http://world.people.com.cn/n/2015/0805/c157278-27416236.html
9. Source is obtained from https://www.yidaiyilu.gov.cn/wcm.files/upload/CMSydylgw/201706/201706131116055.pdf
10. The median pollution emission intensity of each industry is used as the classification criteria, and according to 2012 version of CSRC industry classification code, polluting industries are B06, B07, B08, B09, B10, C13, C14, C15, C17, C22, C25, C26, C27, C28, C30, C31, C32, D44, D45, and D46. The high energy-consuming industries are C26, C30, C31, C32, C25, and D44.

Authors' contributions

Formal analysis, S.Y.; methodology and software, X.L.; writing—original draft, Z.M; writing—review and editing, X.Z. All authors have read and agreed to the published version of the manuscript.

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Appendix A

Table A1. Policy overview.

Promulgator	Policy Document
MOFCOM	Guide for Country-specific Investment Tax Foreign Investment Cooperation Country (Region) Guide
Jilin Province	Adhere to the implementation of "five cooperation" to lead the "one main six double" high-quality development strategy, to further improve the level of development of the open economy, to build an important window of China's opening to the north and Northeast Asia cooperation center hub
Shaanxi Province	"Shaanxi Province 14th Five-Year Plan to deeply integrate into the BRI pattern and build an inland open highland plan"
Qinghai Province	"Qinghai Province in 2021 to promote the BRI construction of key work division of the program"
Zhejiang Province	"Zhejiang Province to create a BRI hub to build a new pattern of comprehensive openness supervision and incentive measures supporting the implementation of measures"
Yunnan Province	"Implementation Plan for Yunnan Province's Participation in the Construction of China-Myanmar Economic Corridor (2020–2030)"
Xinjiang Province	"Construction Program of the Central European Liner (Urumqi) Consolidation Center (2020-2024)"
Guangxi Province	"Several Policy Measures for Financial Support to the Construction of New Western Land and Sea Corridors"
Chongqing	"Chongqing Municipal Implementation Plan for Promoting the Construction of New Western Land and Sea Corridors"
Ningxia Hui Autonomous Region	"Work Plan for 2020 for the Autonomous Region to Promote the BRI and the Construction of Pilot Inland Open Economy Zone"
Gansu Province	"The new era of Gansu into the BRI construction to build "five high points" planning"
Inner Mongolia Autonomous Region	"Outline of the Planning of the China-Mongolia-Russia Economic Corridor"
Heilongjiang Province	Investment security and taxation policy briefing for Heilongjiang overseas enterprises
Liaoning Province	China (Liaoning) - Central and Eastern European Countries Local Economic and Trade Cooperation Cloud Docking Meeting Held
Tibet Autonomous Region	IRS-Service the BRI Policy Interpretation Meeting
Shanghai	Action Plan for Shanghai to Play a Bridgehead Role in Serving the National BRI Construction
Fujian Province	2021 Fujian Province the BRI foreign cooperation in science and technology innovation platform project plan
Guangdong Province	"Guangdong Province, a number of policy measures to stabilize foreign trade"
Hainan Province	Relying on the "Hainan Free Trade Port Construction Master Plan"; deeply integrated into the BRI

See https://www.yidaiyilu.gov.cn/info/iList.jsp?cat_id=10010.
Source: Authors.

Appendix B

Before performing matching, the covariates were selected by using a logit model (By comparing the maximum likelihood values of different models, the first-order and second-order forms of covariates that can achieve the best fitting effect were selected). The propensity scores were further estimated by using the logit model (nearest-neighbor matching within caliper). As can be seen from Table B, the sample deviations after matching were all below 10%, and the majority of t-tests showed systematic differences between the treatment and control groups, and the V(T)/V(C) was also closer to 1 compared to the pre-matching period. Thus, the results suggest that this matching was effective.

Table B1. Matching results.

Variable	Unmatched/ Matched	Mean Treated	Control	%bias	%reduct |bias|	t-test t	V(T)/ p>|t|	V(C)
Lev	U	0.44598	0.44285	1.5		0.91	0.364	0.89*
	M	0.44604	0.44956	−1.7	−12.6	−0.95	0.342	1.01
RD	U	6.2862	3.3769	36.8		22.45	0.000	1.49*
	M	6.2811	6.1153	2.1	94.3	1.02	0.306	1.01
Growth	U	0.14409	0.14548	−0.4		−0.22	0.826	1.28*
	M	0.14186	0.14115	0.2	49.3	0.10	0.924	1.04
Asset	U	22.544	22.31	19.1		11.29	0.000	0.89*
	M	22.544	22.6	−4.6	76.1	−0.17	0.012	0.99
Staff	U	7.7827	7.8228	−3.4		−1.99	0.047	0.95*
	M	7.7839	7.8224	−3.2	3.9	−1.73	0.084	0.98
ROE	U	0.05476	0.06669	−10.6		−6.35	0.000	1.24*
	M	0.055	0.05734	−2.1	80.4	−1.09	0.278	1.13*

Source: Authors.