

The Impact of the Belt and Road Initiative on the Capital Market of Chinese Listed Companies: From the Perspective of Sustainable Development



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ABSTRACT

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This paper primarily investigates the microeconomic impacts of the Belt and Road Initiative. Utilizing the principle of natural experimentation and a sustainable development perspective, we employ the Difference in Differences model with Multiple Time Periods to analyze the influence of the Belt and Road Initiative on corporate capital market performance. The study reveals that, in the capital market, firms directly investing in Belt and Road countries tend to outperform their counterparts investing in non-Belt and Road countries. Specifically, these firms demonstrate enhanced stock liquidity, a finding that maintains robustness upon further analysis. Delving deeper, the research uncovers that non-state-owned enterprises, as compared to state-owned enterprises, display more significant capital market performance when they directly invest in Belt and Road countries. In other words, the improvement in stock liquidity is more pronounced for these firms. In a world increasingly focused on sustainable development, this study can effectively guide investment strategies and contribute to the formulation of Chinese policies.

1. INTRODUCTION

In the aftermath of the 2008 international financial crisis, the global economy has been characterized by sluggishness and a weak recovery. Concurrently, domestically, the necessity for high-quality development has been underscored, particularly in light of the significant strategic opportunities for growth [1]. This context marked the introduction of the Belt and Road (B&R) Initiative by China in 2013, a strategy aimed at fostering an efficient regional cooperation platform and enhancing collaboration with partner countries [2].

The B&R Initiative represents a pivotal platform for China to enact comprehensive opening up and mutual aid under the emerging historical conditions [3]. Over the past decade, the associations between China and the partner countries have been increasingly fortified.

There has been extensive scholarly attention devoted to the economic implications of the B&R Initiative. At the macroeconomic level, studies have explored the impact of the B&R Initiative on foreign investment [4], industrial structure upgrading [5], industrial integration and optimization [6], and international trade relations [7]. Complementary to these, research at the microeconomic level has examined the effects of the B&R Initiative on the alleviation of financing constraints [8], business investment [9, 10], business innovation [11], business upgrading [12], and business performance [13].

Despite these contributions, a noticeable gap in the literature pertains to the impact of the B&R Initiative on corporate capital market performance. The B&R strategy has created opportunities and conditions for optimizing the layout of China's foreign direct investment [14]. An unexplored but pertinent question relates to the performance of listed

enterprises that directly invest in B&R countries in the capital market.

Sustainable development, defined as the requirement for businesses to balance the achievement of business goals, market position enhancement, and profitability maintenance in leading competitive areas over a significant period, provides a critical lens through which to examine these questions. The present paper aims to contribute to filling this gap in the literature.

This study, framed by a sustainable development perspective, scrutinizes the impact of direct overseas investment by Chinese listed enterprises in Belt and Road (B&R) countries on their capital market performance. The period of investigation spans from 2013 to 2022. Guided by the principles of a natural experiment, a Difference-in-Differences model with Multiple Time Periods is constructed.

Findings indicate that enterprises directly investing in B&R countries outperform those investing in non-B&R countries in the capital market, a performance disparity most evident in the enhancement of stock liquidity. This conclusion exhibits a strong robustness. Furthermore, the capital market performance of non-state-owned enterprises making direct investments in B&R countries is found to be more pronounced than that of their state-owned counterparts.

The study offers marginal contributions as follows. Conceptually, it bridges the B&R Initiative with capital market performance, thereby expanding the micro-level understanding of the B&R Initiative and enriching the understanding of the interaction model between the B&R Initiative and the capital market. In terms of research data, the B&R countries are defined as those with cooperation documents with China, and B&R enterprises are identified as those that have invested in B&R countries. This approach

provides a useful reference for assessing the impact of B&R policies.

2. LITERATURE REVIEW AND RESEARCH HYPOTHESIS

Stock liquidity is recognized as a central component of the capital market [15]. A substantial body of research has been devoted to understanding the factors that influence stock liquidity. At the macro level, studies have examined the effects of monetary liquidity [16, 17], exchange rate policy [18], and monetary policy on stock liquidity [19].

Conversely, at the micro level, research has focused on the impact of factors such as foreign ownership [20], stock market activity [21], overseas direct investment [22], and risk information disclosure on stock liquidity [23].

Interestingly, no study to date has explored the influence of the B&R Initiative on stock liquidity. However, it is reasonable to infer that the impact of the B&R Initiative on corporate capital market performance is closely intertwined with the aforementioned factors shaping stock liquidity.

Firstly, it is noted that the Chinese government plays a pivotal role in guiding direct investment along the Belt and Road Initiative (B&R) [24]. In the B&R context, corporations investing in B&R countries are likely to attract more investor and media attention compared to those investing in non-B&R countries, potentially leading to improved stock liquidity [25, 26].

In accordance with Johanson's theory of outsider disadvantage [27], B&R countries, having signed relevant cooperation agreements with China, pose less discriminatory harm due to legitimacy deficits and relationship harm from a lack of embeddedness for Chinese enterprises. As such, the additional costs of direct investment in B&R countries are likely to be lower than those in non-B&R countries. These cost reductions, when reflected in the capital market, may enhance stock liquidity.

The theory of empathy effect suggests that cultural institutional distance can influence the overseas communication costs of investment enterprises. Compared to non-B&R countries [28, 29], China and Asian B&R countries demonstrate closer ties across most dimensions, having a long history of trade, cooperation, and a higher foundation of trust [30]. An increase in manager's perception of host country similarity could encourage corporate social responsibility fulfillment [31].

There are, however, differing views regarding the relationship between social responsibility and stock liquidity. Some argue that social responsibility information increases analyst attention and reduces corporate stock liquidity [32], while others posit that a higher degree of social responsibility fulfillment improves stock liquidity [33]. Capital market investors may recognize the social responsibility of enterprises by increasing stock liquidity [34].

Moreover, overseas direct investment's impact on corporate innovation is influenced by the heterogeneity of the host countries. Notably, over 80% of B&R countries are developing nations [35]. Scholars suggest that when enterprises invest in developed countries, it aids in information disclosure [36], which, in turn, could influence stock liquidity. For risk information disclosure, a negative correlation with stock liquidity is observed, suggesting that increased risk disclosure leads to stronger market risk perception, more

cautious investor behavior, and lower stock liquidity [23]. Contrastingly, from the perspective of stock bar activity, higher activity can aid enterprises in disclosing useful information, thereby reducing uninformed traders' adverse selection and potentially leading to higher stock liquidity [21].

H_{1a}: The direct investment of B&R countries will increase the stock liquidity compared with that of non B&R countries.

H_{1b}: The direct investment of B&R countries will reduce the stock liquidity compared with that of non B&R countries.

The attention garnered by overseas investment events has been observed to gradually diminish over time, subsequently leading to a decrease in investor and media focus [22]. As the period of overseas investment extends, enterprises engaged in foreign direct investment will likely encounter a reduction in impact, as postulated by both the theory of outsider disadvantage and the theory of empathy effect. Considering this dynamic effect, the following research hypothesis is proposed:

H₂: The impact of the direct investment of B&R countries on the liquidity of corporate stocks will weaken over time.

3. RESEARCH DESIGN

3.1 Difference-in-differences with multiple time periods model

The B&R strategy, inaugurated in 2013, represents an exogenous policy influence on stock liquidity. Given that the timeline for enterprises to invest abroad is not standardized, a rigorous assessment of B&R's impact on stock liquidity necessitates the construction of a Difference-in-Differences with Multiple Time Periods benchmark regression model.

$$ILLIQ_Y_{i,t} = \alpha + \beta BR_{i,t} + \gamma Control_{i,t} + FirmFE + YearFE + \varepsilon_{i,t} \quad (1)$$

Among them, *ILLIQ_Y* refers to stock liquidity, *BR* refers to the direct investment event of listed companies in B&R countries, and *Control* refers to the set of control variables, ε is a random perturbation term. Estimated coefficient β would be related to the average difference of stock liquidity before and after the impact of the B&R. In order to improve the reliability of the regression results, the following basic processing is also carried out in this article: firstly, in regression equations, *t*-statistics with clustering robust standard error adjustment are utilized; Secondly, we used the dummy variables of 'Firm' and 'Year' to absorb fixed effects.

3.2 Variable setting

The Dependent Variable: Stock liquidity (*ILLIQ_Y*) is the focus in this study. It has been observed that in the Chinese capital market, non-liquidity indicators serve as relatively effective metrics for assessing the liquidity of corporate stocks [37]. Such indicators are capable of reflecting the cumulative impact of stock trading costs and price fluctuations [38]. In this research, the non-liquidity indicators of stocks are calculated using the methodology proposed as per the following formula [39]:

$$ILLIQ_Y_{i,t} = 10^8 \times \frac{1}{D_{i,t}} \sum_{d=1}^{D_{i,t}} \frac{|R_{i,t,d}|}{VOLD_{i,t,d}} \quad (2)$$

where, $D_{i,t}$ represents the number of trading days of stock i in year t , $|R_{i,t,d}|$ is the return rate of stock i , and trading day is on the d , the trading year is t , $VOLD_{i,t,d}$ is the daily transaction amount of stock i on day d of year t . When the $ILLIQ_Y$ value is larger, the impact of unit trading amount on stock prices is greater. The higher the trading cost for investors, the lower the liquidity of stocks, and vice versa.

Explanatory variable: the direct investment events of B&R countries (BR). BR is the product of *group* and *policy*. Specifically, the *group* of enterprises directly invested in B&R countries is taken as 1, and the *group* of enterprises invested in non B&R countries is taken as 0. When enterprise i invests in B&R countries in t years, the *policy* in and after t years will be taken as 1, otherwise it will be taken as 0. The *policy* value of enterprises directly invested by non B&R countries is 0.

Control variables: This article draws inspiration from Wu et al. [38]'s research and uses the following variables as the control variables: age of the enterprise, size of the enterprise (logarithmic treatment), equity concentration (SD, the largest shareholder's shareholding ratio), return on equity (ROE), and book to market ratio (BM).

3.3 Data sources

This study focuses on publicly listed companies with overseas direct investment from 2013 to 2022, forming the research sample. The sample processing methodology is as follows:

First, financial enterprises are excluded from the sample. Second, samples marked as ST and ST* are removed. Third, in cases where an enterprise undertakes multiple investments in the same country or region within a single year, only one investment instance is retained. If investments were made in both B&R and non-B&R countries within the same year, preference is given to the B&R investment event.

Fourth, to mitigate the influence of outliers, a 1% and 99% tail shrinkage is applied to all micro-level continuous variables. Fifth, events and rumors that lack clear indication of countries and regions, as well as investment events that were halted midway, are excluded.

Sixth, entries with missing financial data or other indicators are removed, as well as companies with recent listing times and shorter observation periods.

The original data sources for this study were the Guotai'an Database (CSMAR) and the CNRDS Platform.

4. EMPIRICAL RESULTS

4.1 Descriptive statistics

To ensure consistency between the samples used in descriptive statistics and those entering the regression, we showed the descriptive statistical results of the variables of this article in Table 1. The mean of the illiquidity indicator ($ILLIQ_Y$) is 0.071, the maximum value is 2.341, and the minimum value is 0.0016, indicating a significant gap in the illiquidity indicators in the study sample. The main descriptive statistical results are as follows: the mean of enterprise size is 22.6791, the mean of equity concentration (SD) is 34.6489, and the mean of return on equity (ROE) is 0.0675, which is basically consistent with Wu et al. [38]. Among them, the mean of age is 9.5411, and the mean of book to market ratio (BM) is 0.6359, which is significantly different from the study by Wu et al. [38]. The reason is that in terms of sample

selection, this article selects listed companies with overseas direct investment, which has significant differences in terms of age and market value compared to the entire sample of companies.

Table 1. Descriptive statistical results

Variable	Obs	Mean	Std. Dev.	Min	Max
ILLIQ_Y	3809	.071	.2378	.0016	2.341
BR	3809	.0614	.2402	0	1
Size	3809	22.6791	1.5902	19.897	27.4644
Age	3809	9.5411	6.6931	0	25
SD	3809	34.6489	15.4159	7.8227	75.0045
ROE	3809	.0675	.1488	-.9152	.3609
BM	3809	.6359	.2461	.1322	1.1412

4.2 Benchmark regression results

Table 2 presents the regression analysis results delineating the influence of the Belt and Road (B&R) initiative on corporate stock liquidity. The estimations provided in column (1) incorporate firm and year-fixed effects, while column (2) extends the model by including a set of control variables. Across all models, the regression coefficient for the B&R variable is consistently negative, suggesting that the implementation of the B&R initiative has served to enhance corporate stock liquidity. This outcome provides empirical support for H_{1a} .

Table 2. Benchmark regression results

	(1) ILLIQ_Y	(2) ILLIQ_Y
BR	-0.0707** (-2.3387)	-0.0757** (-2.5612)
Size		-0.0728*** (-6.7057)
Age		-0.0501*** (-4.8799)
SD		0.0002 (0.4311)
ROE		0.0044 (0.1034)
BM		0.1685*** (4.5256)
_cons	0.0605*** (22.0336)	1.7903*** (7.1521)
Firm	Yes	Yes
Year	Yes	Yes
N	3809	3809
adj. R^2	0.039	0.061

Note: (1) ***, **, * respectively represent significance levels at 1%, 5%, and 10%; (2) The data in parentheses is the t-value adjusted by the robust standard of clustering. The following table is the same.

4.3 Heterogeneity test

Considering the actual situation in China, under different enterprise nature conditions, the impact of the B&R on stock liquidity may have asymmetric effects. Based on this, this article divides the entire sample into state-owned enterprises and non-state-owned enterprises referring to their attributes. In the group of state-owned enterprises, the regression coefficient of the B&R on stock liquidity is positive and has not passed the statistical significance test. The regression coefficient of the B&R on stock flow is negative and has passed the 5% statistical significance test in the state-owned enterprise. The

heterogeneity test table of non-state-owned enterprise and non-state-owned enterprise is shown in Table 3. The reasons for the heterogeneity between state-owned and other enterprises may be as follows: the former are the executors of national policies and have "non market motives" [40]. Therefore, the state-owned enterprises' direct investment in R&D countries will not significantly change the attention of their investors and media than the non-state-owned enterprises. The investment of the former enterprises in R&D countries mostly flows to high-risk countries [40]. The reason why the liquidity of state-owned enterprise stocks has not significantly decreased is analyzed as follows. When state-owned enterprises disclose risks, they often focus more on macro policy risks, while the heterogeneity risk of enterprises is relatively weak, which to some extent diverts investors' attention from enterprise risks [23].

Table 3. Heterogeneity test table

	State-Owned Enterprises ILLIQ_Y	Non-State-Owned Enterprises ILLIQ_Y
BIR	0.0021 (0.3265)	-0.1043** (-2.4826)
Size	-0.0364*** (-3.3796)	-0.0800*** (-6.0000)
Age	-0.0304 (-1.6197)	-0.0474*** (-3.1268)
SD	-0.0006 (-1.0096)	0.0003 (0.4452)
ROE	0.1695 (1.4556)	-0.0386 (-0.7774)
BM	0.0875** (2.4838)	0.2277*** (4.2994)
_cons	1.0766*** (3.4899)	1.8143*** (6.3632)
Firm	Yes	Yes
Year	Yes	Yes
N	1042	2767
adj. R ²	0.114	0.069

4.4 Parallel trend test

Before adopting the DID model, it should be ensured that the experimental and control group have a consistent trend when the policy is changed [41]. Due to the different time of enterprises' foreign investment in the B&R countries, a virtual variable of time cannot be set just by taking a certain year as the breakthrough point of policy impact. In fact, we should set relative dummy variables for the B&R enterprises. In this paper we used the research method of Bai [41] to construct the following formula for parallel trend test and dynamic effect analysis:

$$\begin{aligned}
 ILLIQ_Y_{i,t} = & \alpha + \beta_1 Before2_{i,t} + \beta_2 Before1_{i,t} \\
 & + \beta_3 Current_{i,t} + \beta_4 After1_{i,t} \\
 & + \beta_5 After2_{i,t} + \gamma Control_{i,t} \\
 & + FirmFE + YearFE + \varepsilon_{i,t}
 \end{aligned} \tag{3}$$

Among them, the time dummy variable is the observation value of the first n years, this year and the next n years of the B&R enterprises' investment in the B&R countries. The dummy variables of non B&R enterprises are all 0. Given the observation period spanning from 2013 to 2022, both firm and year-fixed effects were controlled for during the regression analysis. The outcomes of the regression are graphically

presented in Figure 1, where the solid point denotes the regression coefficient and the bounding solid lines represent the 95% confidence interval, thereby providing a visual interpretation of the statistical significance and uncertainty of the estimated effects.

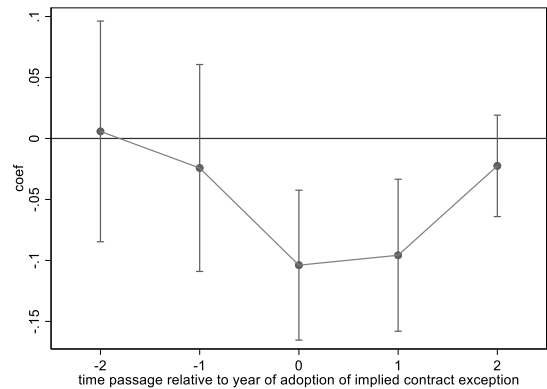


Figure 1. Parallel trend test chart

From the results we could find out that before investment in the B&R countries, the relative time dummy variable coefficients are not remarkable, and the values are in the low level. So, we could make a conclusion there exist no significant difference in stock liquidity between the experimental and control group before investing the B&R countries, which conforms to the hypothesis of parallel trend. In the year of investment in the B&R countries, the impact coefficient of direct investment in the B&R countries on stock liquidity is significantly negative. In the year of investment in the B&R countries, the impact coefficient of investment in the B&R countries on stock liquidity is still significantly negative. But compared to that year, its regression coefficient has increased, indicating that the impact has weakened compared to that year. The impact coefficient of the B&R countries' investment on stock liquidity is no longer significant one year after investing in the B&R countries. This result shows that the impact of investment in the B&R countries on stock liquidity is not long-term, so H_2 has been validated.

4.5 Placebo test

Although this article has adopted DID in model design and controlled for firm fixed and year fixed effects to minimize the impact of endogeneity. And in regression equations, we have applied the t-statistic of Cluster robust standard error adjustment improve the robustness of the model regression. However, there is still a possibility that other policies and random factors may have an impact on stock liquidity. To further mitigate the adverse effects of this on the core research results of this article, this article will draw on the research method of Bai [41] and use a placebo test method. Construct 1000 random impacts of pseudo B&R national investment on 432 sample enterprises, and randomly select 87 enterprises as the experimental group each time, and give the time of B&R national investment at random to obtain 1000 sets of dummy variables $BR^*(Group^* \times Post^*)$; Add 1000 β^* kernel density and its p -value distribution is shown in the figure. In Figure 2, the X-axis is the estimated coefficient of BR^* generated 1000 times randomly. The empty circle symbol is the p value of the estimated coefficient, the solid line is the kernel density distribution, and the left vertical line is the estimated

coefficient of the actual regression -0.0757 . The results show that the random processing generated β^* is mainly close to 0, and the P -value is mostly higher than 0.1, with only a few regression P -values smaller than the true regression coefficient. This also indicates to some extent that the core result of the article has a certain degree of robustness.

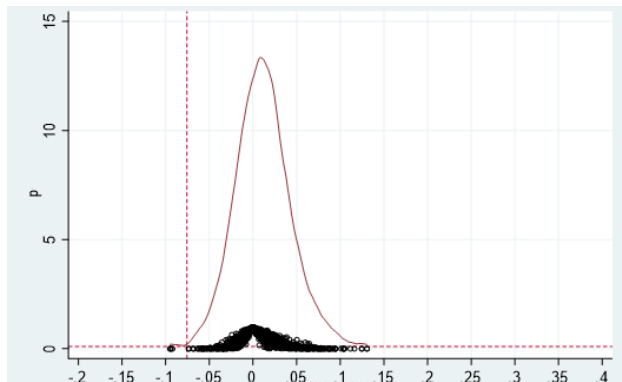


Figure 2. Placebo test chart

5. RESEARCH CONCLUSIONS AND POLICY IMPLICATIONS

The main body of the B&R should not be the government, but enterprises. What impact will going global have on their capital market performance? It has practical value to work on the impact of the B&R on the performance of China's corporate capital market, that is, stock liquidity. This paper takes the overseas direct investment of listed enterprises 2013 - 2022 as the research sample to study the effect of Chinese listed enterprises that have made the direct investment in the B&R countries on their capital market performance. The study found that the asset market performance of enterprises directly investing in the B&R countries is more superior than that of enterprises directly investing in non B&R countries, which is reflected in the rise of stock liquidity. This conclusion has strong robustness. The study also further found that the capital market performance of non-state-owned enterprises in direct investment in B&R countries is more significant than that of compared state-owned enterprises. The symbol of sustainable development of enterprises requires not only the maintenance of stock returns, but also the creation of incremental returns. The acquisition of incremental returns cannot be achieved without innovation in the enterprise's business model, organizational structure, technological research and development, and other aspects. Enterprises should make full use of the platform of B&R to enhance their reputation and profitability.

This article has the following policy implications. First, strengthen communication and exchange with the B&R countries, and pay attention to cultural exchanges while economic exchanges. Through carrying out a series of cultural exchange projects such as "Chinese Bridge" and "Confucius School", we will strengthen the joint consultation, construction and sharing with the B&R countries. Secondly, strengthen policy support for "going global" enterprises, fully leverage the role of the Asian Investment Bank, especially by providing a series of financial guarantees and preferential measures to guide more high-quality enterprises to "going global". Third, improve the construction of the network platform of the B&R, timely release the risk tips of the B&R

countries, and break the information barriers for enterprises to "going global".

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