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Income Distribution Effects of the Belt and Road Initiative

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Abstract: The Belt and Road Initiative (BRI) adheres to the principles of inclusive development, shared business interests, and collaborative construction. This paper empirically investigates the impact of the BRI on domestic income inequality in participating countries using national panel data from 2008 to 2023 and employing a difference-in-differences methodology. The findings indicate that the BRI significantly reduces domestic income inequality in participating countries. This effect is consistent across different geographic locations but is more pronounced in countries with lower levels of economic development. The economic channel analysis reveals that the BRI facilitates trade, which, in turn, reduces income inequality by promoting the industrial upgrading and optimizing the comparative advantages of the host countries. The political channel analysis shows that the BRI enhances governance capacities in participating countries, further contributing to the reduction in income disparity. Extended analyses suggest that the BRI significantly boosts the economic development levels of participating countries, and this positive effect is uniformly distributed across various economies. These findings provide empirical support for the mutually beneficial industrial relationships and inclusive development fostered by the BRI between China and its participating countries.

Keywords: Belt and Road Initiative; income disparity; inclusive development

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1. Introduction

The breakthrough development of information and communication technologies (ICT) in the 1980s ushered in an era of hyper-globalization, characterized by unprecedented global economic integration [1]. While economic globalization has significantly contributed to rapid global economic growth, it has also exacerbated inequalities both between and within countries, sparking considerable academic debate about its role [2]. The adverse impacts of capital globalization were starkly highlighted by the 2008 global financial crisis, which precipitated a weakening of the global economy. In addition, subsequent extreme events such as the United Kingdom's exit from the European Union, trade frictions between the United States and China, the COVID-19 pandemic, and the Russia–Ukraine conflict have injected further instability and uncertainty into the international environment. These developments pose significant challenges to global economic cooperation [3]. This raises critical questions: What is the future trajectory of globalization? Has international cooperation exacerbated income inequalities within countries? Has it widened income disparities between countries? Addressing these questions is of paramount importance for guiding the future course of globalization and fostering global economic cooperation.

China's rapid economic development is intrinsically linked to the process of global economic integration, and the healthy and stable development of the world economy is equally dependent on China's economic participation. In the face of challenges such as sluggish global economic growth, rising trade protectionism, and increasing anti-globalization sentiments, Chinese General Secretary Xi Jinping proposed the concepts of the Silk Road Economic Belt and the 21st Century Maritime Silk Road in 2013, collectively known as the Belt and Road Initiative (BRI). After a decade of dynamic development, the BRI has

evolved into a widely accepted international public good and a platform for international cooperation that is open, inclusive, mutually beneficial, and based on win–win cooperation. As of February 2024, China has signed over 200 cooperation documents with 150 countries and more than 30 international organizations, initiated over 3000 cooperation projects, and invested nearly USD one trillion , creating over 340,000 jobs in countries along the Belt and Road. However, some international scholars have raised concerns about the motives and impacts of China's BRI, citing issues such as "debt traps", "corruption", and worsening income distribution in the participating countries [4,5]. Addressing these concerns by empirically assessing the impact of the BRI on income disparity within and among participating countries is crucial for responding to the international community's doubts and promoting the healthy development of the Initiative in the future.

This paper makes two main contributions to the existing literature. Firstly, it introduces new data and methodologies. Utilizing the Standardized World Income Inequality Database (SWIID), this study overcomes the cross-country comparability constraints faced by previous research that relied on World Bank data [6]. Methodologically, the empirical analyses employ both multi-temporal and single-temporal difference-in-differences (DiD) models. Considering the varying timelines of different economies joining the Belt and Road Initiative (BRI), the primary empirical method used is the multi-temporal DiD, while the single-temporal DiD serves as a robustness check [7]. Secondly, this paper offers new explanations of the mechanisms from both economic and political perspectives. Economically, the study structurally decomposes the trade facilitation effects of the BRI at the product level, concluding that the BRI enhances the comparative advantages of the resource endowments of participating countries and promotes their domestic industrialization processes, thereby reducing domestic income inequality. Politically, the study examines the impact of the BRI on corruption control, finding that the initiative strengthens the governance capacities of participating countries, which in turn reduces domestic income disparities.

The remainder of the paper is organized as follows: Section 2 presents the literature review and theoretical hypotheses. Section 3 describes the empirical design. Section 4 discusses the empirical results. Section 5 analyzes the underlying mechanisms. Section 6 provides extended analyses. Finally, Section 7 offers conclusions and policy implications.

2. Literature Review, Theoretical Analysis and Hypothesis Formulation

The intrinsic motivations for the Belt and Road Initiative (BRI) can be summarized from both economic and political perspectives. Economically, as China's economy transitions towards high-quality development, the search for new economic growth drivers is a key reason for the Chinese government to propose the BRI. Politically, the rise of emerging economies and the 2008 global financial crisis have led to widespread skepticism about US-led economic globalization. Consequently, calls for reforming the international economic system have intensified, and the BRI emerged as a means to raise international cooperation to a new level [8,9]. This paper examines the impact of the BRI on the domestic income gap of participating countries from both economic and political perspectives. Economically, the BRI's innovative model of international cooperation emphasizes policy communication, infrastructure connectivity, unimpeded trade, financial integration, and closer people-to-people ties. Given the empirical data constraints and the significance of trade facilitation, the analysis will focus on the trade facilitation aspect of the BRI's economic channel in influencing domestic income inequality in participating countries. Politically, the analysis will explore how the BRI affects domestic income gaps through the enhancement of governmental governance capacities in participating countries.

2.1. Economic Channels

The Belt and Road Initiative (BRI) has significantly reduced transaction costs between China and participating countries, thereby creating new development opportunities for both China and these countries [10]. The facilitation of trade is a crucial element in advancing the BRI [11]. According to data from China's National Bureau of Statistics, the

total value of imports and exports between China and BRI countries increased from CNY 6.5 trillion in 2013 to CNY 11.6 trillion in 2021, representing an average annual growth rate of 7.5%. During the same period, the proportion of China's total foreign trade with BRI countries rose from 25% to 29.7%. In 2022, data from China Customs indicate that the total trade volume between China and BRI countries reached USD 2072.175 billion, a year-on-year increase of 15.4%, which is 11 percentage points higher than the growth rate of China's overall foreign trade. Specifically, China's exports to BRI countries amounted to USD 1180.88 billion, an increase of 15.7% year-on-year, while imports from BRI countries totaled USD 891.295 billion, an increase of 15% year-on-year. In 2022, the total import and export value between China and BRI countries was CNY 13.83 trillion, a 19.4% increase, which is 11.7 percentage points higher than the overall growth rate of China's foreign trade. Among these, exports were 7.89 trillion yuan, up 20%, and imports were CNY 5.94 trillion, up 18.7%.

The trade facilitation effect of the BRI can be summarized in two areas:

Firstly, the reduction of trade costs is a direct effect of the BRI in promoting smooth trade flow. Institutional distance between economies is a significant obstacle to trade activities between countries [12]. The BRI provides an effective platform for policy communication in international business cooperation, significantly reducing the institutional costs associated with the linked development of countries and regions [13]. The regional customs clearance and regulatory integration facilitated by the BRI has notably improved the efficiency of customs procedures for economic agents, thereby reducing systemic costs across countries. Secondly, cultural distance is another important factor hindering the smooth flow of trade [14]. The BRI offers new opportunities for the growth of trade in cultural products, fostering people-to-people communication between countries and regions, and thus mitigating the hindering effect of cultural distance on international cooperation. Thirdly, as trade barriers decrease, non-tariff barriers become increasingly important factors affecting international cooperation [15]. The BRI helps remove technical and institutional barriers in international trade, significantly reducing the risks associated with corporate investments, creating stable conditions for international cooperation, and facilitating smoother trade flow between countries. Lastly, infrastructure connectivity is a crucial foundation for cooperation and development and a priority area of the BRI [16,17]. China has constructed railways, ports, logistics hubs, and other infrastructure for BRI countries, significantly reducing transportation costs and further enhancing trade levels.

Secondly, industrial interconnection and boosting domestic demand are indirect effects of the BRI's promotion of smooth trade flows. Regarding industrial interconnection, China's large-scale international investments and assistance in BRI countries not only enhance infrastructure connectivity but also significantly improve China's image in the international community and foster people-to-people exchanges. The extensive construction of infrastructure projects can substantially increase the exports of upstream and downstream enterprises within China, generating positive externalities on trade facilitation. Furthermore, scholarly research has found significant complementarity between the traded goods of China and BRI countries, enabling in-depth trade cooperation between these nations [18]. In terms of boosting domestic demand, the BRI primarily involves developing countries and emerging economies, providing crucial support for their rapid development. The large-scale inflow of Chinese capital into these countries has significantly facilitated the flow of information within their economies. This free flow of factors and the reallocation of resources have notably increased domestic demand in BRI countries, further enhancing trade.

Hypothesis 1. *The Belt and Road Initiative increases import and export trade between China and participating countries.*

In summary, it is widely acknowledged that the Belt and Road Initiative (BRI) can promote trade through various channels. However, there is ongoing debate within academia regarding the impact of increased trade openness on domestic income distribution [19]. No-

tably, the potential worsening effect of trade openness on income distribution has become a key theoretical basis for trade protectionists. Some scholars argue that trade openness may exacerbate domestic income inequality [20,21], while others contend that it can reduce income disparities [22,23]. Additionally, the impact may vary depending on a country's level of development [24]. Therefore, this paper will further analyze how the trade effects of the BRI influence the domestic income gap in participating countries, focusing on the industrialization process and the structure of factor endowments.

In terms of the industrialization impact channel, export and investment have been the core drivers of China's economic growth over the past few decades. However, rising labor costs and overcapacity are causing these engines to lose momentum. The Belt and Road Initiative (BRI) is a crucial measure for China to maintain its rapid economic growth. Considering that BRI participant countries are mainly developing countries and emerging economies with relatively low levels of industrialization, these countries serve as important regions for absorbing Chinese manufacturing industries. China collaborates with countries along the BRI to leverage the comparative advantages formed by their factor endowments through trade facilitation, achieving economic growth for both itself and participating countries. The transfer of labor-intensive tasks to these countries signifies that the BRI will significantly increase the scale of imports and exports of industrial products, thereby enhancing the level of industrialization in these regions [25,26]. The industrialization process raises the demand for low-end labor, providing more employment opportunities and income channels for low-skilled workers, optimizing the domestic income distribution structure, and reducing income inequality within the participating countries [27,28].

In terms of factor endowment structure, researchers have found that China's demand for resource-based products from BRI countries is substantial. This may lead to higher incomes for workers who rely on resource endowments, thereby reducing income disparities [29–32]. Given that governments are significant resource owners, the income generated from leveraging comparative advantages under the BRI creates opportunities for governments to adjust income distribution through transfer payments [33,34]. Thus, the BRI may reduce domestic disparities by accelerating the industrialization process and utilizing factor endowments in participating countries.

Hypothesis 1a. *The trade facilitation effect of the Belt and Road Initiative promotes the industrialization process in participating countries and reduces the domestic income gap in these countries.*

Hypothesis 1b. *The trade liberalization effect of the Belt and Road Initiative increases the demand for resource-intensive products in participating countries and reduces the domestic income gap in these countries.*

2.2. Political Channels

Government governance capacity is a crucial factor affecting the domestic income gap [35], with the level of corruption in governance serving as an important proxy for government governance capacity [36,37]. In this paper, the level of governance corruption in an economy is analyzed as a proxy indicator of government governance level. This is particularly relevant because some Western scholars have criticized the Belt and Road Initiative (BRI) by citing governance issues in host countries, such as "fostering corruption" [38]. Existing research indicates that the level of corruption within an economy has a direct impact on the domestic income gap [39,40]. Corruption can lead to a substantial increase in grey income, resulting in widening income gaps and unfair distribution within economies. Since the 18th National Congress, the Chinese government has intensified its anti-corruption efforts [41], coinciding with the introduction of the BRI. Given that the BRI is a significant platform for disseminating Chinese values globally, the view held by some Western scholars that the initiative could deepen corruption in participating countries may not align with reality. This paper posits that the core values of "peace and cooperation, openness and inclusiveness, mutual learning and mutual benefit" propagated by China

through the BRI are more likely to reduce domestic corruption levels in participating countries, improve national government governance capacities, and thereby reduce domestic income disparities.

Hypothesis 2. *The Belt and Road Initiative improves the governance capacity of participating countries and reduces domestic income disparity.*

3. Research Design and Data Sources

3.1. Research Design

To examine whether the Belt and Road Initiative has promoted inclusive development in the participating countries, the following difference-in-differences model is set up:

$$gini_{ct} = \beta_0 + \beta_1 treat_{ct} + \beta_2 X_{ct} + \alpha_c + u_t + \epsilon_{ct} \quad (1)$$

In Equation (1) above, c denotes country and t denotes year. The explanatory variable gini represents the domestic income gap of country c in year t, measured using the domestic Gini coefficient. The core explanatory variable $treat_{ct}$ represents whether economy c signed the Belt and Road Initiative in year t. X represents the control variables, which are a series of factors that may affect the domestic income gap, mainly including the level of economic development, demographic structure and institutional quality. In addition, country fixed effects α_c are added to the model to control for the impact of unobservable factors that change only with individual country characteristics and not over time. Year fixed effects u_t are added to control for the effects of time-varying macro factors that do not vary with individual country characteristics. ϵ_{ct} is the regression disturbance term. Focusing on the estimated coefficient β_1 of the core explanatory variable $treat_{ct}$, the regression coefficient portrays the change in domestic income disparity after an economy joins the Belt and Road Initiative. If the coefficient β_1 is less than 0, it means that the Belt and Road Initiative helps to narrow the income gap within the economy; if the coefficient β_1 is greater than 0, it means that the Belt and Road Initiative leads to a widening of the income gap within the economy.

3.2. Selection of Indicators and Data Sources

The key explanatory variable in this empirical analysis is the domestic income gap across countries, measured using the Gini coefficient. A significant challenge in cross-country empirical studies is ensuring the comparability of Gini coefficients across different countries. Using the Gini coefficient directly from the World Bank database can yield unreliable results due to these comparability issues. To address this challenge, Solt constructed the Standardized World Income Inequality Database (SWIID). The SWIID is based on the Luxembourg Income Study Database (LIS) and integrates data from the OECD Income Distribution Database, the Socio-Economic Database for Latin America and the Caribbean, Eurostat, the UN Economic Commission for Latin America and the Caribbean, as well as national statistical offices and academic research institutes from around the world. The SWIID provides the most cross-country comparable standardized income inequality data currently available. It includes comparable Gini indices for 199 countries, spanning as many years as possible from 1960 onwards. This comprehensive database allows for more reliable and consistent cross-country empirical analyses of income inequality.

Income gap between countries (gap): In order to examine the impact of the Belt and Road Initiative on inclusive development among the countries along the route, the income gap between countries is measured using the generalized entropy method, which is calculated using the following formula:

$$T = \frac{1}{n}\sum_{c}^{n} \frac{y_c}{\overline{y}}\, ln\left(\frac{y_c}{\overline{y}}\right) \quad (2)$$

where y_c is the per capita income level of country c, $\overline{y}$ is the per capita income level of all countries in the group, and n is the number of countries.

Policy intervention dummy variable (treat): The core explanatory variable in the empirical analyses refers to the dummy variable of whether country c joins the Belt and Road Initiative in year t. Specifically, treat takes the value of 1 if the government of a country along the route signed a memorandum or a cooperation agreement or issued a joint statement on the Belt and Road Initiative with the Chinese government, and 0 otherwise.

Control variable (X): Reference to previous literature, three main variables are selected, namely, economic development, demographic structure and institutional quality. Among them, the control variables for economic development are national level of economic development (gdppc), measured using gross domestic product (GDP) per capita; growth rate of the economy (gdpr), measured using the GDP growth rate; national capital stock (rnna), calculated using the perpetual inventory system method of calculating the capital stock of each economy; national level of productivity (rtfp), measured using the constant price-based economy's total factor productivity measure; difficulty of capital formation (pli), using a measure of the price level of capital formation with a base period of 2017; and industrial structure (ind), measured using the share of secondary and tertiary industries in the economy. The main control variables in terms of demographic structure are the country's total population (pop); the share of the country's juvenile population (pop14), measured using the proportion of the population under 14 years of age; and the share of the country's elderly population (pop65), measured using the proportion of the population over the age of years. Institutional quality variables include voice and accountability (voa), political stability (ps), regulatory quality (rq), judicial quality (rol), and corruption control (crr).

The data used in the empirical analysis are mainly from the World Bank's World Development Indicators (WDI), the latest version of the Penn World Table 10.01 (PWT), the database of the Centre d'Études Prospectives et Études de l'Information Internationale (CEDI) and the Centre d'Études Prospectives et d'Informations Internationales (CEPII). In order to avoid the interference of extreme values in the empirical results, all continuous variables were reduced at the 1% and 99% quantiles, and Table 1 shows the descriptive statistics of the main variables. As can be seen in Table 1, the mean of the explanatory variables is 37.4, with a standard deviation of 8.3, indicating that the income gap varies widely among economies; the standard deviation of the core explanatory variables is 0.24, indicating that about 24 percent of the economies in the sample have joined the Belt and Road Initiative.

Table 1. Descriptive statistics.

Variable Name	Observations	Mean	SD	Min	Max
gini	635	37.8924	8.3063	22.4000	64.3000
treat	635	0.2488	0.4327	0.0000	1.0000
gdppc	635	1.8716	2.1420	0.0354	8.6606
gdpr	635	2.1282	2.5182	−10.8620	11.2812
rnna	635	0.3200	0.5236	0.0014	1.9099
rtfp	635	0.9992	0.0517	0.7442	1.5368
pli	635	0.6264	0.1819	0.3140	1.2917
ind	635	70.4960	10.9550	33.3091	90.9498
pop	635	47.2879	106.3960	0.2843	652.3772
pop14	635	25.5234	10.3024	13.1206	48.5803
pop65	635	10.4490	6.4001	1.6732	21.8441
voa	635	0.2582	0.9156	−1.8820	1.6056
ps	635	0.0481	0.8608	−2.6471	1.5424
rq	635	0.3449	0.9244	−1.8927	1.8986
rol	635	0.2422	0.9992	−1.9033	1.9458
crr	635	0.2109	1.0510	−1.4679	2.2565

4. Empirical Findings

4.1. Baseline

The regression Equation (1) is used to empirically test how accession to the Belt and Road Initiative (BRI) by the countries along the route affects domestic income distribution. The results of the benchmark regression are shown in Table 2. Column (1) of Table 2 presents the regression results controlling only for country fixed effects and time fixed effects, with the core explanatory variable significantly less than 0. Columns (2) to (4) of Table 2 show the empirical results after sequentially adding the control variables for economic development, demographic structure, and institutional quality. In all specifications, the core explanatory variable remains significantly negative, indicating that participation in the BRI significantly reduces domestic income disparity. Specifically, in Column (4), which includes all control variables, the coefficient of the core explanatory variable is −0. 183, significant at the 5% level. This implies that participation in the BRI reduces the Gini coefficient by 0. 483% (0.212/37.407∗100). The benchmark regression results support Hypothesis 1.

Table 2. Baseline empirical results.

	(1)	(2)	(3)	(4)
Variables	**Gini**	**Gini**	**Gini**	**Gini**
treat	−0.148 *	−0.152 *	−0.174 **	−0.183 **
	(0.082)	(0.081)	(0.080)	(0.079)
gdppc		−0.267 ***	−0.204 **	−0.213 **
		(0.083)	(0.090)	(0.085)
gdpr		0.008	0.012	0.014
		(0.010)	(0.010)	(0.010)
rnna		1.115	1.338	1.716 **
		(0.769)	(0.874)	(0.851)
rtfp		−0.548	−0.783	−0.849
		(0.656)	(0.643)	(0.603)
pli		−0.121	−0.026	0.317
		(0.373)	(0.419)	(0.423)
ind		−0.008	−0.006	−0.009
		(0.010)	(0.009)	(0.009)
pop			0.008	0.006
			(0.017)	(0.016)
pop14			0.165 ***	0.182 ***
			(0.062)	(0.059)
pop65			−0.199 **	−0.217 ***
			(0.082)	(0.083)
voa				0.166
				(0.199)
ps				−0.532 ***
				(0.137)
rq				0.319
				(0.215)
rol				0.417 *
				(0.233)
crr				−0.849 ***
				(0.224)
cons	37.929 ***	39.264 ***	36.535 ***	36.351 ***
	(0.028)	(0.916)	(2.124)	(2.070)
Year FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Observations	635	635	635	635
Adj. R-sq	0.997	0.997	0.997	0.997

Note: *, **, and *** correspond to being significant at the 10%, 5%, and 1% significance levels, respectively. Cluster robust standard errors are in parentheses.

4.2. Robustness Check

The robustness of the results is verified using dynamic effects analysis, substitution of variable measures, and replacement of identification methods.

4.2.1. Parallel Trend Test

Benchmark regressions use quasi-natural experimental research methods to construct a difference-in-differences model for causal identification. However, the use of a difference-in-differences model requires the fulfillment of the parallel trend assumption. The parallel trend assumption stipulates that, firstly, before the implementation of the policy, there should be no significant difference in the trend of domestic income disparity between different countries; and secondly, after the implementation of the policy, there should be a significant difference in domestic income disparity between the countries joining the Belt and Road Initiative and those that did not. The event study method is employed to test the validity of the parallel trend hypothesis, and the specific econometric regression equation is set as follows:

$$gini_{ct} = \beta_0 + \Sigma_{t=2009, t\neq 2013}^{2023} \beta_t treat_c \times year^t + \beta_2 X_{ct} + \alpha_c + u_t + \epsilon_{ct} \quad (3)$$

In the above Equation (3), $year^t$ is a year-by-year dummy variable; β_t reflects the impact of the Belt and Road Initiative on the domestic income gap of the countries that joined the Initiative in year t; other variables are set exactly the same as in the econometric model (1). The other variables are identical to those in the econometric model (1). Theoretically, if the parallel trend assumption can be satisfied, the estimated coefficients of β_t are not statistically significantly different from 0 in 2013 and earlier years. By estimating Equation (3), we obtain Figure 1, which shows that there is no significant difference in the trend change of domestic income disparity among different types of economies before the Belt and Road Initiative. After the Belt and Road Initiative was proposed, the domestic income disparity of the economies that joined the Initiative was significantly lower than that of those that did not join the Initiative, and this effect shows a tendency to appear gradually and deepen over time. The parallel trend test is valid, and the benchmark regression results are reliable.

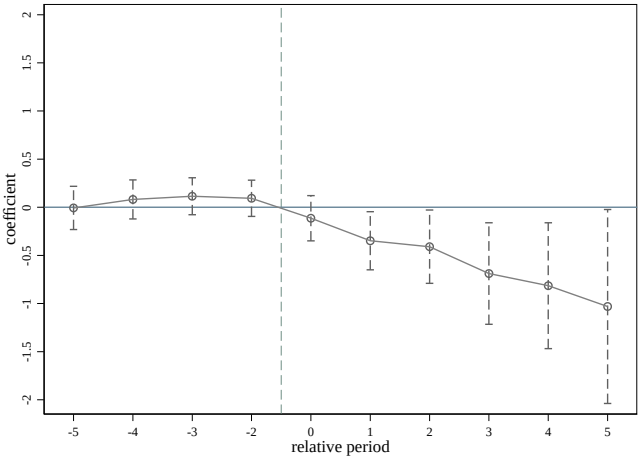


Figure 1. Parallel trend test.

4.2.2. Replacement of Variable Measurements

To mitigate the impact of variable measurement errors on the empirical results, the measures of the explanatory variables and the core explanatory variables are replaced separately, and the empirical analyses are re-run. For the explanatory variables, the market inequality index of economies provided by SWIID is used to replace the Gini coefficient, calculated based on disposable income in the benchmark regression. The results are shown in Column (1) of Table 3, which align with the sign of the results from the benchmark regression, indicating that the empirical results are robust. Regarding the core explanatory

variables, all non-Belt and Road countries are taken as the control group for the empirical analyses. The results are shown in Columns (2) and (3) of Table 3, with the core explanatory variables significantly less than 0. These results are consistent with the sign of the empirical results from the benchmark regression, further confirming the robustness of the results.

Table 3. Robustness check.

	(1)	(2)	(3)	(4)
	Gini2	**Gini**	**Gini2**	**Poverty Rate**
treat	−0.204 **	−0.240 **	−1.428 ***	−1.344 ***
	(0.084)	(0.108)	(0.237)	(0.494)
CV	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Observations	635	635	635	227
Adj. R-sq	0.993	0.992	0.955	0.950

Note: **, and *** correspond to being significant at the 5%, and 1% significance levels, respectively. Cluster robust standard errors are in parentheses. Due to space constraints, regression results for control variables are not reported; same table below.

4.2.3. Placebo Test

The empirical results of the benchmark regression show that participation in the Belt and Road Initiative (BRI) is conducive to narrowing the domestic income gap. The reduction in the domestic income gap indicates that the income of the low-income group grows faster, suggesting a trend of income distribution favoring the low-income segment. Given that the population below the poverty line typically represents the low-income level, if the income of the low-income group grows relatively faster, it can be inferred that the number of poor people in BRI countries is likely to decrease significantly. This implies that poverty reduction is a sufficient, but not necessary, condition for inclusive development. Therefore, the explanatory variable is further replaced by the national poverty rate. If economies joining the BRI experience greater reductions in national poverty rates relative to non-joining economies, this would confirm the inclusive nature of the BRI. As shown in Column (6) of Table 4, economies participating in the BRI have significantly lower domestic poverty rates relative to other countries, providing supportive evidence for the benchmark regression results.

Table 4. Economic integration.

	(1)	(2)
Variables	**Import**	**Export**
treat	0.174 ***	0.055 **
	(0.060)	(0.028)
CV	YES	YES
Year FE	YES	YES
Country FE	YES	YES
Observations	635	635
Adj. R-sq	0.955	0.984

Note: **, and *** correspond to being significant at the 5%, and 1% significance levels, respectively. Cluster robust standard errors are in parentheses.

5. Mechanism Analysis

To examine how the Belt and Road Initiative (BRI) has reduced domestic income disparities in participating countries, the following mechanisms will be explored from both economic and political perspectives.

5.1. Economic Channels

Trade is a crucial engine of economic growth. As one of the five key components of the Belt and Road Initiative (BRI), trade facilitation is a primary focus of BRI construction. The economic integration effect of the BRI is empirically examined using total import trade and total export trade as explanatory variables, with the results presented in Table 4. Columns (1) and (2) of Table 4 demonstrate that the BRI significantly increases trade volume between China and the participating countries, with a positive impact observed in both import and export trade.

Whether the increase in import trade or export trade, a rise in trade volume signifies that China and the participating countries are strengthening their economic ties, which favors further economic growth at the aggregate level. However, the impact of this growth on domestic income distribution patterns remains debated among scholars [42,43]. To understand how the Belt and Road Initiative (BRI) affects domestic income distribution in participating countries by promoting trade, this paper will decompose import and export trade at the product level. Using commodity-level import and export data from the United Nations Commodity Trade Statistics Database (UN Comtrade), and referencing the Standard International Trade Classification (SITC), which divides traded goods into 10 categories, the trade promotion effect of the BRI will be analyzed. The trade volume of different product categories will serve as explanatory variables to decompose the BRI's impact on trade.

According to the empirical results in the previous section, the overall impact of the Belt and Road Initiative (BRI) on both import and export trade is positive. Given that the average treatment effect at the overall level is the weighted result of the treatment effects of heterogeneous samples, a significant positive regression coefficient of the overall regression indicates that the positive effects in the structural decomposition outweigh the negative effects. Therefore, we focus on the empirical results with a significant positive regression coefficient in the structural decomposition of trade.

Table 5 shows the empirical results of the structural decomposition of export trade. The findings indicate that the Belt and Road Initiative (BRI) primarily promotes trade in products such as fossil fuels and lubricants, chemicals, manufactured goods, machinery, and transport equipment. This promotion is the main driver of the positive growth in total trade volume between participating countries and China. China exports mainly manufactured goods and products such as mineral lubricants to participating countries. The large-scale export of these products, which depend on manufactured goods produced by manufacturing machinery or substances such as fuels and lubricants needed for manufacturing, requires substantial manufacturing support, aligning with China's role as the "factory of the world". Additionally, China has exported significant quantities of manufacturing equipment and raw materials to BRI countries. This indicates that the BRI has accelerated the industrialization process in these participating countries. By absorbing China's manufacturing industries, the participating countries can advance their domestic industrialization process, create more employment opportunities for workers, and increase their incomes, thereby reducing poverty and narrowing the income gap within the country. The empirical results support Hypothesis 1a.

The results of the decomposition of import trade structure are shown in Table 6. The findings indicate that China's imports of "non-edible unprocessed materials other than fuels" and "animal and vegetable oils, fats, and waxes" from participating countries play a dominant role in the import promotion effect of the Belt and Road Initiative (BRI). The BRI has led to a significant reduction in the share of China's imports of "animal and vegetable oils, fats, and waxes" from ASEAN countries. Combined with the empirical results of this paper, this implies that China has experienced trade diversion among the participating countries of the BRI. The empirical results support Hypothesis 1b.

Table 5. The structural breakdown of export trade.

	(1)	(2)	(3)	(4)	(5)
Variables	**Food and Live Animals**	**Beverages and Tobacco**	**Crude Materials, Inedible, except Fuels**	**Mineral Fuels, Lubricants and Related Materials**	**Animal and Vegetable Oils and Fats**
treat	−0.078	−0.063	−0.082	0.230 *	−0.112
	(0.065)	(0.152)	(0.079)	(0.131)	(0.116)
Observations	635	635	635	635	635
Adj. R-sq	0.945	0.832	0.941	0.894	0.870
	(6)	**(7)**	**(8)**	**(9)**	**(10)**
	Chemicals	**Manufact Goods Classified Chiefly by Material**	**Machinery and Transport Equipment**	**Miscellaneous Manufactured Articles**	**Commod. and Transacts. Not Classed According to Kind**
treat	0.078 ***	0.083 ***	0.081 **	−0.025	−0.032
	(0.028)	(0.030)	(0.034)	(0.040)	(0.412)
Observations	635	635	635	635	635
Adj. R-sq	0.986	0.982	0.978	0.976	0.765
CV	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES

Note: *, **, and *** correspond to being significant at the 10%, 5%, and 1% significance levels, respectively. Cluster robust standard errors are in parentheses.

Table 6. Structural decomposition of import trade.

	(1)	(2)	(3)	(4)	(5)
Variables	**Food and Live Animals**	**Beverages and Tobacco**	**Crude Materials, Inedible, except Fuels**	**Mineral Fuels, Lubricants and Related Materials**	**Animal and Vegetable Oils and Fats**
treat	0.156	0.028	0.301 ***	−0.491 ***	0.490 **
	(0.155)	(0.143)	(0.112)	(0.184)	(0.202)
Observations	635	635	635	635	635
Adj. R-sq	0.892	0.903	0.916	0.913	0.890
	(6)	**(7)**	**(8)**	**(9)**	**(10)**
	Chemicals	**Manufact Goods Classified Chiefly by Material**	**Machinery and Transport Equipment**	**Miscellaneous Manufactured Articles**	**Commod. and Transacts. Not Classed According to Kind**
treat	−0.228 *	0.195	0.170	−0.112	0.210
	(0.134)	(0.126)	(0.129)	(0.097)	(0.812)
Observations	635	635	635	635	635
Adj. R-sq	0.941	0.929	0.964	0.964	0.747
CV	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES

Note: *, **, and *** correspond to being significant at the 10%, 5%, and 1% significance levels, respectively. Cluster robust standard errors are in parentheses.

In summary, the Belt and Road Initiative (BRI) may narrow the domestic income gap of participating countries in two ways. First, China's increased demand for resource-intensive products from participating countries enables these countries to leverage their factor endowment advantages, thereby raising the income level of low-end domestic labor. Second, the BRI has prompted participating countries to undertake China's manufacturing industry, accelerating the process of domestic industrialization. This shift provides domestic workers with more employment opportunities and raises their income levels. To provide further evidence for this assessment, the proportion of manufacturing industries

in each economy is calculated as a proxy variable for the level of national industrialization. Regression analyses are re-conducted with this proxy variable as an explanatory variable. The empirical results, shown in column (1) of Table 7, indicate that the BRI significantly enhances the level of national industrialization in participating countries, providing more empirical evidence to support the above assessment.

Table 7. Mechanism analysis.

	(1)	(2)	(3)
Variables	**National Industrialization**	**Intensity of Corruption Control**	**Degree of Probity**
treat	0.233 *	0.030 **	2.100 ***
	(0.140)	(0.013)	(0.604)
CV	YES	YES	YES
Year FE	YES	YES	YES
Country FE	YES	YES	YES
Observations	635	635	635
Adj. R-sq	0.947	0.988	0.816

Note: *, **, and *** correspond to being significant at the 10%, 5%, and 1% significance levels, respectively. Cluster robust standard errors are in parentheses.

5.2. Political Channels

The degree of control over corruption in an economy is a significant reflection of its governmental governance capacity. Level of corruption is one of the core factors affecting the domestic income gap and inequitable distribution. By examining the strength of corruption control, we analyze the mechanism through which the Belt and Road Initiative (BRI) reduces the domestic income gap of participating countries via the political channel. Specifically, the corruption control variable from the World Development Index (WDI) and the integrity index provided by Transparency International are used as proxies for government governance capacity. The empirical results, shown in columns (2) and (3) of Table 7, indicate that the BRI significantly enhances the control over domestic corruption in participating countries, thereby improving their government governance capacity and suppressing the widening of the domestic income gap. The empirical results support Hypothesis 2.

6. Further Analysis

6.1. Income Disparities between Countries

Considering that inclusive development encompasses both "inclusion" and "development", this paper also examines the impact of the Belt and Road Initiative (BRI) on income disparities among participating countries. The level of national economic development (GDP per capita) is used as an explanatory variable in the empirical analysis, with the results shown in column (1) of Table 8. The findings indicate that the BRI significantly promotes economic growth in participating countries. Additionally, to empirically test whether the BRI's promotion effect varies among different economies, this paper calculates the income gap between participating and non-participating countries based on the generalized entropy index in Equation (2), using it as an explanatory variable. The results are shown in column (2) of Table 8. The regression coefficient of the core explanatory variable is −0.024, but it is not statistically significant. This suggests that the BRI has not caused a continuous expansion of the income gap between countries along the route. Although the coefficient does not pass the statistical significance test, it still indicates that the initiative has the potential to reduce the income gap between countries. Therefore, the BRI's promotion of economic growth in participating countries is conducive to sharing the dividends of economic development among the people in these economies. Moreover, this promotion effect does not show significant differences among participating countries,

providing evidence of the BRI's inclusive character and realizing the initiative's concept of a "community of human destiny" both within and outside economies.

Table 8. Further analysis.

	(1)	(2)	(3)	(4)
Variables	**Level of Economic Development**	**Income Disparities between Countries**	**Land and Sea**	**Level of Development**
treat	0.020 **			
	(0.010)			
DID		−0.024		
		(0.035)		
DDD			−0.188	0.085 **
			(0.205)	(0.040)
CV	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Observations	635	635	635	635
Adj. R-sq	0.998	0.849	0.997	0.997

Note: ** correspond to being significant at the 5% significance levels. Cluster robust standard errors are in parentheses.

6.2. Heterogeneity Analysis

6.2.1. Regional Heterogeneity

Given that maritime technology has been a core means of transport for international trade, participating countries may be affected by the Belt and Road Initiative (BRI) to varying degrees depending on whether they are coastal or landlocked. To analyze this heterogeneity, a triple difference model is constructed by interacting the policy intervention variable (treat) with a dummy variable indicating whether the participating countries are coastal (sea). The empirical results are shown in column (3) of Table 8. The results show that differences in the coastal status of participating countries do not lead to differences in the dampening effect of the BRI on domestic income disparity. In other words, the BRI's impact on reducing domestic income disparities does not differ based on whether an economy is coastal or landlocked. This finding further supports the "inclusiveness" of the BRI, demonstrating that its benefits extend to all participating countries, regardless of their geographic location.

6.2.2. Development Level Heterogeneity

According to the Kuznets inverted U-shape hypothesis, the level of economic development and domestic income disparity exhibit an inverted U-shaped relationship [44]. Therefore, the effect of the Belt and Road Initiative (BRI) on income disparity may vary among economies with different levels of economic development. To analyze this, the policy intervention variable (treat) is interacted with the level of economic development of participating countries (gdppc), and a triple difference model is constructed for heterogeneity analysis. The empirical results, shown in column (4) of Table 8, indicate that the higher the level of economic development of the participating countries, the smaller the inhibitory effect of the BRI on income disparity within countries. In other words, the BRI is more effective in narrowing the internal income gap in countries with lower levels of economic development.

7. Conclusions and Research Outlook

The world is experiencing unprecedented changes, with the global economic growth momentum being insufficient and an increase in unstable, uncertain, and unpredictable factors. The world stands at a "crossroads" once again. The Belt and Road Initiative (BRI) proposed by President Xi Jinping, based on the principle of "common business, sharing,

and construction", offers direction for the future development of the world economy. This paper explores the inclusive features of the BRI by focusing on income distribution gaps. Using comparable national panel data from 2008 to 2023, this study empirically examines the impact of the BRI on the domestic income gap of participating countries employing the difference-in-differences method. The baseline results indicate that the BRI significantly reduces the domestic income gap in participating countries. The mechanism tests, from both economic and political perspectives, show the following: In the economic channel, the BRI promotes the industrialization process in participating countries and leverages the comparative advantages of their resource endowments, which raises the incomes of low-income workers and reduces the domestic income gap. In the political channel, the BRI enhances the governance capacity of the governments of participating countries and strengthens the control of corruption, further reducing the domestic income gap. Extended analysis reveals that the BRI also significantly increases the level of economic development in participating countries in a balanced manner.

Based on the results of the study, three policy insights can be drawn: First, pay full attention to dynamic changes in trade structure and location. Product-level import and export trade is a key way to reflect a country's resource endowment and trade impact. China should closely monitor the structure of merchandise trade and the geographical distribution of trade flows. By fully exploring the comparative advantages of countries based on their factor endowments, China can leverage its policies at the international level to maximize economic benefits. Improving the match between the supply side of participating countries and China's demand side will deepen regional economic integration and enhance mutual economic gains. Second, strengthen the export of values and international publicity. The empirical results show that the Belt and Road Initiative (BRI) has promoted inclusive development in participating countries. It is necessary for the Chinese government to further promote the concept of "common business, sharing, and construction", highlighting the achievements of the initiative in participating countries. By doing so, more countries can gain the opportunity, confidence, and desire to participate in the BRI. Third, seize the initiative of international industrial transfer. With the gradual disappearance of China's demographic dividend, rising labor costs, declining profitability of capital, weakening investment incentives, and increasing resource constraints, China's development has entered a stage of high-quality growth. Gradually transferring low-end industries to BRI countries is key to proactively managing international industrial transfer. This strategy promotes mutual benefit in bilateral industries while actively cultivating and developing new quality productive forces within China, thereby realizing the high-quality development of China's economy.

This study has several limitations that warrant further investigation in future research. Firstly, the issue of endogeneity needs to be addressed more comprehensively. Despite employing a quasi-experimental design to enhance the credibility of causal inference, endogeneity remains a challenging problem that empirical researchers have yet to fully resolve. Future research should aim to develop and apply more advanced techniques to mitigate endogeneity concerns. Secondly, the data utilized in this study are relatively coarse. Although the most recent data available were used, numerous new phenomena have emerged in international trade due to the impact of the COVID-19 pandemic, which began in 2020. Future research should incorporate these developments to provide a more nuanced understanding of the Belt and Road Initiative's effects.

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