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Can regional cooperation mitigate the impact of COVID-19 pandemic on greenfield investments? Evidence from the belt and road initiative

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Abstract

This paper studies the impact of the COVID-19 pandemic on greenfield investments using a large panel dataset comprising 78 countries and regions at the monthly level from January 2019 to August 2021 (32 months). Particular attention is paid to whether the Belt and Road (BRI), a regional cooperation initiative, contributes to mitigating these shocks. Three indicators are used to measure greenfield investments, i.e., capital inflows, projects and employees. The lockdown measure due to the pandemic is used to conduct a difference-in-difference analysis. This paper finds that the pandemic significantly reduces global greenfield investments, while the BRI participants experience a lesser shock than the non-BRI countries (regions). Robustness checks using the numbers of monthly confirmed cases and deaths also support the role of the initiative in helping the BRI participants to mitigate the negative impact of the pandemic on greenfield investments.

KEYWORDS

belt and road initiative, COVID-19, greenfield investments

1 | INTRODUCTION

The global COVID-19 pandemic has swept through more than 200 countries and regions worldwide. Three years after the outbreak, more than 676 million people have been diagnosed worldwide, with more than 6.8 million deaths (Table 1). The pandemic has severely disrupted global

TABLE 1 The total confirmed cases (1000) and case fatality rates of selected countries (% in brackets).

	2020/1/31	2020/7/1	2021/1/1	2021/7/1	2022/1/1	2022/7/1	2023/1/1	2023/3/9
World	9.9 (2.2)	10,690 (5.2)	84,339 (2.3)	183,144 (2.2)	289,903 (1.9)	548,843 (1.2)	660,678 (1.0)	676,467 (1.0)
US	0.0 (0.0)	2698 (4.7)	20,397 (1.7)	33,797 (1.8)	55,100 (1.5)	87,832 (1.2)	100,770 (1.1)	103,803 (1.1)
India	0.0 (0.0)	605 (2.9)	10,306 (1.4)	30,458 (1.3)	34,889 (1.4)	43,486 (1.2)	44,680 (1.2)	44,691 (1.2)
France	0.0 (0.0)	205 (14.6)	2680 (2.4)	5820 (1.9)	10,237 (1.2)	31,270 (0.5)	39,334 (0.4)	39,702 (0.4)
Germany	0.0 (0.0)	195 (4.6)	1720 (1.9)	3729 (2.4)	7109 (1.6)	28,294 (0.5)	37,370 (0.4)	38,249 (0.4)
Brazil	0.0 (0.0)	1459 (4.2)	7704 (2.5)	18,631 (2.8)	22,296 (2.8)	32,434 (2.1)	36,331 (1.9)	37,076 (1.9)
Japan	0.0 (0.0)	19 (5.2)	239 (1.5)	801 (1.8)	1734 (1.1)	9355 (0.3)	29,322 (0.2)	33,320 (0.2)
South Korea	0.0 (0.0)	13 (2.2)	63 (1.5)	159 (1.3)	639 (0.9)	18,380 (0.1)	29,140 (0.1)	30,616 (0.1)
Italy	0.0 (0.0)	241 (14.4)	2129 (3.5)	4261 (3.0)	6267 (2.2)	18,610 (0.9)	25,144 (0.7)	25,604 (0.7)
UK	0.0 (0.0)	284 (19.8)	2542 (3.8)	4828 (3.2)	13,100 (1.4)	22,741 (0.9)	24,135 (0.9)	24,425 (0.9)
Russia	0.0 (0.0)	653 (1.5)	3154 (1.8)	5473 (2.4)	10,340 (2.9)	18,164 (2.1)	21,496 (1.8)	22,076 (1.8)
Turkey	0.0 (0.0)	201 (2.6)	2221 (0.9)	5431 (0.9)	9519 (0.9)	15,123 (0.7)	17,043 (0.6)	17,043 (0.6)
Spain	0.0 (0.0)	250 (11.4)	1928 (2.6)	3821 (2.1)	6295 (1.4)	12,818 (0.8)	13,684 (0.9)	13,770 (0.9)
Vietnam	0.0 (0.0)	0 (0)	1 (2.4)	18 (0.5)	1746 (1.9)	10,747 (0.4)	11,525 (0.4)	11,527 (0.4)
Australia	0.0 (0.0)	8 (1.3)	28 (3.2)	31 (3.0)	463 (0.5)	8195 (0.1)	11,133 (0.2)	11,399 (0.2)
Argentina	0.0 (0.0)	67 (2.0)	1630 (2.7)	4492 (2.1)	5674 (2.1)	9367 (1.4)	9891 (1.3)	10,045 (1.3)
Netherlands	0.0 (0.0)	50 (12.1)	815 (1.4)	1689 (1.1)	3171 (0.7)	8201 (0.3)	8580 (0.3)	8611 (0.3)
Iran	0.0 (0.0)	230 (4.8)	1231 (4.5)	3219 (2.6)	6195 (2.1)	7239 (2.0)	7561 (1.9)	7572 (1.9)
China	9.8 (2.2)	87 (5.4)	94 (5.1)	102 (4.7)	115 (4.2)	889 (4.3)	1961 (4.3)	2024 (4.3)

Note: 1. 2020/1/31 denotes 31 January 2020. 2. The case fatality rates are in parentheses.

Source: Johns Hopkins University Coronavirus Resource Center.

economic and foreign investment activities (Fang et al., 2021). World Bank statistics indicate that global GDP fell to $84.7 trillion in 2020, with a year-on-year decline rate of 3.3%. Global foreign direct investment (FDI) has also been seriously affected by the pandemic. According to the World Investment Report 2021 published by the United Nations Conference on Trade and Development (UNCTAD), total global FDI drops to $929 billion in 2020, with a year-on-year decline rate of 35%, which was the lowest record from 2005. Developing countries tend to be more affected than developed countries in terms of attracting FDI. In 2020, The inflows of greenfield investment projects to developing and developed countries contracted by 44% and 16%, respectively; while the inflows of international project finance deals to developing and developed countries declined by 53% and 28%, respectively.

The Investment Trends Monitor (UNCTAD) reports that global FDI rose to $1.65 trillion in 2021, with an annual growth rate of 77%, exceeding the 2019 value before the pandemic broke out. Although global FDI seems to have recovered, three-quarters of the renewed increase in FDI in 2021 was invested in developed countries, suggesting that the recovery in developing economies remained fragile. In terms of investment modalities, the growth occurred mainly in international project finance deals. In terms of greenfield investment, the value of investment increased by only 7% and the number of projects increased by only 1%, while the number of new projects in global value chain-intensive industries such as electronics even declined. This implies that the profound impact of the pandemic on global FDI is far from over (Goodell & Huynhb, 2020; McKibbin & Fernando, 2020).

A common view is that reducing import barriers has a positive impact on economic and FDI growth (Filippini & Molini, 2003; Heimberger, 2021; Irwin, 2019; Tongzon, 2005), which is also the economic logic of globalisation. Multilateral economic cooperation initiatives may play an important role in encouraging outward FDI and fostering trade liberalisation and economic prosperity (Bordo, 2017; Costa, 1985; Johnson, 1965; Li & Zhao, 2021). These measures could be useful in addressing the multiple barriers to cooperative confidence posed by the pandemic, including quarantine measures, international air travel suspension, slowdown of economic activities, and trade protectionism.

The Belt and Road Initiative (BRI) proposed by China in 2013 aims to facilitate transnational and transcontinental transport infrastructure in order to strengthen trade and investment cooperation (Ruta et al., 2019). It is expected to reduce the cost of foreign investment and trade and to further economic connections with partner countries, thus resisting the impact of counter-globalisation (Cheng, 2016; Huang, 2016; Wang et al., 2021). Transportation costs between China and countries along the route have been reduced significantly with the BRI (Jiang et al., 2018; Lian et al., 2020; Shao et al., 2018), which contributes to promoting bilateral and multilateral economic activities (Pomfret, 2019). Jackson and Shepotylo (2021) propose that the BRI is an important link between the Asian and European value chains and supply chains, thus having the potential to compensate for the negative impact of the US-Sino trade friction and deliver significant welfare gains. China, on the other hand, is not the sole beneficiary. Herrero and Xu (2017) estimate the potential trade volume due to reduced transport costs and note that EU countries, particularly the landlocked ones, would benefit considerably. Increased total factor productivity, reduced trade costs and local institutional environment changes resulting from the BRI can have an impact on several aspects of economic development in most countries along the route, including economic growth, welfare, and FDI (Liao et al., 2020; Yang et al., 2020).

This paper focuses on whether the BRI, a multilateral regional cooperation initiative, can help mitigate the disruptive shocks to FDI caused by the pandemic. Mergers and acquisitions (M&A) and greenfield investments are two common ways of FDI (Ashraf & Herzer, 2014; Becker

& Fuest, 2011; Görg, 2000; Müller, 2007; Nocke & Yeaple, 2007; Raff et al., 2009). Greenfield investments are defined as the direct investments invested by multinational enterprises (MNEs) to establish new firms in host countries in this paper. This type of investment is considered to generate significant technology spillovers that can contribute to and influence innovation performance (Liu & Zou, 2008), productivity growth (Javorcik, 2004; Luu, 2016; Wang & Wong, 2009) and job creation (Crescenzi et al., 2022) in the host countries. Moreover, greenfield investment is the main form of Chinese investment in the BRI participants (Lv et al., 2019). This paper pays particular attention to the potential for economic recovery in the post-pandemic era, focusing on the impact of the COVID-19 pandemic on greenfield investments and discussing whether this impact is heterogeneous across countries and industries.

Some previous studies on this topic are very insightful. Fang et al. (2021) similarly discuss the impact of COVID-19 on FDI, which empirically analyses the impact of the pandemic on China from both the inward and outward FDI perspectives. Compared with (Fang et al., 2021), this paper (1) focuses on greenfield investment rather than total FDI, (2) uses monthly data for industry-level analysis and (3) involves 78 countries and regions, 39 of which have joined the BRI, and the heterogeneity of greenfield investments received by countries and regions participating in and outside the BRI is specifically discussed. China's inward and outward FDIs have received early attention (Yao et al., 2016; Yao & Wang, 2014; Yao & Wei, 2007), but the greenfield component of these investments have been less studied. Du and Zhang (2018), Yu et al. (2019), and Zhang et al. (2021) also focus on the BRI. These studies look at the role of the BRI in promoting outward foreign direct investment (OFDI) by Chinese firms and discuss the heterogeneity of the BRI's effect across host countries and industries with different willingness to participate. The main difference between this paper and the previous studies is that it focuses on greenfield investments rather than M&A.

This paper uses a large monthly panel dataset comprising 78 countries and regions to examine the disruptive impact of the COVID-19 pandemic on greenfield investments and discusses the heterogeneity of such shocks across countries (regions) and industries. In particular, it considers whether the BRI, a regional cooperation initiative, can help withstand the adverse shocks. Greenfield investments are measured using three indicators, namely capital inflows, projects, and employees. The COVID-19 pandemic is measured by the lockdown measure using a difference-in-difference analysis (DID). Robustness tests are performed using two COVID variables, namely the number of new confirmed cases and deaths per month. This paper first examines the impact of the pandemic on greenfield investments and then discusses the heterogeneity of this impact across continents, as Europe and the Americas were the hardest hit by the pandemic, while other regions such as Asia fared somewhat better in comparison. Specifically, this paper carries out a grouping test by dividing the sample into two sub-samples, namely the BRI participants and the non-BRI countries (regions). Seemingly unrelated regressions (SUE) are then performed to check whether the results of the two groups are significantly heterogeneous. If the BRI participants have declined less than the non-BRI countries (regions), it provides evidence that BRI can mitigate the impact of the pandemic on greenfield investment. On this basis, sectoral analyses are also conducted to identify which sectors are more affected than others by the pandemic, thus providing a useful reference for greenfield investment activities during and after the pandemic.

The main findings of this paper are as follows: The COVID-19 pandemic has significantly reducing impacts on greenfield investments, which are heterogeneous across regions and sectors. Greenfield investments flowing into the BRI participants are found to perform better overall during the pandemic compared to those into the non-BRI countries (regions), especially in the sectors related to medical products, high-tech products and machinery. In other words, the BRI

can help its host countries (regions) to better withstand the impact of the COVID-19 pandemic on greenfield investments.

The rest of this paper is organised as follows. Section 2 sets out and presents the variables, models and data. The baseline results for the complete samples are presented in Section 3, with heterogeneous tests at the continental and sectoral levels. Section 4 reports the results and findings of the respective tests for the countries and regions participating in and outside the BRI. Results of the parallel trend tests and the robustness tests are reported in Section 5. Finally, Section 6 concludes with policy recommendations.

2 | MODELLING

2.1 | Identification strategy

To better capture the shocks of the pandemic, data at the monthly level are used in this paper. Data on the dependent variables are derived from the FDI Markets, which provide data on greenfield investments in over a hundred countries and regions in different industries. Economic indicators commonly used in foreign investment studies are used as control variables, including GDP, trade value, exchange rate, and industrial production index, which are collected from the UNCTAD, OECD database and the World Bank's World Development Index databases. It is challenging work to collect cross-country (region) economic data, especially every month. Data on selected economic indicators in some countries and regions are not available after matching the aforementioned databases, and they are therefore excluded from the sample to obtain relatively balanced panel data to avoid biases arising from sample selection.

This paper identifies 78 countries and regions without unavailable control variables or long-period continuous missing values. Half of the 78 countries and regions are BRI participants, while the remaining 39 have not yet participated. It is worth stating that there are fewer observations for the BRI participants than for the non-BRI countries (regions) as shown in Figure 1. This could indicate that the greenfield investments flowing into the BRI participants are distributed in fewer sectors or months, considering the fact that the data are in the country (region)-industry-month dimension. Therefore, this paper specifically controls the industry-month joint fixed effects and the country-industry (region-industry) joint fixed effects to reduce the resulting bias in the design of the estimation equation.

2.2 | A difference-in-difference analysis

To control the outbreaks of the pandemic, types of lockdown measures are used to partially or fully restrict the activities of the population, thus reducing cross-contamination, including school closing, restrictions on gatherings, public transport closing, etc. The lockdown measure can be denoted by the *stringency index* implemented in conjunction with the pandemic that is unmanipulated and weakly correlated with other economic factors (Brodeur et al., 2021; Chen et al., 2021). Outbreaks globally are a dynamic process, and different countries and regions have outbreaks at different times, resulting in lockdowns at different times. The intertemporal difference-in-difference analysis can reflect this progressive feature and the model set is intuitive, thus being widely used in existing studies (Yao et al., 2020). Therefore, a difference-in-difference

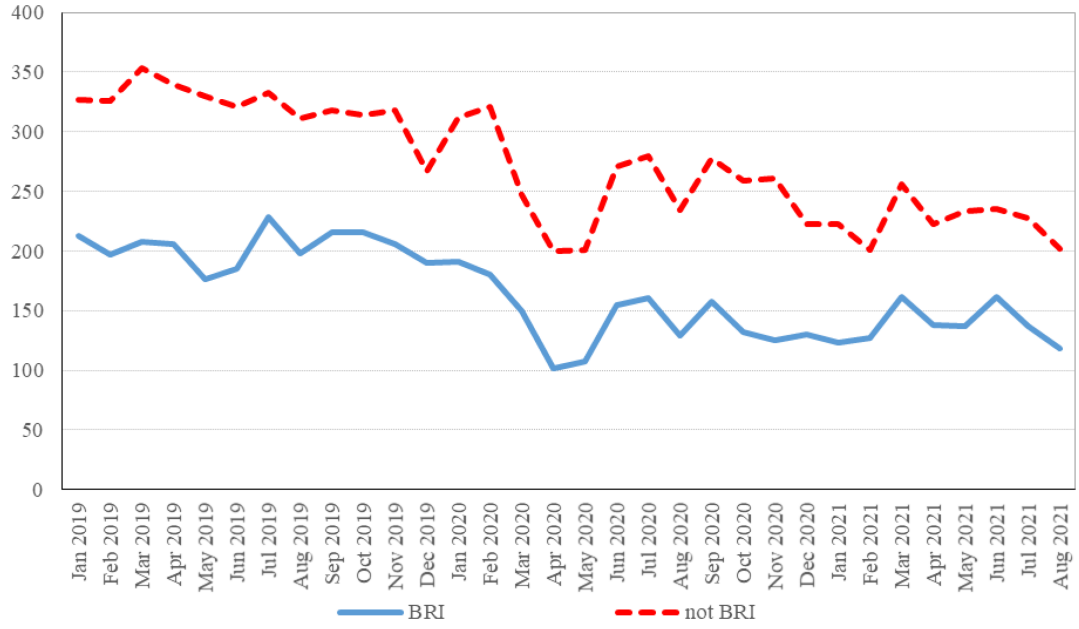


FIGURE 1 The number of observations in each group.

analysis is conducted with the use of the stringency index (si_{ct} variable) to test the economic impact of the pandemic as follows:

$$\ln FDI_{cit} = \beta_0 + \beta_1 si_{ct} + \beta_2 \ln ex_{c,t-1} + \beta_3 \ln tr_{c,t-1} + \beta_4 ui_{c,q-1} + \mu_{it} + \delta_{ci} + \gamma_t + \varphi_{year} + \epsilon_{cit} \quad (1)$$

where subscript c indicates country (region), i industry, t time at the monthly level, and q time at the quarterly level. FDI_{cit} denotes greenfield investments flowing into country (region) c in sector i and month t, which is measured from three perspectives, i.e., capital inflows (*capital*), projects (*project*) and employees (*employee*). si_{ct} variable equals the stringency index when country (region) c has implemented a lockdown measure in period t and 0 otherwise. The data on the stringency index are from the OxCGRT database, developed by Oxford University in 2020.

Based on Erel et al. (2012), Javorcik (2004), Brodeur et al. (2021) and Chen et al. (2021), this paper further controls three more variables, that is, (1) the exchange rate against the US dollar (ex_{ct}), (2) the ratio of total trade with respect to GDP (tr_{ct}) which measures the degree of outward orientation of economic structure, and (3) uncertainty index (ui_{cq}) which denotes the damage and uncertainty caused by the pandemic (Ahir et al., 2018). Particularly, the uni_{cq} variable is only available at the quarterly level, while other variables are at the monthly level. To avoid the reverse causality problem, the aforementioned three control variables are lagged by one period, i.e., variables in month t-1 or quarter q-1 are used.

Industry-month joint fixed-effect μ_{it} is controlled because there seems to be a problem that certain countries and regions attracting FDI in a few industries (see sub-section 3.1). If this is the case, the changing characteristics of the industry may affect the country (region) fixed effect, resulting in omitted variables. Country-industry (region-industry) joint fixed-effect δ_{ci}, month fixed-effects γ_t and year fixed-effects φ_{year} are also controlled. Cluster adjustments are performed in the country (region) dimension.

2.3 | Variables and data

Data on greenfield investments are obtained from the Global Investment Database provided by FDI Markets. Data on GDP, exchange rate, total trade and industrial production index are taken from the UNCTAD, OECD and the World Bank's World Development Index databases. The uncertainty index data comes from the global uncertainty index published by Ahir et al. (2018). Data on lockdown measures are from the OxCGRT database provided by the Oxford Database. Data on the number of confirmed cases and deaths are from the Johns Hopkins University Coronavirus Resource Center.

This paper uses panel data for a period of 32 months, from January 2019 to August 2021, to conduct the study. The variables, definitions and statistics are given in Tables 2 and 3.

3 | EMPIRICAL FINDINGS

3.1 | Descriptive statistics

Global FDI has experienced significant disruption during the pandemic. As an important form of FDI, this paper first looks at the changes in greenfield investments. Figures 2–4 report the changes in three indicators of greenfield investments in each group, i.e., capital inflows, projects and employees. Overall the COVID-19 pandemic causes a more pronounced decline in greenfield investments, especially in 2020. In 2021, each indicator displays a recovery trend.

All three indicators relating to greenfield investment in different groups reflect certain structural differences. In terms of investment inflows received, the two groups are closed, with average inflows of about $100 million per month. As to newly signed projects, the BRI participants sign on average two or fewer new projects per month; while this figure for the non-BRI countries (regions) is around 2.5–3, nearly 1.4 times the former. However, the BRI participants are doing better at creating jobs. The average number of employees is about 220 per month for the non-BRI countries (regions), and corresponding number for the BRI participants is about 400, which is twice as large as the former. The differences among these three indicators may suggest, to some extent, that the BRI participants achieve higher results in terms of average capital and average employees for each greenfield investment project.

TABLE 2 Variables and definitions.

Variable	Definition
$capital_{ict}$	Capital inflows of greenfield investments ($ mil.)
$project_{ict}$	Projects of greenfield investments
$employee_{ict}$	Employees of greenfield investments
si_{ct}	The stringency index variable, which equals the stringency index when country (region) c has implemented a lockdown measure in period t and 0 otherwise
$case_{ct}$	Number of new confirmed COVID-19 cases per month
$death_{ct}$	Number of new deaths by the COVID-19 per month
$\ln ex_{c,t-1}$	Logarithm of the one-period lagged exchange rate against the USD
$\ln tr_{c,t-1}$	Logarithm of the one-period lagged ratio of total trade with respect to GDP
$un_{c,q-1}$	One-period lagged uncertainty index

TABLE 3 Variables and statistics.

	Full samples			BRI participants			Non-BRI countries (regions)		
Variable	**Obs.**	**Mean**	**Std.**	**Obs.**	**Mean**	**Std.**	**Obs.**	**Mean**	**Std.**
ln $capital_{ct}$	14,152	3.19	1.73	5149	3.33	1.62	9003	3.11	1.79
ln $project_{ct}$	14,156	0.57	0.73	5149	0.47	0.63	9007	0.63	0.77
ln $employee_{ct}$	14,151	4.50	1.53	5148	4.76	1.53	9003	4.35	1.52
si_{ct}	14,156	31.11	32.76	5149	29.86	32.51	9007	31.82	32.88
ln $case_{ct}$	14,156	5.13	5.49	5149	4.52	5.08	9007	5.48	5.68
ln $death_{ct}$	14,156	2.99	3.79	5149	2.34	3.39	9007	3.37	3.95
ln $ex_{c,t-1}$	8257	1.50	2.29	2753	2.67	2.42	5504	0.92	1.97
ln $tr_{c,t-1}$	8160	0.67	0.53	2663	0.85	0.60	5497	0.58	0.46
$un_{c,q-1}$	8257	0.35	0.28	2753	0.21	0.15	5504	0.42	0.31

Note: The lagged control variables lose several observations due to the fact that these greenfield investments are discontinuous, i.e., they only happen once in a given month.

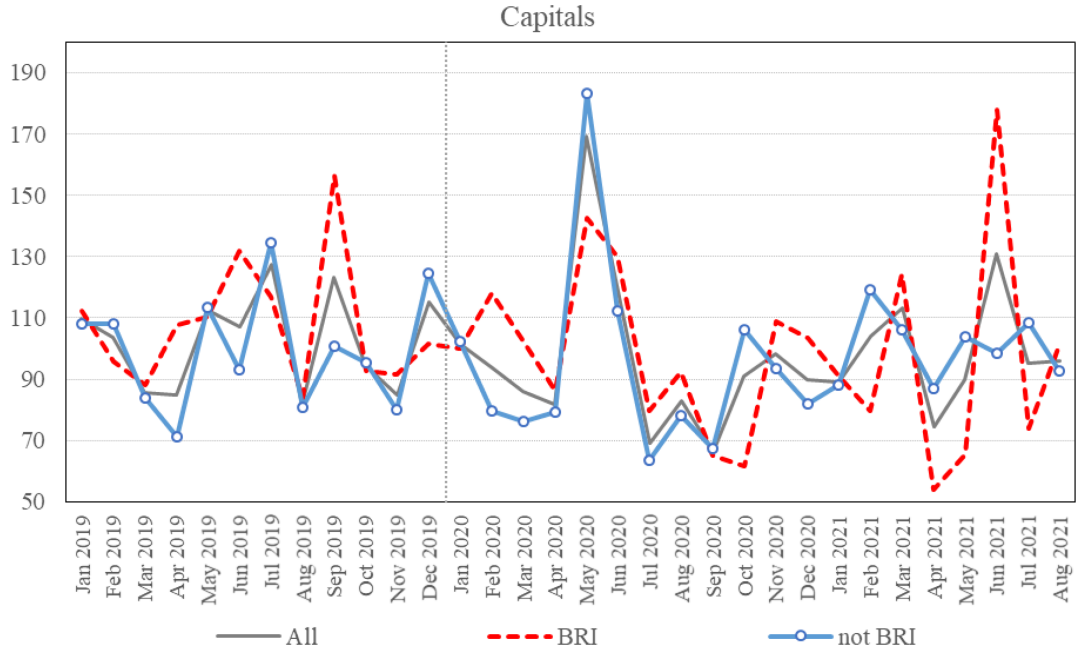


FIGURE 2 The mean of capital inflows ($ mil.) per month of greenfield investments.

The following empirical analyses are performed using the 78 sample countries and regions. Heterogeneous analyses of groups participating in and outside the BRI will be presented in Section 5.

3.2 | Basic empirical findings

This section examines the impact of the COVID-19 pandemic on greenfield investments for the whole sample. Table 4 depicts the empirical results based on Equation (1). The pandemic

FIGURE 3 The mean of newly signed project counts per month of greenfield investments.

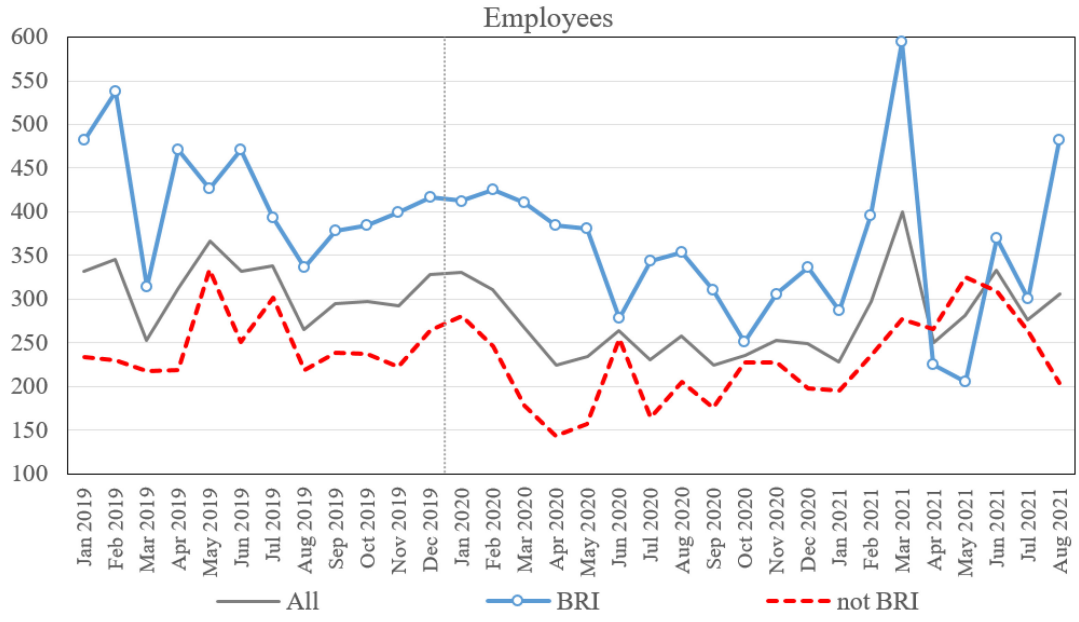


FIGURE 4 The mean of employee counts per month of greenfield investments. *Data Source*: FDI Markets.

significantly reduced greenfield investments, with significant negative shocks on all three indicators, that is, capital inflows, projects, and employees. Clearly, the failure in a host country (region) to take effective measures to control the pandemic severely hampers its ability to attract greenfield investments. It is worth noting that there is no significant impact of the control variables on greenfield investments, including the exchange rate, the trade/GDP ratio, and the

TABLE 4 Results of the impact of the lockdown measure (si_{ct} variable) on greenfield investments.

DV	ln *capital*	ln *project*	ln *employee*
Column	**(1)**	**(2)**	**(3)**
si_{ct}	−0.0068***	−0.0045***	−0.0063***
	(0.001)	(0.001)	(0.001)
ln $ex_{c.t-1}$	0.0495	0.1148	−0.0051
	(0.294)	(0.152)	(0.249)
ln $tr_{c.t-1}$	−0.0405	0.0293	0.1271
	(0.139)	(0.098)	(0.139)
$un_{q.t-1}$	−0.0517	0.0369	−0.0065
	(0.089)	(0.053)	(0.075)
μ_{it}	YES	YES	YES
δ_{ci}	YES	YES	YES
γ_t	YES	YES	YES
φ_{year}	YES	YES	YES
Constant	3.6335***	0.9173***	4.6182***
	(0.485)	(0.250)	(0.487)
Obs.	8160	8161	8159
Adj. *R*-squared	0.0301	0.0671	0.0308

Note: 1. Cluster robust standard errors in parentheses. 2. ***$p < .01$, **$p < .05$, *$p < .1$.

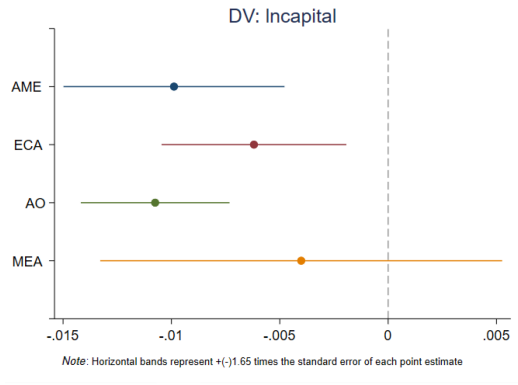
uncertainty index. This may be due to the uncontrolled group differences between BRI and non-BRI countries (regions), which is supported by the findings to be discussed in Section 4.

3.3 | Heterogeneous impacts in different locations

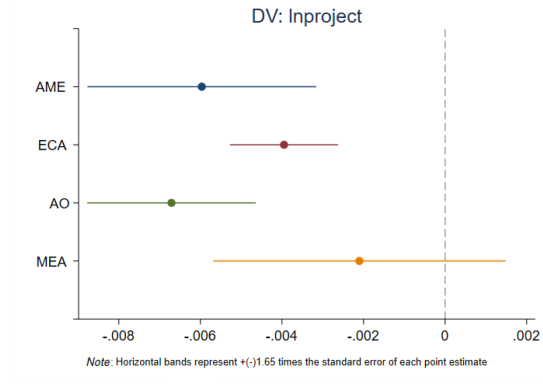
The pandemic first broke out in Asia, followed by the Americas and Europe being the worst affected. Some countries have experienced waves of outbreaks as the pandemic continues and new variants of the virus emerge. This section examines whether the impact of COVID-19 on greenfield investments is heterogeneous in different countries (regions) by grouping them according to the continents where they are located.

The findings reported in Figure 5 show that greenfield investments in the Americas and Asia have been severely hit by the pandemic, with significant declines in capital inflows, projects, and employees. COVID-19 also significantly reduced greenfield investments in Europe. Other continents are found to have suffered much less.

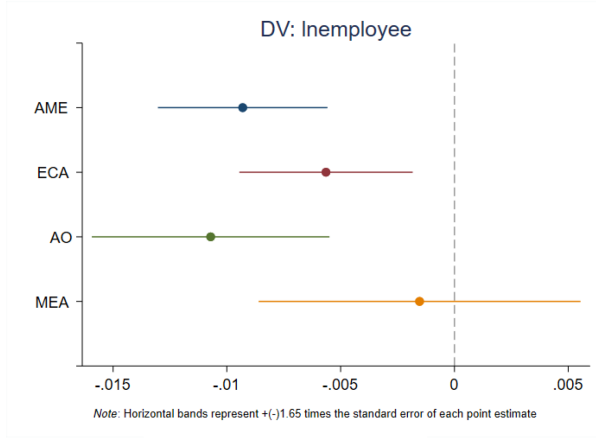
The results of this section show that the negative impact of the pandemic on greenfield investments is heterogeneous across regions. The worst declines in greenfield investments occur in the Americas, Asia, and Europe; whereas the declines in other continents are relatively moderate. This heterogeneity could be explained by the concentration of epicentres in the Americas, Europe and Asia, which accentuates the negative impact of the epidemic. It may also indicate that better prevention and control, and therefore fewer infections and deaths, are conducive to strengthening greenfield investments under downward pressure.



(a) $y = \ln capital$



(b) $y = \ln project$



(c) $y = \ln employee$

FIGURE 5 The heterogeneous impacts of the pandemic on greenfield investments in different continents. *Note*: AME denotes the Americas, ECA denotes Europe and Central Asia, MEA denotes the Middle East and Africa, and AO denotes Oceania and Asia other than the Middle East and Central Asia.

3.4 | Heterogeneous impacts in different sectors

While the pandemic severely affects greenfield investments, the sensitivity to such shocks may be heterogeneous across sectors. Seven representative sector subgroups are identified to test this possibility, including industries related to services, energy & materials, high-tech products & machinery, textiles & garments, medical products, consumer products, and transportation. Table 5 illustrates the industries in each sector.

The results of the heterogeneous impact test on greenfield investments in the different sectors are given in Figure 6. Overall, the industries related to services, high-tech products and machinery products have suffered the most notable shocks with significant declines in capital inflows, projects and employees. There are significant declines in the numbers of projects and employees of greenfield investments in transportation-related industries. Moreover, the numbers of projects notably decrease in the industries in connection with textiles & garments and consumer products. These sectors are usually dependent on active individual economic activities or highly embedded in the global value and supply chains (Stöllinger, 2021). The restrictions such as home

TABLE 5 Seven representative sectors and the industries comprising each sector.

Sector	Industry
Services	The real estate, financial services, software & IT services, business services, leisure & entertainment, hotels & tourism, and healthcare
Energy & Materials	Ceramics & glass, coal, oil & gas, renewable energy, building materials, chemicals, paper, printing & packaging, minerals, plastics, metals, rubber, and wood products
High-tech & Machinery	Electronic components, communications, industrial equipment, automotive components, non-automotive transport OEM, business machines & equipment, biotechnology, engines & turbines, aerospace, automotive OEM, space & defence, and semiconductors
Textiles	Textiles and garments
Medical products	Pharmaceuticals, healthcare and medical devices
Consumer products	Food, beverages and consumer products
Transportation	Air transportation, rail transportation, truck transportation, water transportation, support activities for transportation

quarantine and suspension of international air travel to prevent and control the outbreak seriously undermine such activities. The transport of raw materials and intermediate goods is stalled or interrupted due to the collapse of international flights as well as port congestion and container shortages in international shipping. Consequently, the relevant production and commercial activities of these sectors are hindered.

4 | HETEROGENEOUS IMPACTS IN GROUPS PARTICIPATING IN AND OUTSIDE THE BRI

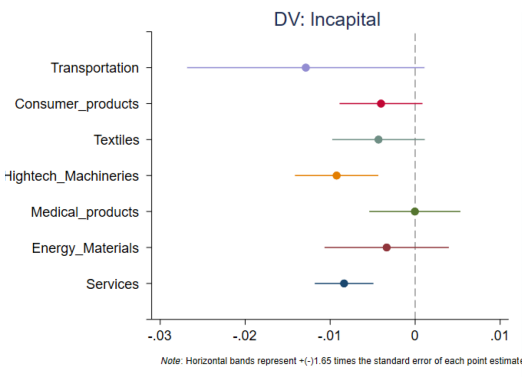
The analyses in this section focus on whether the BRI helps mitigate the impact of the pandemic on greenfield investment by comparing and finding differences in the results between the two groups, i.e., countries and regions participating in and outside the BRI.

4.1 | Baseline empirical findings

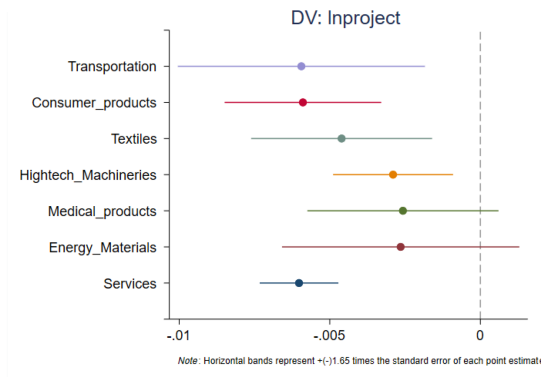
The BRI, launched by China in 2013, aims to deepen multilateral economic and commercial cooperation with the BRI participants. One of the key objectives of this initiative is to expand investment areas and encourage Chinese companies to invest in infrastructure construction and industries in the BRI participants (Lv et al., 2019). By August 2021, 39 of the 78 sample countries and regions in this paper had participated in the BRI. This section divides the samples into two groups, that is, group 1 consists of the 39 BRI participants and group 2 consisting of the other 39 non-BRI countries (regions). The two groups are, respectively, tested based on Equation (1) to compare whether there are significant differences between the results of the two groups, thus identifying whether this initiative helped to mitigate the negative impact of the pandemic on greenfield investment.

Table 6 shows the impact of the pandemic on greenfield investments in the two groups, with the use of the DID term si_{ct}. The pandemic has significantly negative impacts on both groups based on three different greenfield investment indicators, i.e., capital inflows, projects and employees. The impacts of the control variables are heterogeneous. Specifically, the exchange rate can promote the growth of investment flows and the number of projects in the BRI group. As to the non-BRI group, it has a negative but insignificant effect. Similarly, the trade/GDP ratio is found to have raised the numbers of projects and employees in the BRI group, although it is found to have significantly reduced investment flows in the non-BRI group. This heterogeneity may imply that for BRI members, a more open and outward-oriented economic structure is favourable for them to attract greenfield investment projects and create more jobs. As for the non-BRI countries (regions), they failed to attract greenfield investments through more international trade during the sample period.

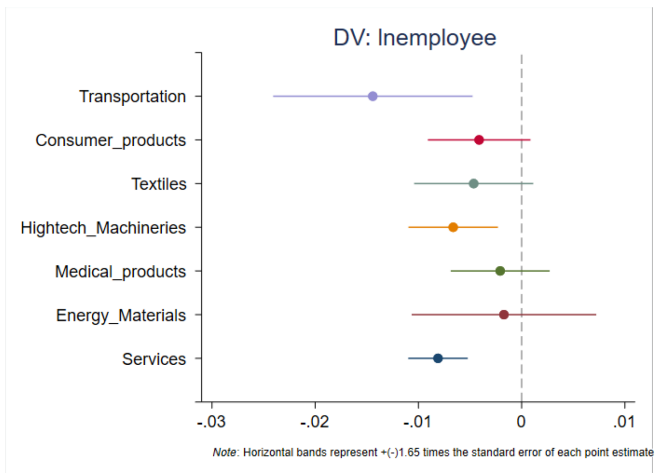
On this basis, seemingly unrelated regressions (SUE) are performed to test whether there are significant differences between the impacts of the pandemic on the two groups. The *p*-values of the SUE tests are reported in the last row of Table 6. The negative impacts of the si_{ct} variable on the inflows and employment in the BRI participants decrease less than those in the non-BRI



(a) $y = \ln capital$



(b) $y = \ln project$



(c) $y = \ln employee$

FIGURE 6 Results of the heterogeneous impacts of the pandemic on greenfield investments in different sectors.

TABLE 6 Results of the two groups using the DID model.

DV	ln *capital*	ln *capital*	ln *project*	ln *project*	ln *employee*	ln *employee*
Group	BRI	Non-BRI	BRI	Non-BRI	BRI	Non-BRI
Column	(1)	(2)	(3)	(4)	(5)	(6)
si_{ct}	−0.0058***	−0.0074***	−0.0048***	−0.0044***	−0.0059***	−0.0065***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
ln $ex_{c.t-1}$	0.7050*	−0.2554	0.4052*	−0.0625	0.5811	−0.2418
	(0.379)	(0.507)	(0.230)	(0.244)	(0.350)	(0.397)
ln $tr_{c.t-1}$	0.1541	−0.3562*	0.1715*	−0.1829	0.3481**	−0.2249
	(0.176)	(0.192)	(0.101)	(0.137)	(0.159)	(0.166)
$un_{q.t-1}$	0.0757	−0.0588	−0.0389	0.0367	0.1722	−0.0209
	(0.266)	(0.097)	(0.169)	(0.060)	(0.253)	(0.078)
μ_{it}	YES	YES	YES	YES	YES	YES
δ_{ci}	YES	YES	YES	YES	YES	YES
γ_t	YES	YES	YES	YES	YES	YES
φ_{year}	YES	YES	YES	YES	YES	YES
Constant	1.3270	4.1101***	−0.2607	1.3909***	3.0795***	5.0848***
	(1.138)	(0.506)	(0.669)	(0.257)	(1.079)	(0.508)
Obs.	2664	5496	2664	5497	2664	5495
Adj. *R*-squared	0.0334	0.0399	0.0369	0.0867	0.0349	0.0441
SUR test *p*-value	.030		.309		.054	

Note: 1. Cluster robust standard errors in parentheses. 2. ***$p < .01$, **$p < .05$, *$p < .1$.

countries (regions), while there is no significant difference in terms of investment projects. It can be supported to some extent that the BRI is conducive to withstanding the shocks caused by the pandemic.

4.2 | Heterogeneous impacts in different sectors

4.2.1 | Results of the BRI participants

In accordance with the grouping methodology in Section 3.4, this section examines the heterogeneity of new investments in different sectors in the BRI participants. Results reported in Table 7 show that the service-related industries are mostly affected by the pandemic. There are also significant contractions in the number of projects in the relevant sectors connected with transportation, textiles & garments, and consumer products. The number of employees has also declined in the energy- and material-related industries.

However, there is no significant decline in the greenfield investments received by the BRI participants in those sectors related to medical products, high-tech products and machinery products, suggesting that these sectors have better withstood the negative shocks of the

TABLE 7 The coefficients of the si_{ct} variable with respect to the three FDI variables in the BRI group.

	Services	Energy& Materials	Medical products	High-tech & Machinery	Textiles	Consumer products	Transportation
Capital	−0.0089***	−0.0033	0.0022	−0.0059	−0.0032	−0.0010	−0.0069
	(0.003)	(0.003)	(0.006)	(0.005)	(0.004)	(0.003)	(0.019)
Project	−0.0062***	−0.0012	−0.0002	−0.0039	−0.0035*	−0.0042*	−0.0146***
	(0.001)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)
Employee	−0.0076**	−0.0104*	0.0071	−0.0041	−0.0070	−0.0043	−0.0219
	(0.003)	(0.006)	(0.007)	(0.004)	(0.006)	(0.003)	(0.016)

Note: 1. Cluster robust standard errors in parentheses. 2. ***$p < .01$, **$p < .05$, *$p < .1$. 3. Results of the control variables are omitted to save pages.

pandemic. Interestingly, BRI participants show a growing but insignificant trend in their capital inflows and employees of the greenfield investments in the medical-related sectors. This is to some degree consistent with the fact that the medical sector, particularly the pharmaceutical industry, has been the "winner" during the pandemic. A typical example is Ireland, a BRI participant that became the only EU country with a positive growth rate in 2020, precisely due to the relative importance of this industry.[1]

4.2.2 | Results of the non-BRI countries (regions)

Similar heterogeneous tests of greenfield investments in different sectors are conducted in the non-BRI countries (regions) as reported in Table 8. Several sectors have declined significantly during the pandemic in capital inflows, projects and employees, including the industries related to services, transportation, high-tech products and machinery. Employment in the medical industry has also fallen. This may, in part, indicate that this sector is likely to recover from the pandemic, without significantly reducing the number of projects. Whereas the industries related to textiles & garments, consumer products, energy and materials show notable decreases in their greenfield investment projects, implying a likely lack of potential for future development. A conservative outlook on the growth expectations of these industries is recommended over the coming period.

4.2.3 | A comparison in BRI and non-BRI countries (regions)

The heterogeneity of the sectoral analyses in both groups is summarised in Figure 7 and Table 9. The commonality is that the greenfield investments of the two groups have experienced declines in the sectors connected with services, textiles & garments and consumer products. As to the transportation-related industries, the three indicators significantly decrease in the non-BRI group, while the decline in the BRI group primarily shows in project numbers. Similar conservative optimisms are suggested in these sectors in both groups. Regarding the energy- and material-related industries, the BRI and non-BRI groups sustained negative but heterogeneous impacts, with the former's employment decline and the latter's project number contraction.

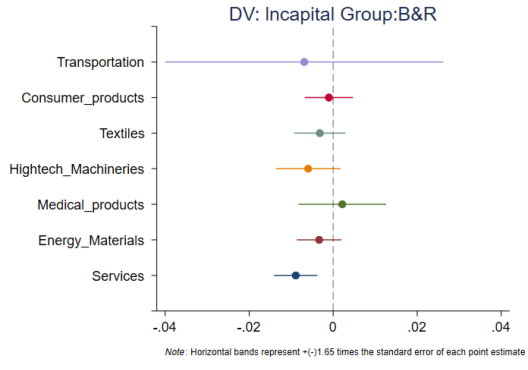
The two characteristics are (1) there are more declining sectors among the non-BRI countries (regions), particularly in the medical, high-tech and machinery-related industries, and (2) there are interesting findings with respect to the medical-related industry, where the BRI group shows insignificant growth in capital inflows and jobs, consistent with the participants' success in this industry during the pandemic. These observations at the sector level may provide some support that the BRI is helpful in resisting the shocks posed by unforeseen events such as the COVID-19 pandemic and maintaining the attractiveness of greenfield investments under downward pressure.

[1]Many thanks to the reviewer for pointing out this case.

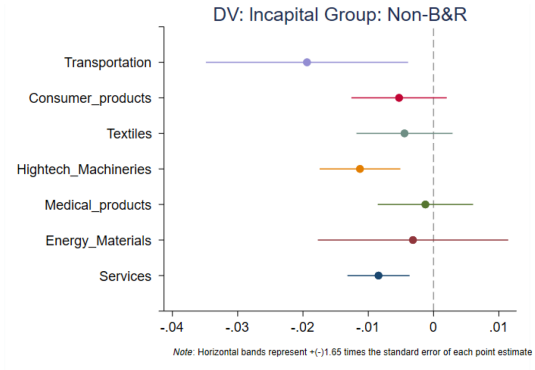
TABLE 8 The coefficients of the si_{ct} variable with respect to the three FDI variables in the non-BRI group.

	Services	Energy& Materials	Medical products	High-tech & Machinery	Textiles	Consumer products	Transportation
Capital	−0.0084***	−0.0032	−0.0013	−0.0113***	−0.0045	−0.0053	−0.0194**
	(0.003)	(0.009)	(0.004)	(0.004)	(0.004)	(0.004)	(0.009)
Project	−0.0059***	−0.0052*	−0.0034	−0.0024*	−0.0057**	−0.0067***	−0.0079***
	(0.001)	(0.003)	(0.002)	(0.001)	(0.003)	(0.002)	(0.002)
Employee	−0.0085***	−0.0015	−0.0056*	−0.0080**	−0.0037	−0.0033	−0.0211***
	(0.002)	(0.006)	(0.003)	(0.003)	(0.004)	(0.005)	(0.004)

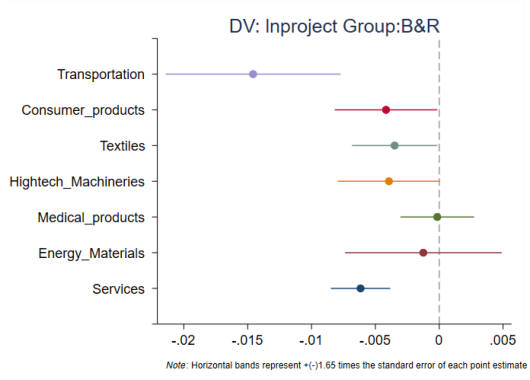
Note: 1. Cluster robust standard errors in parentheses. 2. ***$p < .01$, **$p < .05$, *$p < .1$. 3. Results of the control variables are omitted to save pages.



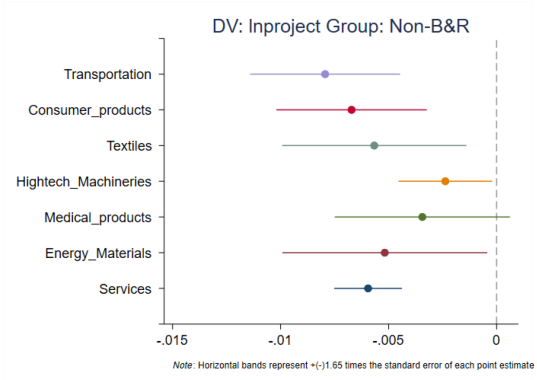
(a) $y = \ln capital$, group=BRI



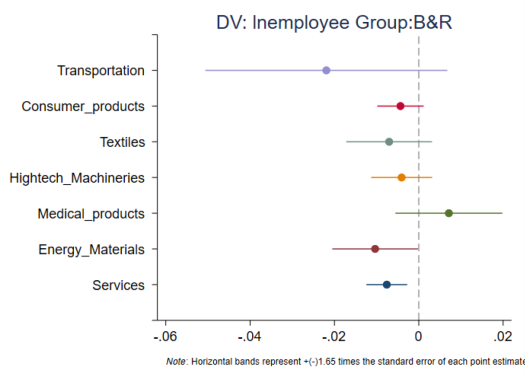
(b) $y = \ln capital$, group=non-BRI



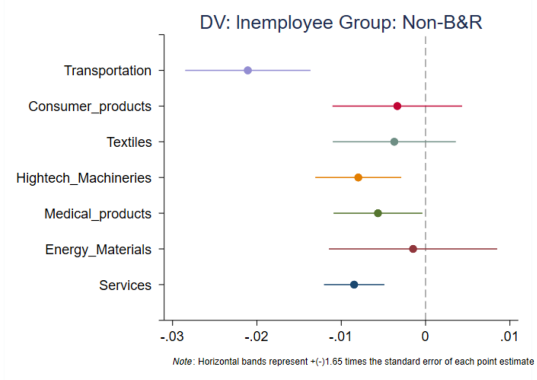
(c) $y = \ln project$, group=BRI



(d) $y = \ln project$, group=non-BRI



(e) $y = \ln employee$, group=BRI



(f) $y = \ln employee$, group=non-BRI

FIGURE 7 Results of the heterogeneous impacts of the pandemic on the two groups in different sectors.

5 | ROBUSTNESS CHECKS

5.1 | Parallel trend test

The DID analysis requires that the treatment and control groups move towards a common trend before the pandemic, i.e., the so-called parallel prior trend; otherwise, it fails. To test whether the parallel prior trend condition is satisfied, an event study is introduced in Equation (2):

TABLE 9 Summary of the decreases in different sectors in the two groups.

	Services	Energy & Materials	Medical products	High-tech & Machinery	Textiles	Consumer products	Transportation
BRI							
Capital	★						
Project	★				☆	☆	★
Employee	☆	☆					
Not BRI							
Capital	★			★			☆
Project	★	☆		☆	☆	★	★
Employee	★		☆	☆			★

Note: ★ denotes $p < .01$, and ☆ denotes $.01 \leq p < .1$.

$$\ln FDI_{cit} = \beta_0 + \beta_k \sum_{k=-12,k\neq 1}^{k=12} treat_c * 1\{period_{ct} = k\} + \beta_2 \ln ex_{c,t-1} + \beta_3 \ln tr_{c,t-1} + \beta_4 ui_{c,q-1} + \mu_{it} + \delta_{ci} + \gamma_t + \varphi_{year} + \varepsilon_{cit} \quad (2)$$

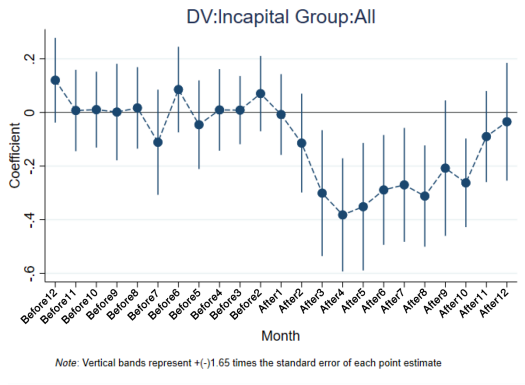
where $1\{period_{ct} = k\}$ is an event time indicator equal to 1 when $period_{ct} = k$, and 0 otherwise. $period_{ct}$ indicates how long before the lockdown is imposed, for example, $period_{ct} = -3$ means 3 months before country (region) c is on lockdown. $treat_c$ is a dummy variable that equals 1 when country (region) c implements a lockdown measure and 0 otherwise. Other variables are defined in Equation (2). This event study essentially tests whether there is a significant difference between the treatment and control groups in the 12 consecutive months before and after the lockdown.

Figure 8 reports the results of the event study. Regarding the capital inflows and employees of greenfield investments, the confidence intervals of the coefficients for these two indicators contain 0 in the entire period prior to the pandemic as well as in the first 2 months with the lockdown's implementation, implying that there was no significant difference between the treatment and control groups. As to the project indicator, the confidence intervals of the coefficients mostly contain 0 in the same period except in the 7th month before the pandemic. While the greenfield investments of the samples decline significantly in the 3rd to the 8th months after the lockdown. Overall, the results of the parallel trend test on the samples support the validity of the DID design.

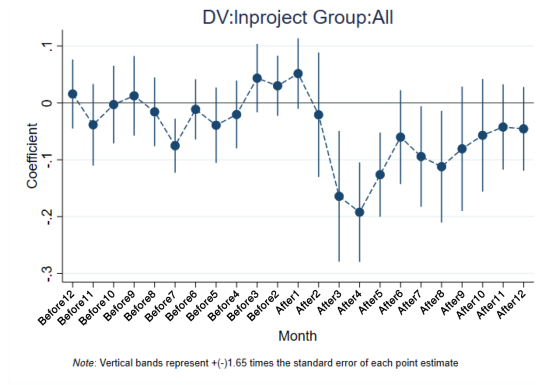
This paper suggests that the BRI plays a role in the FDI attraction of the BRI participants, therefore, it is necessary to perform respective event studies on countries and regions participating in and outside the BRI. Figure 9 shows the results of the event studies of the two groups.

In the BRI group, treatment and control samples show no significant difference in terms of capital inflows, projects and employees during the 12 months prior to the lockdown, meeting the parallel trend requirement. There are significant contractions in capital inflows and employees after the lockdown, being consistent with the aforesaid findings in this paper.

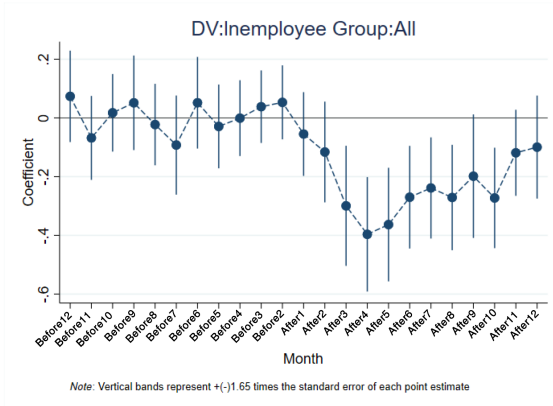
As for the non-BRI countries (regions), the confidence intervals of the coefficients on capital inflows and employees do not contain 0 prior to the pandemic. Those on the project indicator essentially contain 0, except in the 2nd and 3rd months prior to the pandemic. Overall, the use of DID design is acceptable. However, the three greenfield investment indicators drop significantly



(a) $y = \ln capital$



(b) $y = \ln project$



(c) $y = \ln employee$

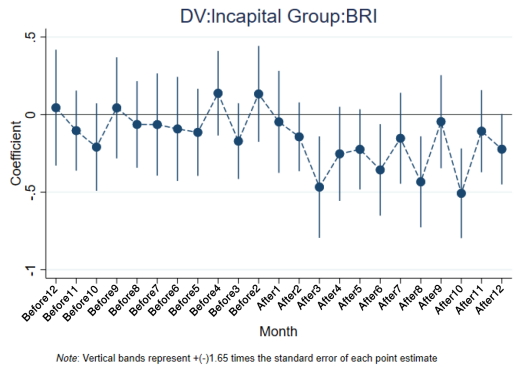
FIGURE 8 Results of the event study of all the samples. *Note*: Before 1 (after 1) to before 12 (after 12) denote the 12 months before (after) the lockdown measure(s) were implemented.

after the lockdown, capturing the significant damaging effects of the COVID-19 on the non-BRI group.

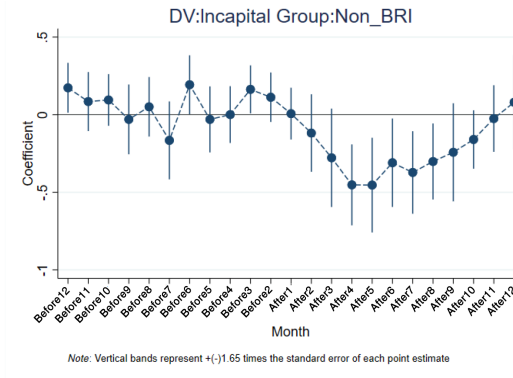
5.2 | Robustness test using the numbers of confirmed cases and deaths as COVID variables

The aforementioned DID design is carried out based on the lockdown measures due to the pandemic. It is necessary to further test the validity of the DID design, considering that the lockdown measures in fact lag behind the outbreaks of the COVID-19. This section performs robustness tests using the numbers of confirmed cases and deaths directly caused by the pandemic as follows:

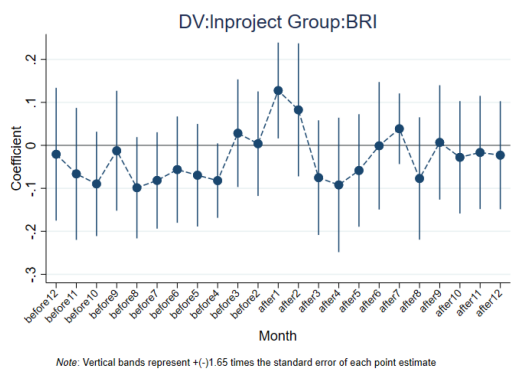
$$\ln FDI_{cit} = \beta_0 + \beta_1 \ln COVID_{ct} + \beta_2 \ln ex_{c,t-1} + \beta_3 \ln tr_{c,t-1} + \beta_4 ui_{c,q-1} + \mu_{it} + \delta_{ci} + \gamma_t + \varphi_{year} + \varepsilon_{cit}. \quad (2)$$



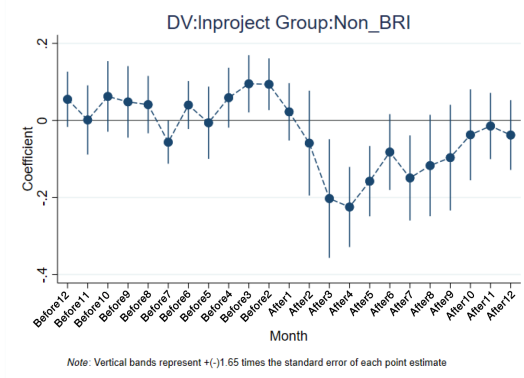
(a) DV: ln *capital*, group=BRI



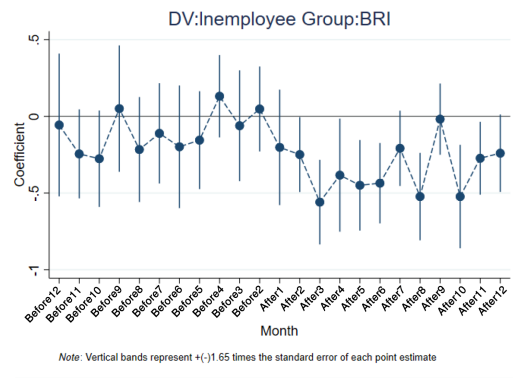
(b) DV: ln *capital*, group=non-BRI



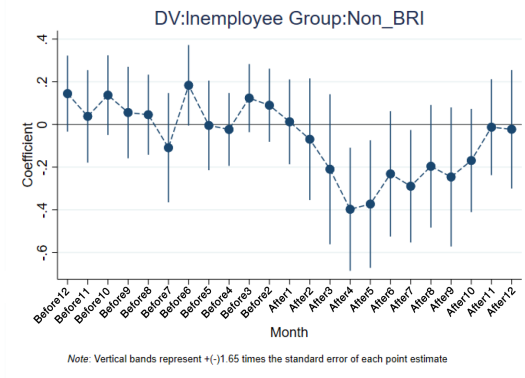
(c) DV: ln *project*, group=BRI



(d) DV: ln *project*, group=non-BRI



(e) DV: ln *employee*, group=BRI



(f) DV: ln *employee*, group=non-BRI

FIGURE 9 Results of the event study of the two groups. *Note*: Before 1 (after 1) to before 12 (after 12) denote the 12 months before (after) the lockdown measure(s) were implemented.

where FDI_{cit} denotes greenfield investments flowing into country (region) c in sector i and month t. $COVID_{ct}$ denotes the COVID-19 pandemic, measured by the numbers of new confirmed cases (*case*) and deaths (*death*) in time period t. Other variables are defined in Equation (1).

Table 10 reports the empirical results based on Equation (2). The COVID-19 variables have significant negative impacts on the capital inflows, projects, and employees of greenfield

TABLE 10 Results of the impact of the COVID-19 pandemic on greenfield investments.

DV	ln *capital*	ln *project*	ln *employee*	ln *capital*	ln *project*	ln *employee*
Column	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ln $case_{ct}$	−0.0486***	−0.0297***	−0.0445***			
	(0.009)	(0.005)	(0.009)			
ln $death_{ct}$				−0.0517***	−0.0299***	−0.0457***
				(0.012)	(0.006)	(0.012)
ln $ex_{c.t-1}$	0.1967	0.1967	0.1273	0.3456	0.2730**	0.2496
	(0.272)	(0.139)	(0.225)	(0.245)	(0.122)	(0.197)
ln $tr_{c.t-1}$	−0.1068	−0.0131	0.0660	−0.1379	−0.0300	0.0395
	(0.150)	(0.107)	(0.154)	(0.140)	(0.102)	(0.146)
$un_{q.t-1}$	−0.1471	−0.0161	−0.0923	−0.1353	−0.0029	−0.0759
	(0.094)	(0.064)	(0.078)	(0.098)	(0.058)	(0.082)
μ_{it}	YES	YES	YES	YES	YES	YES
δ_{ci}	YES	YES	YES	YES	YES	YES
γ_t	YES	YES	YES	YES	YES	YES
φ_{year}	YES	YES	YES	YES	YES	YES
Constant	3.4796***	0.8345***	4.4797***	3.3616***	0.7793***	4.4022***
	(0.455)	(0.231)	(0.466)	(0.422)	(0.206)	(0.455)
Obs.	8160	8161	8159	8160	8161	8159
Adj. *R*-squared	0.0307	0.0663	0.0313	0.0310	0.0657	0.0312

Note: 1. Cluster robust standard errors in parentheses. 2. ***$p < .01$, **$p < .05$, *$p < .1$.

investments. The results are consistent using the numbers of monthly new confirmed cases and deaths. These findings also support the robustness of the results of the DID analyses reported in Section 4.

The robustness checks are further performed for the two groups, i.e. the BRI participants and the non-BRI countries (regions). Tables 11 and 12 show the impacts of the pandemic on the greenfield investments in the two groups, with the respective use of the variables *case* and *death*. The two COVID-19 variables have caused significant negative impacts on the three greenfield investment indicators, i.e., capital inflows, projects and employees. Consistent results are obtained using the number of new confirmed cases and deaths to represent the pandemic.

On this basis, SUE tests are performed to study whether there are significant differences between the results of the two groups. The results and *p*-values of the SUE tests are reported in the last rows of Tables 11 and 12. The results in Table 11 show that the inflows and employment of the BRI participants decrease less than those of the non-BRI countries (regions), while there is no significant difference in the decline in projects. Table 12 reports the results using the number of monthly deaths as the COVID-19 variable, which supports that the BRI participants experienced a less decline than the non-BRI countries (regions) in all three

TABLE 11 Results of the two groups using the *case* variable.

DV	ln *capital*	ln *capital*	ln *project*	ln *project*	ln *employee*	ln *employee*
Group	BRI	Non-BRI	BRI	Non-BRI	BRI	Non-BRI
Column	(1)	(2)	(3)	(4)	(5)	(6)
ln $case_{ct}$	−0.0407**	−0.0538***	−0.0296***	−0.0301***	−0.0386**	−0.0496***
	(0.016)	(0.009)	(0.009)	(0.005)	(0.017)	(0.008)
ln $ex_{c.t-1}$	0.9936*	−0.1938	0.6034*	−0.0343	0.8477*	−0.1784
	(0.549)	(0.498)	(0.323)	(0.241)	(0.495)	(0.389)
ln $tr_{c.t-1}$	0.1401	−0.4892**	0.1596	−0.2585**	0.3337**	−0.3462**
	(0.172)	(0.197)	(0.100)	(0.121)	(0.156)	(0.151)
$un_{q.t-1}$	0.0275	−0.1473	−0.0683	−0.0086	0.1300	−0.1071
	(0.206)	(0.101)	(0.117)	(0.075)	(0.193)	(0.084)
μ_{it}	YES	YES	YES	YES	YES	YES
δ_{ci}	YES	YES	YES	YES	YES	YES
γ_t	YES	YES	YES	YES	YES	YES
φ_{year}	YES	YES	YES	YES	YES	YES
Constant	0.5455	4.1140***	−0.7813	1.4111***	2.3705	5.0847***
	(1.546)	(0.507)	(0.920)	(0.256)	(1.419)	(0.513)
Obs.	2664	5496	2664	5497	2664	5495
Adj. *R*-squared	0.0341	0.0402	0.0354	0.0860	0.0350	0.0450
SUR test *p*-value	.012		.215		.012	

Note: 1. Cluster robust standard errors in parentheses. 2. ***$p < .01$, **$p < .05$, *$p < .1$.

TABLE 12 Results of the two groups using the *death* variable.

DV	ln *capital*	ln *capital*	ln *project*	ln *project*	ln *employee*	ln *employee*
Group	BRI	Non-BRI	BRI	Non-BRI	BRI	Non-BRI
Column	(1)	(2)	(3)	(4)	(5)	(6)
ln $death_{ct}$	−0.0383**	−0.0582***	−0.0220**	−0.0343***	−0.0339*	−0.0542***
	(0.016)	(0.013)	(0.010)	(0.007)	(0.019)	(0.013)
ln $ex_{c.t-1}$	0.9811*	0.0627	0.5326*	0.1241	0.8100	0.0633
	(0.553)	(0.436)	(0.288)	(0.205)	(0.493)	(0.330)
ln $tr_{c.t-1}$	0.1191	−0.5267***	0.1470	−0.2836**	0.3149**	−0.3822**
	(0.166)	(0.194)	(0.095)	(0.121)	(0.147)	(0.153)
$un_{q.t-1}$	0.0842	−0.1400	−0.0193	−0.0105	0.1871	−0.1025
	(0.207)	(0.105)	(0.128)	(0.072)	(0.194)	(0.091)
μ_{it}	YES	YES	YES	YES	YES	YES
δ_{ci}	YES	YES	YES	YES	YES	YES
γ_t	YES	YES	YES	YES	YES	YES
φ_{year}	YES	YES	YES	YES	YES	YES
Constant	0.6286	3.9997***	−0.5514	1.3328***	2.5288*	4.9759***
	(1.536)	(0.459)	(0.817)	(0.223)	(1.398)	(0.489)
Obs.	2664	5496	2664	5497	2664	5495
Adj. *R*-squared	0.0331	0.0406	0.0287	0.0878	0.0335	0.0456
SUR test *p*-value	.019		.089		.022	

Note: 1. Cluster robust standard errors in parentheses. 2. ***$p < .01$, **$p < .05$, *$p < .1$.

indicators of greenfield investments. These results are consistent with the aforementioned findings that BRI is helpful for mitigating the downside impacts of the pandemic on greenfield investments.

6 | CONCLUSIONS

This paper uses a large panel dataset comprising 78 countries and regions to study the impact of the COVID-19 pandemic on greenfield investments and then discusses whether this shock is heterogeneous across countries (regions) and sectors. It pays special attention to whether the BRI, a regional cooperation initiative, can help mitigate such shocks. Three variables are used to measure greenfield investments, namely capital inflows, projects and employment. Monthly data are collected from January 2019 to August 2021. The stringency index is used as the core explanatory variable to perform a DID analysis, which denotes the lockdown measure due to the COVID-19 pandemic. Two indicators are used to measure COVID-19 in the robust check, i.e., the number of new confirmed cases and deaths. The main findings and policy recommendations are summarised later.

The COVID-19 pandemic causes significant declines in greenfield investments. Heterogeneous tests conducted in different locations show that the pandemic has the greatest impact on host countries (regions) in the Americas, Europe and Asia, the epicentres of the global pandemic. Further tests of sectoral heterogeneity identify several sectors that are hit hard, including the industries related to services, transportation, textiles & garments, consumer products, high-tech products and machinery products.

On this basis, the respective tests are performed in the countries and regions participating in and outside the BRI. Both groups have experienced significant decreases in the three indicators of greenfield investments, namely capital inflows, projects and employees. Further, SUE tests show that the decline in BRI members is significantly less than that of the non-BRI countries (regions). In other words, these findings support that the greenfield investments in the former have performed better than the latter during the pandemic, providing evidence that the BRI can help counteract the impact of the pandemic on greenfield foreign investment. Further robustness checks with the use of the two COVID-19 variables have drawn consistent findings, supporting the robustness of the DID design.

The results of the sectoral tests likewise show a certain degree of heterogeneity. In the transportation-related industries, there shows particular declines in the projects and employees of the greenfield investments in the BRI participants. Both groups have seen declines in the industries related to services, transportation, textiles & garments, consumer products, energy and materials. However, the medical-related industry shows heterogeneous performance during the pandemic, with a significant decrease in the number of employees in the non-BRI group and an insignificant rise in capital inflows and employees in the BRI participants. Besides, the three greenfield investment indicators for the non-BRI group show a particular decline in high-tech and machinery-related industries.

Certain policy recommendations can be suggested based on the research findings. First, the prevention and control of the COVID-19 pandemic are important prerequisites for resuming economic activities and attracting FDI. The declines in greenfield investments are more pronounced in regions with severe contagion and fatality. Second, the BRI participants have proven to be more resilient to pandemic shocks. As the main initiator of the BRI, China is suggested to have actively used this initiative, as well as the newly signed RCEP (Regional Comprehensive Economic Partnership), to expand partnerships and deepen cooperation with the BRI participants. Finally, it is recommended that firms undertaking foreign investment activities refocus their investments appropriately and increase their investment footprint in the post-pandemic era, and the medical, high-tech and machinery-related industries are recommended in the future greenfield investments flowing into the BRI participants.

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DATA AVAILABILITY STATEMENT

Data available on request from the authors.

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