Journal of the Asia Pacific Economy

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rjap20

Does the Belt and Road Initiative affect the business environment of participating countries?

Yahui Chen, Charles van Marrewijk, Changsheng Xu & Congmin Zuo

To cite this article: Yahui Chen, Charles van Marrewijk, Changsheng Xu & Congmin Zuo (2022) Does the Belt and Road Initiative affect the business environment of participating countries?, Journal of the Asia Pacific Economy, 27:3, 425-444, DOI: 10.1080/13547860.2022.2082748

To link to this article: https://doi.org/10.1080/13547860.2022.2082748

Published online: 23 Jun 2022.

JOURNAL OF THE ASIA PACIFIC ECONOMY
2022, VOL. 27, NO. 3, 425–444
https://doi.org/10.1080/13547860.2022.2082748

Does the Belt and Road Initiative affect the business environment of participating countries?

Yahui Chen[a], Charles van Marrewijk[b], Changsheng Xu[c] and Congmin Zuo[d]

[a]School of Economics and Management, Beijing University of Technology, Beijing, China; [b]Utrecht School of Economics, Utrecht University, Utrecht, The Netherlands; [c]School of Economics, Huazhong University of Science and Technology, Wuhan, China; [d]Institute of World Economy, Institute of Belt and Road & Global Governance, Fudan University, Shanghai, China

ABSTRACT

This article analyzes the impact of the Belt and Road Initiative (BRI) on the economic and business environment of its participants using the Global Doing Business Report from the World Bank. We use a difference-in-difference approach to identify the impact by considering BRI as an exogenous policy shock. We find that BRI positively impacts the business environment of the participating countries; in particular, there is a great improvement in the scores of business starting and contract enforcing. The positive effect is larger in low-income countries and the countries with a growing investment from China.

KEYWORDS

Belt and Road Initiative; business environment; trade and investment; propensity score matching; difference-in-difference

JEL CLASSIFICATIONS:

E65; F42; M21

1. Introduction

This article aims to investigate the impact of the Belt and Road Initiative (BRI) on the business environment of the participating countries. As one kind of soft environment, the business environment is an important guarantee for the economic and business development of the country, and its improvement can promote the local and foreign enterprises' well operation, investment, and sustainable development. Proposed by the Chinese President Xi Jinping in October 2013 as a regional comprehensive cooperation arrangement, BRI has the main objective of enhancing the sustainable socio-economic development of the participating countries. As of June 2021, there are more than 140 participating countries and regions. They differ greatly in their geographic locations, history, political and legal institutions, and level of internationalization, leading to the differences in their business environment. Among the participants, there are highly developed countries like Singapore, which ranks second in the latest World Bank's Global Doing Business Report (The World Bank, 2020), but also the least developed countries like Afghanistan (ranked 173rd).[1] Given the far-reaching nature of BRI, it provides a cooperative stage and may lead to a convergence in the various socio-economic aspects in the

CONTACT Changsheng Xu chshxu@hust.edu.cn School of Economics, Huazhong University of Science and Technology, Wuhan, China

participating countries, and we are interested in whether BRI positively contributes to their business environment.

The existing literature mostly analyses BRI from the angle of trade and FDI (see, e.g., Huang 2016; Vinokurov and Tsukarev 2018). Mao et al. (2019) found that BRI increases the exports from the participating countries to China. Liu and Dunford (2016) argued that BRI promotes modernization in the less-developed participating countries, which is echoed by Jackson and Shepotylo (2018) who pointed out that BRI will improve their welfare. However, the opinions toward BRI are still a controversial mixture of optimism and anxiety (Fan et al. 2016; Dadabaev 2018). Callahan (2016) for instance found that BRI is mainly a unilateral action of China to increase its outward investment and to strengthen its global influences. The above-mentioned research or literature on the BRI focuses on the impact of the BRI on some intuitive "hard" indicators, such as economic, trade or investment benefits. However, few scholars have paid attention to the impact of the BRI on the soft environment of participating countries, especially on the local environment involving the investment and trade of multinational enterprises.

Few literature studies on the effect of the BRI on the business environment of participating countries. According to the World Bank report, if completed, BRI transport projects could reduce travel times along economic corridors by 12%, and provide the job opportunity to lift 7.6 million people from extreme poverty, which will benefit the business environment of those countries[2]. Irshad et al. (2016) for instance found that the implementation of the BRI would improve the backward infrastructure, provide employment opportunities, and improve the investment environment in Pakistan. In regional cooperation, Sarker et al. (2018) pointed out that the BRI would motivate nations for policy sign and coordination and create a better environment conducive to cooperation and investment between local and foreign enterprises. Furthermore, Wang et al. (2020) analyzed the business environments in 121 countries participating in BRI, and found that the ranking of less-developed countries is underestimated, and the business environment has become better after joining the BRI.

Selecting 64 participating countries (hereinafter called the BRI countries, see the appendix, Table A1) as the research object, we use propensity score matching (PSM) and a difference-in-difference (DID) approach to evaluate whether BRI positively contributes to their business environment. We found that the implementation of the BRI has a positive impact on the business environment of BRI countries, and among the 10 sub-indicators, business starting and contract to enforce have got better improved. Furthermore, the positive effect is larger in low-income countries and the countries with a growing investment from China.

The main contributions of this research will be as follows: (1) Unlike previous literature focusing on the impact of the BRI on the normal economic and business indicators of the participating countries, such as the investment and trade volume, we attempt to explore the impact of the BRI on the soft environment (business environment) of the countries for the first time; (2) Considering that the Doing Business Report does not report a complete fiscal year, it is usually reported from May 1 of the last year to April 30 of this year. Thus, in addition to using the data in the latest Global Doing Business Report from the World Bank to represent the business environment quality of the country in the reporting year, we also weight the data based on the Doing Business Report statistics time for robustness test.[3]

The rest of this article is organized as follows. Section 2 reviews the theoretical analysis of the impact mechanism of BRI and hypothesis, while Section 3 presents the statistical model and the data. Section 4 presents the empirical results and discussion. Finally, Section 5 concludes the article.

2. Theoretical analysis and hypothesis

Our research refers to the reality and related theories and sorts out the impact mechanism of BRI on the business environment of participating countries.

2.1. The external driving effect from BRI

The international business environment generally refers to the contradictory unity of various political factors, natural factors, economic factors, and social factors that affect international investment (Stobaugh 1969). And many internal and external factors affect the business environment (Hamilton and Webster 2018). Based on the external driving effect, the effects of BRI on participating countries, such as the growth of foreign investment and trade, economic development, financial support, infrastructure improvement, and job opportunity (Dumitrescu 2015; Wang and Yau, 2018; Liu and Dunford 2016), are beneficial to their business environment, in particular to the business environment of low-income countries. Especially the BRI has identified policy communication, infrastructure interconnection, trade facilitation, financial intermediation, and people-to-people exchanges as its five pillars (hereafter called "five links"), and the "five links" provide critical support to the development of the BRI countries through many multiple channels (Lyu 2022), and also be beneficial to their business environment. For example, Verlare and van der Putten (2015), Spruds (2017) both believed that the BRI provides opportunities for economic development in Latvia, especially in terms of infrastructure improvements, which is good for the local business. Though Ruta (2018) pointed out that due to the poor governance capabilities of some BRI countries, infrastructure investment will bring the country at risk of commercial corruption, some researchers found that strengthening the port and other infrastructure would help improve the local business environment (Shepherd and Wilson 2009; Nag and Chatterjee 2018). BRI can also bring technical cooperation and R&D improvements to participating countries and some studies have pointed out that technical cooperation between public sectors can greatly improve the level of the local business environment (Kozubikova and Kotaskova 2019; You et al. 2019). Further, Koišová et al. (2017) found that enterprise financing is an important factor that affects the regional business environment. Better external financing is conducive to improving business convenience.

2.2. The competitive effect and self-improvement from BRI country

A high-quality business environment that creates the conditions for long-term economic growth is a basic precondition for business development and increasing the competitiveness of the country (Fabus 2018). Especially, the business environment

plays an important role in attracting FDI to a country (Kostevc, Redek, and Sušjan 2007; Bhasin and Garg 2020). Some researchers found that a country's convenient and favorable business environment can help attract FDI inflows, because the business environment of the host country is the security guarantee for FDI, and it is also one of the institutional foundations for the sustainable operation of multinational enterprises (Corcoran and Gillanders 2015; Hassan and Basit 2018), furthermore, Piwonski (2010) found that a country's business environment index ranking up by 1 place can bring more than 40 million U.S. dollars of FDI inflow to the host country. For low-income countries, it is necessary to improve their business legal environment to increase the country's FDI (Nangpiire, Rodrigues, and Adam 2018), especially improving the execution of contract facilitation (Hassan and Basit, 2018). When the host country has relatively good economic conditions and an investment environment, foreign investment can have a better impact on the local economy (Alfaro et al. 2004; Chen and Lin, 2018). For example, Dang (2013) stated that ASEAN countries such as Vietnam have carried out a series of business environment reforms in the recent years to attract more foreign direct investment to promote local economic development. Besides, the overall ease of doing business that ranked highest has a significant relationship with economic growth (Djankov et al. 2002). Gani and Clemes (2013) also found that there is a positive correlation between service trade and the business environment indicators of OECD countries. Thus, taking into account the ranking and competition of the business environment, countries will follow the first-come, first-served rule of the bus theory to improve the business environment as soon as possible after joining the BRI to attract more investment and trade. Especially, these less developed countries that are already at a disadvantage would have a strong desire to improve their business environment.

2.3. The reverse-force driving effect from the multinational companies

A better business environment in the host country can effectively enhance innovation policies, reduce the market risks faced by multinational enterprises and increase their profits (Nam and Bao Trom 2021; García-Canal and Guillén 2008; Gaganis, Pasiouras, and Voulgari 2019). Based on the utility maximization theory and the principles of instinctive risk aversion, and considering that the reduction of international investment from multinational corporations will have an adverse impact on the employment or taxation of the country, such as reducing employment opportunities and reducing tax revenue, these multinational corporations investing in Belt and Road countries may use this to force these countries to improve the business environment that is conducive to the investment and operation of multinational corporations. For example, to improve the host country's market environment, Malesky (2004) pointed out that using various channels (such as business forums), multinational companies put forward suggestions to the Vietnamese government, including reducing administrative procedures and improving tax regulations. Moreover, to gain a better business environment convenience when entering the country, the potential multinational companies will negotiate with the intended host country through trade fairs, new government-enterprise cooperation methods, etc. Thus, the reverse

promotion of multinational companies may improve the business environment of the BRI countries.

2.4. Government cooperation and credit order in business environment

Credit order is very important for local business operations and economic development, and the quality of the business environment reflects the credit level faced by local business operations to a certain extent. According to the rankings of the World Bank's Business Environment Report, the business environment of the most BRI countries is at a low and medium level. Government cooperation and the experience and information sharing between BRI countries are conducive to the improvement of the credit order and level, leading to the increase in the business environment of these countries. In the process of participating in the BRI, multinational companies can provide these countries with the experience and lessons of other high-level countries in improving the business environment. Rich experience and information sharing will help the host country improve the success rate of business environment reforms. Moreover, government cooperation between BRI countries is conducive to the improvement of the business environment of these countries, especially, policy communication and people-to-people exchanges in the five links of the BRI play an important role. In the process of cooperation, they can build good bilateral relations through signing bilateral agreements, high-level visits, cultural exchanges, etc. (Sun and Sun 2017). Bilateral political relations are conducive to promoting political mutual trust, enhancing the credibility of the country's institutional environment, and improving a country's business and investment environment (Neumayer and Spess 2005). Besides, strengthening cultural exchanges and political visits between countries help to understand cultural and political differences, which are also particularly important for the business environment and business activities (Fogel 2010; Jiang 2015).

Based on the above analysis, we conduct a hypothesis that the implementation of BRI has a positive impact on the business environment of the participating countries, especially in low-income countries.

3. Data and model

3.1. Description and analysis

For the business environment of one country, the BRI is an exogenous policy shock. We treat the BRI as a good quasi-natural experiment and use the difference-in-difference (DID) approach to estimate the treatment effect of the BRI. Since the BRI was implemented practically from 2014, this study chose 2014 as the initial year for the impact of BRI. Our research selects the BRI countries as the treatment group, and countries not involved in the BRI as the control group.

We plotted the density chart to observe the distribution trend of the treatment group and the control group. This study uses the growth rate of ease of doing the business score in the Doing Business Report to represent the improvement of doing business in a country. Considering that 2014 was taken as the time node for the proposal of the BRI, we used the average business environment level of the BRI countries

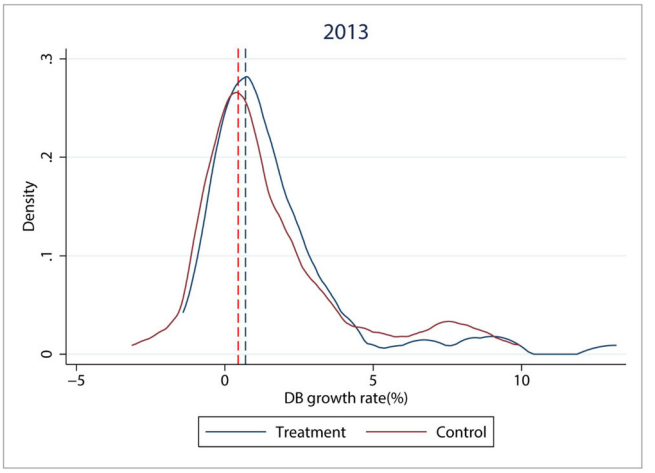

Figure 1. Density distribution of DB in 2013. Note: The solid line represents the density distribution of each country's business environment score growth level, and the dashed line represents the mode of the density distribution.

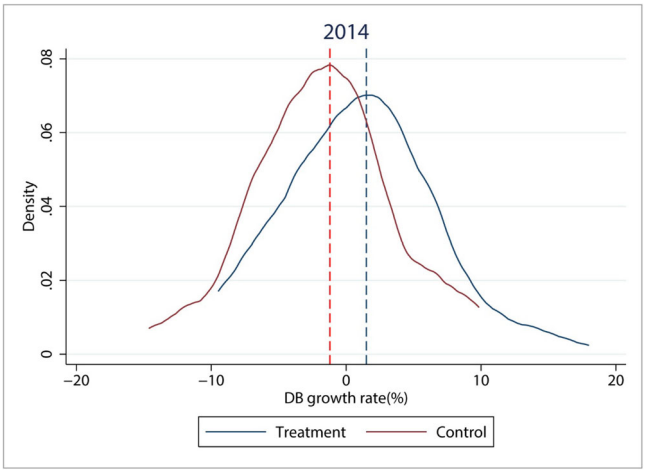

Figure 2. Density distribution of DB in 2014. Note: The solid and dashed lines of the two groups are similar and close, respectively. In 2014, both the solid and the dashed line of the treatment group shift to the right and become larger.

for one year before and after the implementation of the BRI to show whether the business environment of the countries along the route has changed significantly before and after the proposal of the BRI. Figures 1, 2, and 3, respectively, show the density distribution of the doing business growth rate of the country in the years 2013, 2014, and 2015. We can easily find that in 2013 there is a similar trend between the two groups, the mode of the density distribution of the growth rates of Doing Business level (DB) in these two groups is about the same. Notably, in 2014, the treatment group has an obvious move to the right side though the density distribution is relatively scattered and has no previous concentration. The treatment group still has a higher mode value of the density distribution of doing business growth

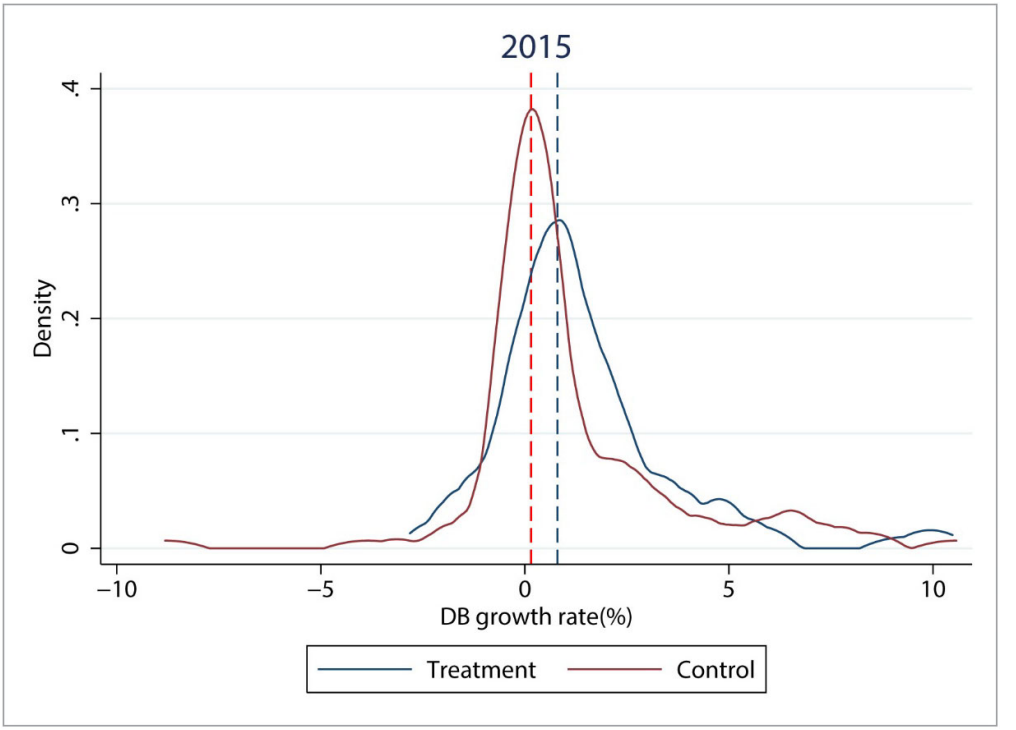

Figure 3. Density distribution of DB in 2015. Note: In 2015, the solid and dashed lines of the treatment group are still distributed on the right side of the control group and keep a certain gap.

rates than the control group in 2015. All of these show a trend that the treatment group has a better average growth rate of doing business than the control group from 2014. It is consistent with our previous theoretical assumptions that BRI may have a positive effect on the business environment of the BRI countries.

3.2. Model design

The doing business level of BRI countries is almost evenly distributed, which helps us use the DID model to evaluate the policy impact of BRI. At the same time, to lessen the bias in the estimation results caused by sample selection, we also use the DID model combined with matching technology (Egger, Egger, and Greenaway 2008).

3.2.1. Difference in difference (DID)

The DID model aims at excluding some interference factors and finding the difference in the doing business of the treatment group between the two periods before and after participating in the BRI. We cannot estimate the real effect directly because we cannot observe what would have happened to the treatment group if they would not join the BRI. However, we can identify the treatment effect if there is a strong assumption that the control group has a common trend with the treatment group when they do not receive the treatment from the BRI. We set *Post* as the dummy variable indicating the year pre- and post-BRI, taking a value of 1 in the post-BRI

period. and set *BRI* as the dummy variable of the treatment group (value is 1) and control group (value is 0). Thus, the effect of BRI δ can be calculated by the following equation:

$$\begin{aligned}\delta = {} & E(DB_{it}|BRI_i = 1, \mathrm{Post_t} = 1) - E(DB_{it}|BRI_i = 0, \mathrm{Post_t} = 1) \\ & -[E(DB_{it}|BRI_i = 1, \mathrm{Post_t} = 0) - E(DB_{it}|BRI_i = 0, \mathrm{Post_t} = 0)]\end{aligned} \tag{1}$$

where DB_{it} represents the business environment (doing business level) of the BRI countries i (i = 1, 2, … 164) in the period t (t = 2011–2018).

Among the equation, $E(DB_{it}|BRI_i = 1, \mathrm{Post_t} = 0) - E(DB_{it}|BRI_i = 0, \mathrm{Post_t} = 0)$ denotes the trend between the two groups before the BRI was proposed.

Since the implementation period of BRI is not long and to satisfy the above strong assumption, we also apply the DID method combined with a matching technique in this study. The propensity score matching (PSM) is a good matching design, and the basic concept of it is to create a control group that is similar to or has the same trend as the treatment group before the policy implementation, and then match the countries in the two groups. There is only a difference caused by the policy treatment effect in the matched pairs.

After the basic setting of the DID and PSM methods, the final empirical model is shown as follows:

$$DB_{it} = \beta_0 + \beta_1 BRI_i \times Post_t + \partial_j \sum_{j=1}^{n} Control_{\mathrm{j}} + \varepsilon_{it} \tag{2}$$

The parameter β_1 represents the treatment effect of BRI on the business environment of the BRI countries. The vector *Control* includes all the control variables and ε_{it} is a random disturbance item.

This article also explores which sub-indicators of the Doing Business Report have been effectively affected. We investigate the 10 sub-indicators (s = 1,2, … ,10) separately. The model is the same as Equation (2).

$$\mathrm{sub}DB_{it}^{s} = \beta_0^s + \beta_1^s BRI_i \times Post_t + \partial_j^s \sum_{j=1}^{n} Control + \varepsilon_{it}^s \tag{3}$$

3.2.2. Income-level heterogeneity

Since countries at different income levels may have different responses to the implementation of the BRI, especially the low-income countries, our study also tests whether BRI will have different impacts on the business environment of BRI countries with various income levels. According to the World Bank classification criteria, we divide the sample countries into low-income, lower middle income, upper middle income, and high-income countries (r = 1,2,3,4) and take the regression test, respectively. We treat $Income_i^{\mathrm{r}}$ as a dummy variable and construct a triple differential method, which is shown in Equation (4):

$$DB_{it}^{r} = \beta_0^r + \beta_1^r BRI_i \times Post_t + \beta_2^r Income_i \times (BRI_i \times Post_t) + \partial_j^r \sum_{j=1}^{n} Control_j + \varepsilon_{it}^r \quad (4)$$

Where β_2^r represents the treatment effect of BRI on the business environment of different income level BRI countries. If the significance test is passed, then it means that the effects of BRI on doing business are significantly different among different income level countries.

3.2.3. The effectiveness of the investment from China

Since countries participating in the BRI may get more foreign investment, especially from China, this article also verifies whether the foreign investment from China would impact the effect of the BRI on doing business in the BRI countries. Considering the scale of investment received from China varies greatly among countries, we use the growth rate of the investment from China and set $Invest_{it}$ to take a value of 1 if the growth rate of the investment from China is greater than 0 and a value of 0 other else. The model could be set as:

$$DB_{it} = \beta_0 + \beta_1 BRI_i \times Post_t + \beta_2 Invest_i \times (BRI_i \times Post_t) + \partial_j \sum_{j=1}^{n} Control + \varepsilon_{it} \quad (5)$$

3.3. Data and variable

The business environment data for this study are from the *Doing Business Database* under the World Bank Database. The indicators information of countries is derived from the Economic Freedom of the World Index and Worldwide Governance Indicators. The samples are simply screened and processed, and in the end, we get 164 countries. Among these sample countries, 63 countries are in the treatment group and others are in the control group (the 63 countries, please see the Appendix, Table A1). Our sample years (2011–2018) include the pre-BRI period and post-BRI period, and we take 2014 as the year of exogenous policy shock.

The variables description has been presented in Table 1. The main dependent variable of this study is Doing Business (DB). We use the growth rate of ease of doing the business score to represent the improvement of the country's business environment (Since the statistical caliber of the business environment changes, we convert the scores to 2011 as the benchmark). There are also scores of ten indicators including business starts, corporate lending, minimum investor protection, labor employment, contract execution, property rights protection, cross-border trade, tax reform, trade, enforcing contracts, and resolving insolvency. Moreover, we use the Entry rate of the new limited liability companies (Entrance) in a country to replace the main dependent variable as a robustness test.

The control variables should be the factors that affect the countries' doing business and include the political, economic, legal, and so on. We refer to the existing research and select the factors growth rate of gross domestic product, FDI Inflow, Investment Freedom Score, government public debt, government effectiveness, rule of law, and

Table 1. Variables' meaning and data source.

Variable	Meaning	Data Source
DB	Ease of doing business score, growth rate (%)	DB
Start	Score-Business starting, growth rate (%)	DB
Constru	Score-Dealing with construction permits, growth rate (%)	DB
Elec	Score-Getting electricity, growth rate (%)	DB
Reg Prop	Score-Registering property, growth rate (%)	DB
Credit	Score-Getting credit, growth rate (%)	DB
Investor	Score-Protecting minority investors, growth rate (%)	DB
Tax	Score-Paying taxes, growth rate (%)	DB
Trade	Score-Trading across borders, growth rate (%)	DB
Contract	Score-Enforcing contracts, growth rate (%)	DB
Insolve	Score-Resolving insolvency, growth rate (%)	DB
Entrance	Entry rate of the new limited liability companies (%)	DB
lnInvFree	Natural logarithm of Investment Freedom Score	EFW
lnTraFree	Natural logarithm of Trade Freedom Score	EFW
GDPRate	The growth rate of the Gross Domestic Product (%)	EFW
lnGDPcap	Natural logarithm of GDP Per Capita (PPP)	EFW
lnDebt	Natural logarithm of Public Debt rate (% of GDP)	EFW
LnFDI	Natural logarithm of FDI Inflow (Millions)	EFW
lnunemp	Natural logarithm of Unemployment rate (%)	EFW
Gov Eff	Government Effectiveness	WGI
Ru Law	Rule of Law	WGI
Reg Qual	Regulatory Quality	WGI

Note: Doing Business Database (DB); Economic Freedom of the World (EFW); Worldwide Governance Indicators (WGI).

regulatory quality, etc., as the control variables. Descriptive statistics of the variables are shown in Table 2.

4. Empirical results

4.1. Preliminary results

To accurately examine the impact of the BRI on the doing business of the countries participating in the BRI, we also attempt to match each country participating in the BRI with the country not participating in the BRI that had the most similar propensity score. For the PSM method, we use the kernel matching method to confirm the weight and estimate the propensity score by the variables (growth rate of GDP, GDP per capita, unemployment rate, Trade Freedom Index, and public debt) and finally gain the results by a logit model.

The results from the matching are shown in Table 3 and Figure 4. In Table 3, we can find that the variables after being matched has a significantly smaller standardized deviation than unmatched, and the *t*-values, corresponding concomitant probability, cannot reject the null hypothesis which means that the treatment group and control group has no systematic difference. The content of Figure 4 presents that the treated and untreated groups on support have a roughly symmetrical distribution, which is consistent with the above finding, and both of them indicate that the matching technique is valid. These also indicate that the matching method provides reliable and accurate results on the impact of BRI on the business environment. This study gains empirical results from Stata13.

The strong assumption of using the DID method is that the two groups (treatment and control) should have a parallel time trend. This study tests the parallel trend

Table 2. Variables' basic statistics.

Variable	Max	Min	Mean	Median	Sd	Num
DB	20.39	−14.60	1.223	0.608	3.205	1298
Start	2.651	−0.424	0.023	0.001	0.110	1298
Constru	4.048	−100.0	−1.060	0.001	10.34	1298
Elec	1.399	−100.0	−0.746	0.001	8.749	1298
Reg Prop	0.780	−100.0	−0.760	0.000	8.748	1298
Credit	6.000	−100.0	−0.934	0.000	9.974	1298
Investor	2.600	−0.364	0.018	0.000	0.104	1298
Tax	1.451	−100.0	−0.754	0.000	8.749	1298
Trade	1.750	−100.0	−0.836	0.000	9.172	1298
Contract	0.500	−100.0	−0.766	0.000	8.747	1298
Insolve	3.406	−0.257	0.018	0.000	0.132	1298
Gdprate	19.77	−36.05	3.461	3.400	3.479	1298
lnGDPcap	11.87	5.796	9.103	9.250	1.253	1295
lnDebt	5.514	0.451	3.742	3.799	0.691	1274
LnFDI	12.88	−2.892	7.021	7.025	2.177	1225
lnunemp	4.344	−2.303	1.925	1.960	0.822	1144
lnInvfree	4.554	1.609	3.957	4.094	0.502	1270
lnTrafree	4.552	3.509	4.311	4.346	0.160	1285
Gov Eff	2.241	−2.078	0.007	−0.120	0.955	1204
Ru Law	2.100	−2.339	−0.022	−0.210	0.958	1204
Reg Qual	2.261	−2.334	0.026	−0.134	0.929	1204
Entrance	24.56	0.010	3.293	1.510	4.184	963

Table 3. Balancing test for the matching.

		Mean					
Variable	Type	Treated	Control	%bias	|bias|	t	p>|t|
Gdprate	Unmatched	3.770	2.981	23.70	95.60	3.770	0.000
	Matched	3.797	3.832	−1.000		−0.170	0.866
lnGDPcap	Unmatched	7.527	7.104	21.10	97.30	3.300	0.001
	Matched	7.533	7.545	−0.600		−0.090	0.930
Lnunemp	Unmatched	1.801	2.035	−28.30	79.00	−4.680	0.000
	Matched	1.816	1.865	−6.000		−0.890	0.371
Lntrafree	Unmatched	4.349	4.299	32.40	96.50	5.150	0.000
	Matched	4.349	4.347	1.100		0.180	0.854
lnDebt	Unmatched	3.634	3.867	−34.20	97.80	−5.590	0.000
	Matched	3.676	3.671	0.700		0.110	0.909

from 3 years before the year 2014 to 3 years after the year 2014. Figure 5 presents the trend of the coefficient β along with the 95% confidence intervals. Before the year 2014, all of the coefficients are below the zero-value line and close to the line, representing that the sample countries have the same trend before participating in the BRI. However, the coefficients are above the zero-value line from the year 2014, and the positive coefficients gradually increased since 2014. This can be regarded as a signpost, namely that the positive effects of the BRI on the business environment of the BRI countries may be increasing in the long term.

4.2. Baseline results

This study applies the time fixed-effect technique of panel data to estimate the effect of BRI on the doing business of the countries participating in the BRI, and the clustering robust standard error used in the regression. Table 4 shows the base results.

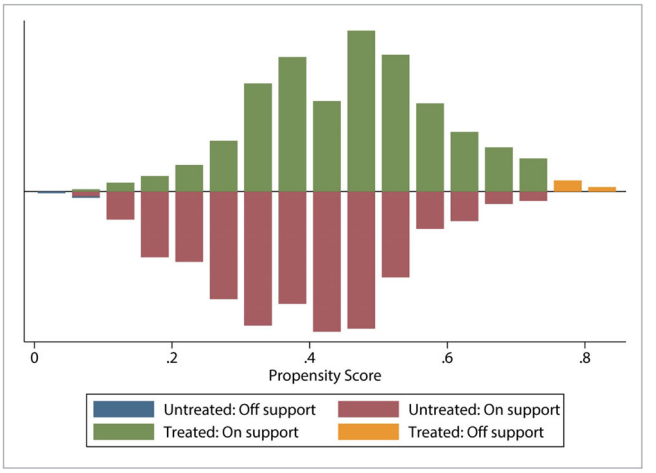

Figure 4. The balance propensity score.

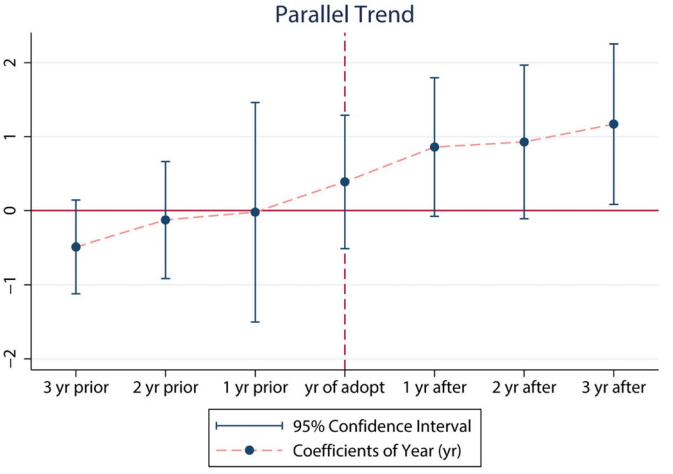

Figure 5. Parallel trend test.

The basic regression results of Equation (2) without the matching technique PSM are described in Columns (1) and (2), while other columns show the results of the same equation after combining with the matching technique. When we apply the DID method alone, the coefficients of the Post*treat are positive and statistically significant no matter with or without the control variables. Likewise, the coefficients of the interaction term in Column (3) and (4) are larger and still significant as DID combine with the PSM. These results indicate that participating in BRI increases the business environment of these countries at least in the initial implementation phase.

The regression results also indicate that higher investment freedom significantly increases the business environment of the BRI countries. The public debt of one country is beneficial for the business environment of BRI countries. It is in keeping with the finding of Consolo, Langiulli, and Sondermann (2019) that in euro area countries with larger excess leverage, the links between business investment and

business environment are found to be stronger. We can explain by the fact that high public debt, as a common phenomenon in many countries, can bring capital to a country in a short term to support economic development and social stability, which is good for the country's business environment. Notably, regulatory quality plays a negative role in the business environment of the BRI countries in the early stages of BRI implementation, which can be explained that the improvement of regulatory quality in the short term will increase the requirements for starting a business and construction permits, making the lending standards for corporate investment more stringent. It is not conducive to corporate investment in the short term, but it will be conducive to the business environment in the long run.

4.3. The effect of BRI on the ten Sub-Indicators of business environment

We also estimate the effect of BRI on the ten sub-aspects of the business environment of the countries. The results shown in Table 5. Among the ten sub-indicators, the coefficients of Post*treat of business starting and dealing with construction permits are positive and significant. That means business starting and dealing with construction permits of the BRI countries have got better improved after participating in the BRI. There is a negative and significant effect on the indicators of getting credit. Other indicators show the positive coefficients of Post*treat, but none of them are significant. We explain that in the process of participating in the BRI, with greater financial, goods, and materials investment from foreign, the local enterprises need a better environment for starting a business. For construction permits, on the one hand, there are more and more infrastructure construction and investment from foreign enterprises to BRI countries, to improve the efficiency of the cooperation and ensure better execution of the infrastructure construction, the environment of dealing with construction permits needs to be improved; On the other hand, the country that signs some treaties with other countries under the BRI would face some external requests and compulsions from partner countries to improve and protect the smooth execution of the business and construction. Besides, the relatively worsening environment for getting credit in the BRI countries may be due to the increased competitive pressure and financial support from foreign countries after joining the BRI, which makes the review of local

Table 4. The basic effect of BRI on doing business.

	DID		DID with PSM	
	(1)	(2)	(3)	(4)
Post*treat	0.877** (2.42)	0.769** (1.97)	0.953* (1.66)	0.997* (1.67)
Gdprate		−0.417 (−0.13)		−5.928 (−1.06)
lnFDI		−0.0133 (−0.10)		0.184 (0.94)
lnInvfree		0.348 (0.55)		2.209** (2.03)
lnDebt		2.071*** (5.22)		2.032*** (3.15)
GovEff		0.688 (0.83)		1.782 (1.36)
RegQual		−3.301*** (−3.32)		−5.320*** (−3.56)
Law		1.156 (1.18)		0.628 (0.42)
Cons	1.496*** (10.70)	−7.187** (−2.46)	1.173*** (4.95)	−15.59*** (−3.17)
Year FE	Yes	Yes	Yes	Yes
N	1298	1095	1060	960

Note: ***, ** and * respectively indicate that the regression coefficient is significant at the statistical level of 1%, 5%, and 10%, with *t*-values in brackets.

corporate loans more stringent and make it difficult for local companies to obtain credit. The coefficients of other sub-indicators like getting electricity, registering property, etc., do not show significance, meaning that BRI has a less significant impact on these sub-aspects in the initial implementation phase.

4.4. The income level heterogeneity effect of BRI on the business environment

The income level heterogeneity effect of the BRI on the business environment of countries participating in the BRI can be estimated by Equation (4). Table 6 shows the regression results of 4 income groups.

We first find that the coefficients of Post*treat are positive and significant in all the four groups, which is consistent with the basic results above. We define the dummy variable $Income^{i}$ to represent the 4 different income groups. In the low-income country group, the coefficient of Post*treat*$Income^{1}$ is 1.529 and significant; indicating that compared with the other BRI countries, the implementation of BRI has a greater positive impact on the business environment of the low-income countries, such as Tajikistan.[4] We can explain this result as follows: Compared with the others, low-income countries are more active in participating in the BRI. They have received a lot of investment from their partner countries, such as China, and the huge investment in infrastructure and transportation facilities greatly improves the local business vitality; Moreover, cooperating with multinationals from other BRI countries not only brings capital, products, but also technology and management experience, and all of these may bring opportunities and motivation to local businesses, and also help improve the local employment environment. However, for the mid- and high-income countries, participating in the BRI may be more beneficial to their overseas business and have less impact on their local business environment.

4.5. The effectiveness of the investments from China

Considering that foreign investment plays an important role in the cooperation between the BRI countries, especially, the investment from China accounts for an

Table 5. The effect of BRI on the sub-indicators of doing business.

	Dependent variable				
	Start	Constru	Elec	Reg Prop	Credit
Post*treat	0.0223* (1.78)	2.479** (2.19)	1.197 (1.17)	1.193 (1.17)	−1.258** (−2.10)
Cons	0.0269*** (5.56)	−2.867*** (−6.57)	−2.248*** (−5.70)	−2.257*** (−5.73)	−0.219 (−0.05)
Year FE	Yes	Yes	Yes	Yes	Yes
N	1095	1095	1095	1095	1095
	Dependent variable				
	Investor	Tax	Trade	Contract	Insolve
Post*treat	0.0164 (1.33)	1.170 (1.14)	1.740 (1.62)	1.198 (1.17)	0.0752 (0.05)
Cons	0.0194*** (4.08)	−2.245*** (−5.69)	−2.466*** (−5.96)	−2.271*** (−5.76)	1.115* (1.82)
Year FE	Yes	Yes	Yes	Yes	Yes
N	1095	1095	1095	1095	1095

Note: All control variables have been considered in the regressions. ***, ** and * respectively indicate that the regression coefficient is significant at the statistical level of 1%, 5%, and 10%, with *t*-values in brackets.

Table 6. Income heterogeneity Effect of BRI.

	Low income	Lower middle income	Upper middle income	High income
Post*treat	0.734* (1.96)	1.076*** (3.18)	0.761* (1.76)	0.872* (1.85)
Post*treat*Income[1]	1.529** (2.07)			
Post*treat*Income[2]		−1.044 (−1.08)		
Post*treat*Income[3]			0.289 (0.51)	
Post*treat*Income[4]				−0.0347 (−0.07)
Control variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	1158	1158	1158	1158

Note: ***, **, and *, respectively, indicate that the regression coefficient is significant at the statistical level of 1%, 5%, and 10%, with *t*-values in brackets.

essential part, our study tries to test if the investments from China would lead to a better effect of BRI on the business environment of BRI countries. We investigate the effectiveness of the "Investments from China" by regressing Equation (5), and the results are shown in Table 7.

In Columns (1) and (2) of Table 7, the coefficients of Invest*post*treat are significantly positive with or without control variables. It means that the countries receiving more and more investment from China could be more affected and their business environment would be better improved. The results obtained after combining with the matching technique in Columns (3) and (4) are consistent with the above results without the matching technique. The result shows that China is playing a positive role in the advancement of BRI.

4.6. Robustness test

We use the time placebo test method to move the time node to 2013. The results are mentioned in column (1) of the appendix, Table A2. The regression results are not significant, indicating that the advanced time node is invalid.

Considering that the Doing Business Report does not report a complete fiscal year, such as data in Doing Business 2020 are reported from May 1, 2018, to April 30, 2019. Thus, we use months for weighting, and our research calculates and gets the weighted Doing Business Score (Weighted DB).[5] We use the weighted Doing Business Score for regression, and the result is shown in column (2) of the appendix, Table A2. The coefficient is significantly positive, which is in keeping with our earlier finding.

Moreover, the entry rate of new limited liability companies in a country can reflect the quality of the country's business environment. The higher the entry rate of new companies, the better the country's business environment. So, we use the company entry rate (Entrance) to replace the main dependent variable as a robustness test. The results are shown in columns (3) and (4) of the appendix Table A2. The coefficients in both columns are positive and significant, which indicates that BRI has an obvious positive effect on the new company entry rate of a country. It is consistent with the basic results above, showing that the BRI is beneficial for the business environment of the BRI countries.

Table 7. The effectiveness of the "Investments from China."

	DID		DID with PSM	
	(1)	(2)	(3)	(4)
Invest*post*treat	0.966** (2.03)	0.951* (1.97)	1.982*** (3.03)	1.383** (2.08)
Post*treat	0.620* (1.72)	0.421 (1.09)	0.104 (0.23)	0.084 (0.17)
Gdprate		−3.271 (−0.83)		−9.319* (−1.72)
lnFDI		−0.0984 (−0.71)		0.124 (0.64)
lnInvfree		0.382 (0.35)		2.205** (2.07)
GovEff		0.695 (0.93)		0.427 (0.28)
RegQual		1.581* (1.71)		2.161* (1.65)
Law		−3.788*** (−4.15)		-5.383*** (−3.64)
Cons	1.497*** (13.79)	0.992 (0.23)	1.033*** (6.02)	-7.824* (-1.76)
Year FE	Yes	Yes	Yes	Yes
N	1298	1111	1060	960

Note: ***, ** and *, respectively, indicate that the regression coefficient is significant at the statistical level of 1%, 5%, and 10%, with *t*-values in brackets.

5. Conclusion

The BRI is both an opportunity and a challenge for many countries. The business environment of a country will change in the participating process. Based on the Global Doing Business Report from the World Bank, this article used a DID approach and examined the impact of the BRI on the business environment of the participating countries. The results indicate that the BRI has a positive impact on the business environment of the BRI countries in the early stages of BRI implementation, and among the 10 sub-indicators, business starting and contracts enforcing have got better improved. We also find that low-income countries get a more obvious effect from the BRI than the mid and high-income countries and the positive effect is larger in the countries with a growing investment from China. Therefore, promoting BRI construction and increasing the regional investment cooperation can improve the business environment of the participating countries, which will become the direction that countries, especially low-income countries, should pay special attention to in international economic cooperation in the future.

Our research examines the impact of the BRI on the business environment of various countries for the first time. There are still some limitations to be addressed in future research. Firstly, we focus on the country's characteristics as the main control variable, so our model does not account for other possible factors, such as the regional features. Secondly, this research may be extended in the future by exploring the specific effect mechanism of BRI on the business environment of the participating country. Thirdly, in the future, we can continue to explore the heterogeneity effect of cultural similarity or dissimilarity between countries on affecting the nexus between BRI and the business environment of the participating country.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes

1. Data Source: http://www.doingbusiness.org/rankings

2. Data Source: https://www.worldbank.org/en/topic/regional-integration/brief/belt-and-road-initiative
3. Please see Section 4.6 for details.
4. We also conducted empirical tests on each income group separately, and the results were consistent with the above results.
5. For the data of Weighted DB in year 2018, we use the weighting method to get, namely Weighted DoBus2018 = 2/3*DoBusReport2020 + 1/3*DoBusReport2019.

Funding

This research was supported by the National Social Science Fund of China, Major Program (Grant No.08&ZD037).

ORCID

Yahui Chen http://orcid.org/0000-0003-0472-5642

References

Alfaro, Laura, Areendam Chanda, Sebnem Kalemli-Ozcan, and Selin Sayek. 2004. "FDI and Economic Growth: The Role of Local Financial Markets." *Journal of International Economics* 64 (1): 89–112. doi:10.1016/S0022-1996(03)00081-3.[Mismatch]

Bhasin, N., and S. Garg. 2020. "Impact of Institutional Environment on Inward FDI: A Case of Select Emerging Market Economies." *Global Business Review* 21 (5): 1279–1301. doi:10.1177/0972150919856989.

Callahan, William A. 2016. "China's "Asia Dream":the Belt Road Initiative and the New Regional Order." *Asian Journal of Comparative Politics* 1 (3): 226–243. doi:10.1177/2057891116647806.

Chen, Maggie Xiaoyang, and Chuanhao Lin. 2018. *Foreign Investment across the Belt and Road: Patterns, Determinants, and Effects, Policy Research Working Papers*. Washington, DC: The World Bank. doi:10.1596/1813-9450-8607.

Consolo, Agostino, Marco Langiulli, and David Sondermann. 2019. "Business Investment in Euro Area Countries: The Role of Institutions and Debt Overhang." *Applied Economics Letters* 26 (7): 561–575. doi:10.1080/13504851.2018.1488041.

Corcoran, A., and R. Gillanders. 2015. "Foreign Direct Investment and the Ease of Doing Business." *Review of World Economics*151 (1): 103–126. doi:10.1007/s10290-014-0194-5.

Dadabaev, Timur. 2018. "Silk Road" as Foreign Policy Discourse: The Construction of Chinese, Japanese and Korean Engagement Strategies in Central Asia." *Journal of Eurasian Studies* 9 (1): 30–41. doi:10.1016/j.euras.2017.12.003.

Dang, Duc Anh. 2013. "How Foreign Direct Investment Promote Institutional Quality: Evidence from Vietnam." *Journal of Comparative Economics* 41 (4): 1054–1072. doi:10.1016/j.jce.2013.05.010.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2002. "The Regulation of Entry." *The Quarterly Journal of Economics* 117 (1): 1–37. doi:10.1162/003355302753399436.

Dumitrescu, George Cornel. 2015. "Central and Eastern European Countries Focus on the Silk Road Economic Belt." *Global Economic Observer* 3 (1): 186–197.

Egger, Hartmut, Peter Egger, and David Greenaway. 2008. "The Trade Structure Effects of Endogenous Regional Trade Agreements." *Journal of International Economics* 74 (2): 278–298. doi:10.1016/j.jinteco.2007.06.004.

Fan, Zhaobin, Ruohan Zhang, Xiaotong Liu, and Lin Pan. 2016. "China's Outward FDI Efficiency along the Belt and Road: An Application of Stochastic Frontier Gravity Model." *China Agricultural Economic Review*8 (3): 455–479. doi:10.1108/CAER-11-2015-0158.

Fogel, Georgine K. 2010. "Business Environment in China: Economic, Political, and Cultural Factors." MBAA Proceedings.

Gaganis, C., F. Pasiouras, and F. Voulgari. 2019. "Culture, Business Environment and SMEs' Profitability: Evidence from European Countries." *Economic Modelling* 78: 275–292. doi:10.1016/j.econmod.2018.09.023.

Gani, Azmat, and Michael D. Clemes. 2013. "Modeling the Effect of the Domestic Business Environment on Services Trade." *Economic Modelling* 35: 297–304. doi:10.1016/j.econmod.2013.06.033.

García-Canal, Esteban, and Mauro F. Guillén. 2008. "Risk and the Strategy of Foreign Location Choice in Regulated Industries." *Strategic Management Journal*29 (10): 1097–1115. doi:10.1002/smj.692.

Hamilton, L, and P. Webster. 2018. *The International Business Environment*. Beijing University of Technology, Beijing, China.

Huang, Yiping. 2016. "Understanding China's Belt & Road Initiative: Motivation, Framework and Assessment." *China Economic Review* 40: 314–321. doi:10.1016/j.chieco.2016.07.007.

Irshad, Muhammad Saqib, Qi Xin, Li Xuan, and Hamza Arshad. 2016. "Deltoid Analysis of Pakistan-ASEAN-China Free Trade Agreements and Opportunities for Pakistan." *Asian Economic and Financial Review* 6 (5): 228–237. doi: https://ssrn.com/abstract=2769335. doi:10.18488/journal.aefr/2016.6.5/102.5.228.237.

Jackson, Karen, and Oleksandr Shepotylo. "Belt and Road': The 'China Dream." *China Economic Review* 67: 101604. doi:10.1016/j.chieco.2021.101604.

Jiang, Guanhong. 2015. "Institutional Difference, Cultural Distance and OFDI Risks for Chinese Enterprises." *World Economy Studies* 8: 37–47.

Koišová, Eva, Jozef Habanik, Zuzana Virglerova, and Zoltan Rozsa. 2017. "SMEs Financing as an Important Factor of Business Environment in Slovak Republic Regions." *Montenegrin Journal of Economics*13 (2): 29–40. doi:10.14254/1800-5845/2017.13-2.8.

Kostevc, Črt, Tjaša Redek, and Andrej Sušjan. 2007. "Foreign Direct Investment and Institutional Environment in Transition Economies." *Transition Studies Review*14 (1): 40–54. doi:10.1007/s11300-007-0140-5.

Kozubikova, L., and A. Kotaskova. 2019. "The Impact of Technological Factors on the Quality of the Business Environment." *Transformations in Business & Economics 18* (1) :95-108.

Liu, Weidong, and Michael Dunford. 2016. "Inclusive Globalization: unpacking China's Belt and Road Initiative." *Area Development and Policy* 1 (3): 323–340. doi:10.1080/23792949.2016.1232598.

Malesky, Edmund I. 2004. "Push, Pull, and Reinforcing: The Channels of FDI Influence on." *Beyond Hanoi: local Government in Vietnam*: 285–333. doi:10.1355/9789812305947.

Mao, Haiou, Guanchun Liu, Chengsi Zhang, and Rao Muhammad Atif. 2019. "Does Belt and Road Initiative Hurt Node Countries? A Study from Export Perspective." *Emerging Markets Finance and Trade* 55 (7): 1472–1485. doi:10.1080/1540496X.2018.1553711.

Nag, Tirthankar, and Chanchal Chatterjee. 2018. "Factors Influencing Firm's Local Business Environment in Home Country Context: Exploring Evidences from Firm Surveys in India and China." *Journal of Indian Business Research*10 (4): 322–336. doi:10.1108/JIBR-09-2017-0162.

Nam, V. H., and H. Bao Tram. 2021. "Business Environment and Innovation Persistence: The Case of Small-and Medium-Sized Enterprises in Vietnam." *Economics of Innovation and New Technology* 30 (3): 239–261. doi:10.1080/10438599.2019.1689597.

Nangpiire, C., R. G. Rodrigues, and I. O. Adam. 2018. "Ease of Doing Business and Foreign Direct Investment Inflow among Sub-Sahara African Countries." *International Journal of Business and Emerging Markets*10 (3): 289–303. doi:10.1504/IJBEM.2018.093006.

Neumayer, Eric, and Laura Spess. 2005. "Do Bilateral Investment Treaties Increase Foreign Direct Investment to Developing Countries?" *World Development* 33 (10): 1567–1585. doi: 10.1016/j.worlddev.2005.07.001.

Ruta, Michele. 2018. "Three Opportunities and Three Risks of the Belt and Road Initiative." *World Bank Blog. May* 4:2018.

Sarker, Md., Md Hossin, Xiaohua Yin, and Md Sarkar. 2018. "One Belt One Road Initiative of China: Implication for Future of Global Development." *Modern Economy* 9 (4): 623–638. doi:10.4236/me.2018.94040.

Shepherd, Ben, and John Wilson. 2009. "Trade Facilitation in Asean Member Countries: Measuring Progress and Assessing Priorities." *Journal of Asian Economics* 20 (4): 367–383. doi:10.1016/j.asieco.2009.03.001.

Spruds, Andris. 2017. "Towards a Balanced Synergy of Visions and Interests: Latvia's Perspectives in 16 + 1 and Belt and Road Initiatives." *Croatian International Relations Review*23 (78): 37–56. doi:10.1515/cirr-2017-0006.

Stobaugh, Robert B. 1969. "How to Analyze Foreign Investment Climates-4 Techniques for Dealing with Tricky Questions of Economic and Political Stability." *Harvard Business Review* 47 (5): 100.

Sun, Yi, and Yuchen Sun. 2017. "Will FTAs Bring Countries Closer? An Empirical Analysis Based on China's Neighboring FTAs." *World Economics and Politics* 4: 129–154.

Verlare, J, and F. P. van der Putten. 2015. *One Belt, One Road': An Opportunity for the EU's Security Strategy*. Clingendael: Netherlands Institute of International Relations.

Vinokurov, Evgeny, and Taras Tsukarev. 2018. "The Belt and Road Initiative and the Transit Countries: An Economic Assessment of Land Transport Corridors." *Area Development and Policy* 3 (1): 93–113. doi:10.1080/23792949.2017.1385406.

Wang, James Jixian, and Selina Yau. 2018. "Case Studies on Transport Infrastructure Projects in Belt and Road Initiative: An Actor Network Theory Perspective." *Journal of Transport Geography* 71: 213–223. doi:10.1016/j.jtrangeo.2018.01.007.

You, Kefei, Silvia Dal Bianco, Zhibin Lin, and Joseph Amankwah-Amoah. 2019. "Bridging Technology Divide to Improve Business Environment: Insights from African Nations." *Journal of Business Research* 97: 268–280. doi:10.1016/j.jbusres.2018.01.015.

Appendix

Table A1. Classifications of countries and regions along the Belt and Road.

Income level	Country
Low-income (6 countries)	Afghanistan, Ethiopia, Madagascar, Nepal, Tajikistan, and East Timor
Lower-middle income (17 countries)	Bangladesh, Bhutan, Burma, Cambodia, Egypt, India, Indonesia, Laos, Vietnam, Philippines, Kyrgyzstan, Moldova, Mongolia, Morocco, Pakistan, Ukraine, and Uzbekistan
Higher-middle income (21 countries)	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Iran, Jordan, Kazakhstan, Lebanon, Malaysia, Maldives, Montenegro, Romania, Russia, Serbia, South Africa, Turkey, Sri Lanka, and Thailand
High-income (19 countries)	Bahrain, Brunei, Croatia, Czech Republic, Estonia, Hungary, Israel, Kuwait, Latvia, Lithuania, New Zealand, Oman, Panama, Poland, Qatar, Saudi Arabia, Singapore, Slovakia, United Arab Emirates, and Slovenia

Note: The data are organized from the "One Belt, One Road" Big Data Centre of the National Information Centre of China in 2018. The classification according to the World Bank income classification standards in the year 2015.

Table A2. The robustness tests.

	Time Placebo Test	Weighted DB	Entrance	
	(1)	(2)	(3)	(4)
Post*treat-p	0.405 (0.92)			
Post*treat		0.665** (2.35)	0.226*** (3.65)	0.205*** (2.97)
Cons	−5.655* (−1.94)	−4.525** (−2.14)	0.842*** (32.97)	−0.960* (−1.70)
Control variables	Yes	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
N	1095	1095	1060	960

Note: ***, ** and *, respectively, indicate that the regression coefficient is significant at the statistical level of 1%, 5%, and 10%, with *t*-values in brackets.