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Five Stylized Facts on Belt and Road Countries and Their Trade Patterns

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Abstract

The Belt and Road Initiative (BRI) offers investment opportunities for several Eurasian countries but not all of them attract investments in the same way. This paper investigates the geographical distribution of BRI projects completed between 2013 and 2020. The analysis shows that pre-existing trade patterns are related to the likelihood of a country receiving completed BRI projects. We single out and provide evidence in support of five stylized facts. First, BRI countries with completed projects tend to be poorer and larger. Second, projects are more likely to occur in countries with intense intermediate trade with China. Third, the countries that received projects have more diversified export structures and their sectoral specialization overlaps with that of China. Fourth, among middle-high-income countries, the allocation of projects tends to favor those with high levels of intra-industry trade. Fifth, among BRI countries with projects, the complexity or sophistication of the goods traded increases faster with income. These findings suggest that fostering trade integration has direct benefits and may also contribute to further BRI investments.

Keywords: Belt and Road Initiative, China, global value chains, network, trade in intermediates

JEL codes: F14, F15, F21

I. Introduction

In recent decades, China has decided to improve its connections with Central and South Asian countries, reinforcing interconnectivity to facilitate regional value

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chains and trade. However, associated potential political and economic risks led to investments in the region being limited for several years. The official announcement of the Belt and Road Initiative (BRI) by Xi Jinping in 2013 triggered significant changes. The BRI is the result of the Chinese government's effort to enhance and deepen regional international economic relations. It is also China's most ambitious geoeconomic and foreign policy initiative in recent decades. It combines the land-based Silk Road Economic Belt and the sea-based 21st Century Maritime Silk Road. This combination creates a network of connectivity across Central, Western, and Southern Asia, likely to reduce travel time and costs and to enhance trade and investment. Beyond Asia, the network connectivity encompasses countries in the Middle East and Northern Africa, Eastern Africa, and Central and Eastern Europe countries. More than 60 countries are currently involved in the BRI. As of 2020, their combined GDP was US$23 trillion – 30 percent of the world GDP with a population of approximately 4.4 billion people – around 60 percent of the world population (World Bank Group, 2020). With the BRI aiming to enhance connectivity among participating countries, providing the necessary infrastructure is one of the main objectives of the BRI. The Asian Development Bank (2017) estimated that developing Asia will need to invest US$1.7 trillion per year from 2016 to 2030 to maintain its growth levels and overall poverty eradication objective. However, considering the territorial coverage of the BRI and the massive infrastructure differences between countries, it is necessary for China – the main financer of BRI – to prioritize certain countries over others.

This paper seeks to investigate specific patterns in the geographical distribution of completed infrastructure projects under the BRI. Do the projects reflect existing economic relations or do they seek to reconfigure relations among countries? Our research is motivated by the potentially different theoretical underpinning of the geographic distribution of projects under the BRI, linked to China's need to sustain its economic development through its international linkages. On one hand, BRI infrastructure projects may favor countries with similar trade specializations and comparative advantage, thereby enabling China to relocate labor-intensive production to the receiving countries. On the other hand, the overall returns on investment projects could be prioritized and countries with better connectivity and more central positions in the trade networks would receive more investment. For instance, investments may have favored countries with trade specialization like that of China, thus reinforcing the status quo; or, on the other hand, they may have favored sectoral diversification. Similarly, export capabilities in terms of the sophistication of exported products may represent a relevant factor affecting the allocation of investment projects. Hence, while increasing trade is likely to be one of the drivers of BRI projects, whether project allocation is reinforcing existing linkages or, on the contrary, is going to change and reconfigure them is an empirical question.

The paper addresses these questions and provides descriptive evidence on the BRI countries (i.e., countries that received investments). We analyze carefully the possible differences in economic, trade, and demographic characteristics between non-BRI and BRI countries as well as within BRI countries with completed projects and those without projects at the launch of the initiative. Using data on BRI infrastructure projects completed between 2013 and 2020, we examine whether BRI infrastructural investments favor countries that are more involved in intermediate trade and/or trade more intensely with China; we then assess whether sectoral specialization plays a role and, finally, we consider how BRI countries differ in terms of intra-industry trade (IIT) and export sophistication, and to what extent this matters for investment allocation.[1]

We summarize our findings into five stylized facts. First, BRI countries are poor and large. Second, their intermediate exports are skewed towards China, but intermediate imports are not. Third, their exports are more diversified, and their sectoral specialization overlaps with that of China. Fourth, high-income BRI countries are more involved in IIT. Fifth, the export and import sophistication of BRI countries increases faster with income per capita relative to other countries.

Our findings highlight that BRI investments are closely related to existing trade patterns and production fragmentation. Hence, they are likely to contribute to strengthening the global value chains (GVCs) and related production networks but also to the provision of a reliable base of suppliers to China. China, in turn, may be able to upgrade its production. If this is the case, then the BRI is a win–win strategy.[2]

This paper contributes to the literature on BRI by providing new evidence on the connection between trade and the allocation of BRI projects. While most existing analysis investigate the possible impacts of the BRI on the reduction in transport costs, increase in trade potential, or increase in GDP (Villafuerte et al., 2016; Garcia-Herrero and Xu, 2017; de Soyres et al., 2020), they do not focus on the role of pre-existing trade patterns as explanatory factors in project allocation. This paper offers a new perspective

[1]The focus on trade patterns as a driver of BRI project allocation does not exclude or downplay other important factors such as geopolitical relations.

[2]There are many problems with the BRI that we do not address here (e.g., debt, finance, and geopolitical). See for instance, Anastasiadou (2019) and Brakman et al. (2019) for an extensive coverage of these issues. De Soyres et al. (2019, p. 4) suggest that "Belt and Road transport corridors could substantially improve trade, foreign investment, and living conditions for citizens in participating countries – but only if China and corridor economies adopt deeper policy reforms that increase transparency, expand trade, improve debt sustainability, and mitigate environmental, social, and corruption risks."

and improves our understanding of the main aspects of trade that matter in investment allocation within the BRI. The importance of the topic stems from the economic size and geographical width of the BRI and from the lessons that can be learned regarding how investments respond to economic conditions. As such, our work contributes to highlighting trade as a driver of BRI investments. Moreover, the possibility that specific trade relations facilitate further economic investments and make countries more attractive brings policy implications regarding the type of international linkages that countries may want to prioritize. The stylized facts highlighted in this paper provide an informative background for further investigations.

The rest of the paper is organized as follows. Section II reviews the literature and the main evidence relating to infrastructure investment and trade. Section III discusses the conceptual framework. Section IV describes data sources and methodology. Section V presents the descriptive evidence highlighting the stylized facts. Section VI discusses our main findings while Section VII concludes the paper.

II. Literature review

The economic literature on the BRI has focused on its impacts. There are two types of trade-related effects: (i) reduction in trade costs, improvement in trade efficiency and capacity; and (ii) changes in trade patterns. A strand of the literature has also investigated the strategic and political reasons behind the BRI. In what follows, we provide a brief overview of the literature that is more closely related to our work. We aim to provide basic information about what has been done in the literature to position our paper. Relative to existing studies, this paper provides new insights into the relationship between BRI investments and pre-existing trade patterns.

It is known that infrastructure and connectivity play a crucial role in reducing trade costs and, in turn, in stimulating international trade (Coşar and Demir, 2016). Transport and logistics are among the main drivers of international trade. The type and quality of infrastructure can enhance international trade through better connectivity, whereas high transport and logistics costs can greatly impede trade and investments (Bougheas et al., 1999). In an extensive study using data from 150 developed and emerging countries between 1992 and 2011, Donaubauer et al. (2018) showed that improvement in infrastructure endowment and quality decreased trade costs and increased bilateral and multilateral trade flows.

The BRI encompasses several activities, with investment in transport infrastructure such as building roads, rails, and ports to connect countries being the most explicit and visible aspect (Andornino, 2017). As of December 2020, more than 300 major infrastructure projects, including roads, railways, dry ports, and seaports, have been completed since the inception of the BRI.[3] Roads account for almost two-thirds of infrastructural projects, while railways, dry ports, and seaports account for about 10–15 percent each.

Transport infrastructure development through the BRI has the potential to enhance regional trade and the development of GVCs, policy coordination, trade facilitation, financial integration, as well as capital and labor mobility. Moreover, among BRI countries, institutional quality was found to foster the participation of GVCs (Ge et al., 2020), whereas institutional and cultural distance inhibited bilateral trade with China (Liu et al., 2020). On the other hand, Zhang et al. (2022) found that the BRI significantly increased the probability and the value of mergers and acquisitions deals in target countries and that the market reacted more positively to these deals, starting a virtuous circle.

The immense potential benefits from the BRI must also be evaluated at the country level as the incentives and the cost-benefits may vary. With China being the main promoter and the major investor of BRI, the coverage and distribution of BRI projects might turn out to be particularly favorable to China. Nonetheless, potential benefits will accrue to other countries, too – for instance, through transport cost reduction and improved connectivity in the continent, which, in turn, can foster integration into global (regional) value chains.

For the BRI, recent estimates by the World Bank suggest that shipping times may decrease by 1.2 to 2.5 percent, leading to a reduction in trade costs by 1.1 to 2.2 percent at the world level and even larger amounts for the BRI countries, from 1.5 to 2.8 percent (de Soyres et al., 2019).

Reduced trade cost could boost trade growth. Given the geographical characteristics of the Eurasian region, some peripheral and especially landlocked countries are therefore likely to benefit from BRI connectivity (Garcia-Herrero and Xu, 2017; Lu et al., 2018).

The importance of transport infrastructural investments is also related to the fact that eight Central Asian countries are landlocked (about one-fifth of the 44 landlocked countries in the world) with Uzbekistan being a doubly landlocked country (i.e., all its neighbors are also landlocked).

Faye et al. (2004) document how, despite technological improvements and advances in transportation, landlocked countries face several challenges to accessing the world markets and participating in international trade, their costs remaining large.

[3]The reported figure excludes infrastructure projects other than completed ones, such as those planned, initiated, and/or under construction. We do not address issues related to risks of incurring high debt by receiving countries. For a complete analysis of this issue see de Soyres et al. (2019).

The disadvantage faced by landlocked countries in accessing international markets in comparison with their neighbors with maritime connections reinforces the potential positive impact of BRI on the receiving countries so that the geographical coverage and the distribution of infrastructural projects matter in shaping the potential benefits of the BRI. Access to the international market seems particularly relevant for poorer and smaller countries (whether landlocked or not), which may find it costly to build the required infrastructure individually, and easier and faster to develop industrial segments through the integration of GVCs rather than counting entirely on domestic capacity.

If the BRI is expected to reduce trade costs and increase trade intensity, the reasons behind the initiative go beyond simply boosting international trade. Scholars have stressed the role of strategic and geopolitical aspects such as China's need to sustain its economic development and its willingness to expand its political influence in the area (Perkins, 2015; Cheng, 2016; Huang, 2016). In this context, the BRI may contribute to building a network of suppliers of intermediate goods, acquiring resources abroad, and accessing foreign technology (Du and Zhang, 2018). Moreover, through investments and exports, Chinese standards and technology are likely to be more widespread, strengthening the country's influence (Cai, 2017).

Summing up, existing studies have focused on the effects of the BRI in terms of trade cost reduction or trade creation, while none of them has explicitly investigated the connection between pre-existing trade relations and investment project allocation. Similarly, scholars have questioned the motives behind the BRI, stressing strategic and political reasons, but have not checked the connection between investment projects and trade. Yet, the ex ante trade patterns and country characteristics as well as their linkages with China are likely to be considered by investors and to be related to the likelihood of receiving projects. This specific aspect, which, as far as the authors are aware, has not been considered in the literature, is the focus of our study.

III. Conceptual framework and hypotheses

As our perspective on the BRI is new relative to the literature focusing either on the motives behind the BRI or on its impacts, it is useful to discuss the possible linkages between trade and investments and to clarify why ex ante trade patterns may matter for project allocation.

An important link between trade and investments stems from China's need to sustain its economic development (Perkins, 2015; Cheng, 2016; Huang, 2016). In the last decade, China's growth has slowed and, with increasing wages, the cost advantage of labor-intensive production has begun to shrink. In this context, the upgrading of China's industry has started to erode the comparative advantage in traditional sectors in favor of more sophisticated and technologically advanced production (Que et al., 2020). Better connectivity with surrounding countries might prove helpful in relocating labor-intensive manufacturing to other low-cost countries. If this is the case, investments might favor poor countries and, even more importantly, involve sectors in which China already has a comparative advantage. Trade in intermediates and IIT is likely to play a significant role because they signal existing production linkages. There is a connection between BRI investments and GDP, overlap in revealed comparative advantage with China, and with trade in intermediate goods, IIT, and export sophistication.

Another link involves the potential returns on projects. Investments may accrue to countries that already have better linkages with China or that are more integrated into international trade and production networks, making them even more attractive for further investment, including investment from the private sector (Chang et al., 2021). Countries with higher intermediate trade shares might be more likely to receive investments because they represent strategic hubs. Investing in poor and peripheral countries might also be beneficial, however, because even small investments, like roads, might be enough to improve connectivity and accessibility of markets and yield high returns.

This conceptual framework suggests that some aspects are particularly worth investigating. BRI projects are not randomly assigned to countries, and it is informative to verify with data the aspects of trade that are more likely to be associated with investments. Based on the related literature and the above theoretical framework, we advance some hypotheses. To begin with, we check whether projects are associated with GDP per capita or country size as measured by population.

Market-seeking investments are likely to select richer or larger countries (Kang et al., 2018). On the other hand, if investments aim to improve general connectivity in the area, then countries with less advanced transport infrastructure, like poorer or smaller landlocked countries, may be targeted.

Hypothesis 1: Market-seeking considerations guide investments in richer countries, while infrastructure improvement investments aim towards more populous but poorer countries. Hence, land infrastructure projects, such as those associated with the BRI, are more likely to accrue to larger and poorer countries.

Transport infrastructure is crucial to facilitate trade, especially that of intermediate goods (Coşar and Demir, 2016; Donaubauer et al., 2018). Investments may be positively or negatively associated with countries' involvement in intermediate trade and their links with China. In the context of BRI, investments are likely to reinforce important trade links and enhance the global value chains.[4]

Hypothesis 2: Intermediate trade requires sound transport infrastructure. BRI investments are likely to aim towards reinforcing existing links. Pre-existing patterns in intermediate trade, thus, are expected to be positively associated with projects.

Sectoral specialization and comparative advantage may also be associated with investment decisions. With the upgrading of China's manufacturing and the erosion of its cost advantage, investments may aim to provide better connectivity with countries whose sectoral specialization is compatible with China's needs. An overlap in revealed comparative advantage may signal that a destination can cooperate and sustain China's economic needs.

Hypothesis 3: Connectivity between countries with complementary skills is likely to foster greater specialization and upgrading. When production processes are highly fragmented, such complementarity is likely to arise within sectors rather than between them. Hence, investments may involve countries with similar sectoral specialization.

Intra-industry trade arises from two-way exchanges of differentiated goods belonging to the same sector, and this often involves intermediate goods. Involvement in IIT thus signals both product differentiation and participation in international production processes (Sawyer et al., 2010; Dunning and Norman, 2019). Following the above reasoning, infrastructure projects may favor countries active in IIT.

Hypothesis 4: If intermediate trade and similarity in sectoral specialization matter, then facilitating two-way trade is also important. Hence, countries more involved in IIT are also more likely to receive investments.

Products are differentiated, and complex and sophisticated products require more advanced skills (Schott, 2008; Wang and Wei, 2008; Yao, 2009; Hidalgo and Hausmann, 2009; Marvasi, 2013). Furthermore, countries with a greater scope for upgrading in terms of sophistication are likely to represent valuable destinations for investment. There is recent evidence that Chinese outward investments contribute to increase in bilateral export sophistication (Rehman and Noman, 2022). Hence, countries with sophisticated export baskets may be more attractive to investments.

Hypothesis 5: Gains from increased connectivity are likely to be larger when they involve countries with a greater scope for further integration and upgrading in international production networks. Hence, investments may be aimed at countries that process and export complex and sophisticated products.

[4]In this case the correlation is positive. However, investments could also trigger access to new markets and diversification, which could induce a negative correlation.

In what follows, based on this theoretical framework and the available data on the BRI projects, we provide descriptive evidence about the relation between pre-existing trade patterns and investment project allocation, to single out the main stylized facts.

IV. Data and methodology

1. Data sources

Our analysis focuses on completed BRI transport infrastructure projects, compiled on raw data from the Center for Strategic and International Studies (CSIS) database, and connects them with trade data, especially regarding intermediate products. The source of the trade data is the Eora multiregional input–output tables for the year 2012, i.e., a year before the official announcement of the BRI. The use of input–output tables allows us to focus consistently on trade in intermediates, while the focus on the year 2012 allows us to examine pre-existent trade relations.

Our definition of trade in intermediates refers to sector-to-sector exchanges and reflects the endogenous input–output structure of the trade. The Eora database, unlike other sources, has a wide country coverage, including low- and middle-income countries. Each Eora input–output table includes 187 countries and 26 sectors; hence, the intermediate block has 26 times 187 cells, which represent a total of more than 23.6 million country–sector-to-country–sector observations. In the empirical analysis, we elaborate and organize the data and the variables to operate at the country–sector level, with 4,862 country–sector observations. Other country-level variables, such as GDP per capita are taken from the World Bank Doing Business and World Development Indicators (see Table A2 in Appendix A for a full description).

Regarding the BRI, our analysis considers the six land corridors, encompassing the central cities along the international routes and the economic industrial parks (as cooperation platforms):

(i) the China–Mongolia–Russia Corridor

(ii) the New Eurasian Land Bridge

(iii) the China–Central Asia–West Asia Corridor

(iv) the China–Indochina Peninsula Corridor

(v) the China–Pakistan Corridor, and

(vi) the Bangladesh–China–India–Myanmar Corridor

We focus on transport infrastructure projects completed between 2013 and 2020. The dataset on infrastructural investments has been built by the authors collecting data from the Reconnecting Asia project of the CSIS. This project maps five infrastructural project types – road, rail, seaports, intermodal facilities and powerplants –

geographically spread in Eurasian countries. The CSIS database represents our source for the identification of the countries involved in the BRI. These countries can be further divided into those with completed projects as of 2020, and the participants with no completed projects. A list of member countries, geographic scope as well as related organizations, initiatives, projects, and events is available on the website.[5]

2. Methodology

To analyze the main characteristics of trade along the BRI and single out some stylized facts, we start with a descriptive analysis. We focus on five dimensions. Besides GDP per capita and population, we also focus on trade in intermediate goods, export specialization, IIT, and export and import sophistication. We measure these variables with different trade indicators. More specifically, we calculate the share of intermediates in total trade, the share of China in bilateral intermediate trade, the Balassa revealed comparative advantage index (RCA), the Grubel–Lloyd index of IIT, and the Hausman–Rodrik sophistication indexes. Further details about the calculation of the indexes are provided in Appendix B.

Our final dataset includes non-BRI countries and BRI countries. We are primarily interested in the comparison between (i) BRI and non-BRI countries, and (ii) BRI countries with projects and those with no projects. The comparison between BRI and non-BRI countries (i.e., countries excluded or not yet involved in the BRI) is useful to define the characteristics of BRI countries relative to the rest of the world. As BRI participation is obviously nonrandomly assigned and in part related to geography, it is important to know what the key features of BRI participants are. The comparison between countries with projects and countries without projects is restricted to the BRI countries and aims to identify differences between the two groups: the former includes those with completed projects, whereas the latter includes those that are potentially involved in the BRI but still do not see active projects.

Together with the purely descriptive evidence, we verify whether the main facts hold after controlling for country and/or sector characteristics. To this end, for each trade indicator, we perform an econometric analysis in two steps. First, we focus on BRI countries and then on project allocation among them. Our variable of interest is the dummy I_i. In the first specification (BRI countries versus non-BRI countries), I_i is a dummy indicating whether country i is part of BRI or not. In the second specification on the subsample of BRI countries only, instead, I_i indicates whether the country has received projects or not. In what follows, for space reasons, we only report the results on projects (details of the construction of the variables and more results are reported in Table A2 in Appendix A).[6]

[5]See https://reconnectingasia.csis.org/database/initiatives/one-belt-one-road/ [online; cited October 2022]. In our database, we have 64 BRI countries, 48 with completed projects, and 16 with no projects.

[6]Supplementary results are available upon request.

Note that the trade indicators of interest vary along different units of observation. Specifically, while intermediate trade shares and RCA have a sectoral dimension, for IIT and export sophistication we are interested in the country dimension. Our econometric analysis is, therefore, performed at the country–sector level when applied to intermediate trade and RCA, and at the country level when applied to IIT and sophistication.

As stated above, we are interested in the BRI and project dummies, which provide an indication of the conditional means at the pre-BRI baseline, thus indicating whether future BRI or project recipient countries display certain characteristics that make them more attractive. Note that our empirical strategy is not meant to address any causal impact of the BRI – which is not our research question. On the other hand, we are interested in the pre-BRI factors behind the (subsequent) BRI project allocation. Thus, rather than considering the ex post outcomes, we investigate the ex ante characteristics, with our dependent variables capturing the pre-BRI trade patterns. The cross country–sector regressions can be written as:

$$y_{ij}^{pre} = \alpha + \beta_1 I_i + \beta_2 X_{ij}^{pre} + \gamma_j + \varepsilon_{ij}, \quad (1)$$

where the pre-BRI dependent variable y_{ij}^{pre} is in turn: (i) the intermediate export share of total trade; (ii) the intermediate import share of total trade; (iii) the share of total intermediate export going to China; (iv) the share of total intermediate import coming from China; and (v) the RCA overlap index. The variable of interest, I_i, is either the BRI or the project dummy. The variable X_{ij}^{pre} denotes pre-BRI country-level controls, e.g., GDP per capita or a logistics index (the two variables are positively correlated and replacing GDP per capita with the logistics index does not affect the results); γ_j indicates sector fixed effects and ε_{ij} is the error term. In the country-level regressions, the dependent variables are IIT, export, and import sophistication. The econometric specification is similar to the previous one, but the analysis is now at the country level. Moreover, interaction terms are introduced to account for possible changing relationships with income.

In what follows, we concentrate on the trade figures for the year 2012, a year before the 2013 official announcement of the BRI. This allows us to reduce endogeneity concerns, describe the pre-existing trade patterns accurately, and investigate their relationship with the subsequent BRI investments completed between 2013 and 2020.

V. Stylized facts

Trade between China and its Central Asian partners has increased in the last 15 years. Back in 2000, the BRI countries only constituted 13 percent of China's exports and 19 percent of China's imports; by 2015 the two shares reached 27 percent and 23 percent, respectively. The largest trading partners for China along the Belt and Road area are the

Association of Southeast Asian Nations (ASEAN) countries (12 percent of China's total exports and 11.58 percent of total imports) with balanced trade, partly because of their complementarity on value-added chains. China's second-largest trading partners within the BRI area are countries in the Middle East (from where China imports oils). South Asia is the third largest trading partner along the road and has a very unbalanced bilateral trade as well as a complex product structure. Central Asia, Central and Eastern European countries, and Mongolia added together account for less than 3 percent of China's external trade. Production and exports from Central Asia are currently concentrated in oil, minerals, and agricultural products, although there is considerable diversity among the countries and some countries are specialized in manufacturing – typically textiles and machinery.

Starting a project in one country rather than in another represents a clear signal of preference or a higher expected return. The main recipients are likely to be the most strategic countries for the initiative. Are the main recipients the richer countries? Or intermediate product producers? Or raw material providers, or large and increasing destination markets?

In what follows, we single out five stylized facts connecting BRI investments to the level of income per capita, the population, and the specialization characteristics of the destination countries.

1. GDP per capita and population

Let us first consider the income level of BRI and non-BRI countries by comparing their average GDP per capita as reported in Table 1. The BRI countries are poor compared to the world's average income per capita. This fact could be partially due to the geography of the BRI, involving landlocked Western and Central Asian countries. However, the BRI countries are very heterogeneous.

The income gap between countries with completed projects and the other BRI countries is even larger. The income of the former is less than half that of the latter. The income per capita of the project recipients is about half the world average, while that of the BRI countries with no completed project is US$5,000 higher than the world average. Considering that many projects involve roads, railways, and ports, these numbers suggest that investments are directed towards where the infrastructure gap is higher and so is likely to be the return on each dollar spent.

The opposite trend emerges when we consider population. The BRI destination countries are larger than the world average. This result is driven by India; excluding India, BRI countries are close to the world's average population. Among BRI countries, the presence of India, a large country that is among the project recipients, confirms the evidence that projects tend to go towards large countries. The effect of country size may be related to gravity forces and to the fact that projects may yield greater returns in larger markets. To add further detail, we also show the cross-country distributions of income and population for the BRI countries with and without projects in Figure 1. This evidence on the relation between BRI investments and GDP per capita and the population is consistent with Hypothesis 1 stylized (income and size): the BRI countries are poor and large; those of them with completed projects tend to be poorer and larger.

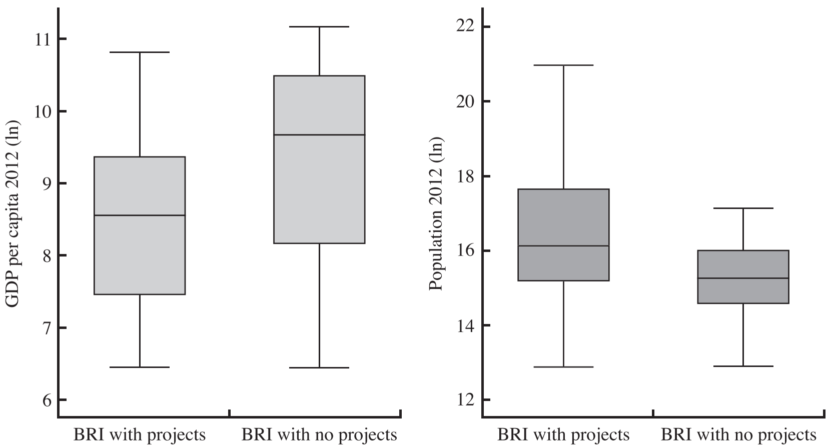
Table 1. Income and population of the Belt and Road Initiative countries in 2012

	Number of countries	GDP per capita (US$)	Population (million)	Population excluding India (million)
BRI countries	61	10,627	50.2	29.9
with projects	47	7,634	61.2	35.1
with no projects	14	20,674	13.2	13.2
Non-BRI countries	111	16,927	35.3	35.3
Total	172	14,693	40.6	33.5

Sources: Data compiled by the authors from the Reconnecting Asia project database of the Center for Strategic and International Studies (CSIS) (see https://reconnectingasia.csis.org/database/initiatives/one-belt-one-road/), and World Development Indicators by the World Bank Group (see https://databank.worldbank.org/source/world-development-indicators). GDP per capita is reported in constant 2010 US$ prices.

Notes: "With projects" refers to BRI countries with at least one completed infrastructure project, and "with no projects" refers to BRI countries without any completed projects. A list of countries is available in Table A1 in Appendix A. BRI, the Belt and Road Initiative.

Figure 1. Distributions of income and population of the Belt and Road Initiative countries



Sources: Data compiled by the authors from the Reconnecting Asia project database of the CSIS and World Development Indicators.

Notes: "BRI with projects" refers to BRI countries with at least one completed infrastructure project, and "BRI with no projects" refers to BRI countries without any completed projects. A list of countries is available in Table A1 in Appendix A. BRI, the Belt and Road Initiative.

2. Trade in intermediate goods

We now focus on trade in intermediate goods, singling out the shares of total intermediates exported to China ($Export^{CHN}$) and imported from China ($Import^{CHN}$).[7] Larger shares of intermediates in total trade could suggest stronger participation in production networks. Descriptive statistics are reported in Table 2. At the world level, trade in intermediates represents about 71 percent of total exports and 64 percent of total imports (country–sector average). The BRI countries trade slightly fewer intermediates, but they trade more with China. Within BRI countries, those with projects trade more intermediates, export more to China, but import less from China. This evidence is in line with the idea that BRI projects may allow China to develop its suppliers' network, freeing internal resources for upgrading, while at the same time helping industrial development in the recipient countries.

Table 2. Intermediate exports and imports shares

	Export (%)	Import (%)	$Export^{CHN}$ (%)	$Import^{CHN}$ (%)
BRI countries	70.1	63.5	4.2	5.0
with projects	71.2	64.5	4.5	4.8
with no projects	66.5	60.3	3.2	5.8
Non-BRI countries	71.4	64.1	3.6	4.7
Total (world)	70.9	63.9	3.8	4.8

Sources: Data compiled by the authors from the Eora database (see https://worldmrio.com/) and the Reconnecting Asia project database of the CSIS.

Notes: "With projects" refers to BRI countries with at least one completed infrastructure project, and "with no projects" refers to BRI countries without any completed projects. $Export^{CHN}$ is defined as the shares of total intermediates exported to China. $Import^{CHN}$ is defined as the shares of total intermediates imported from China. BRI, the Belt and Road Initiative.

The above results are supported by the econometric analysis presented in Tables 3 and 4. The project dummy coefficients on intermediate exports and imports are both positive, showing that, unlike other BRI countries, those that received projects tend to export and import more intermediates. This seems to suggest that BRI investments and production networks are closely related.

The results indicate that, on average, richer countries trade more intermediates with China. This effect is higher for imports from China: BRI countries with completed projects export more intermediates to China but import less (the project dummy coefficient is positive on intermediate exports to China, but it is negative on intermediate

[7]Based on the Eora MRIO tables, trade in intermediate goods refers to the inter-sectoral international block matrices of the tables.

imports from China). This suggests that investments may favor countries that are in a better position to supply intermediates to China, rather than countries that demand inputs.

The evidence on the intermediate trade patterns supports Hypothesis 2 and the idea that involvement in intermediate is associated with the likelihood to receive projects. Stylized fact (intermediate trade): the BRI countries with completed projects are more involved in intermediate trade than other countries; their intermediate export is skewed towards China but the same does not apply to intermediate imports.

Table 3. Intermediate export and import shares and projects recipients

	Intermediate export		Intermediate import	
	(1)	(2)	(3)	(4)
Projects	0.132***	0.151***	0.193***	0.169***
	(0.026)	(0.026)	(0.031)	(0.030)
Log (GDP per capita)	−0.022**		0.089***	
	(0.009)		(0.011)	
Logistics index		−0.223***		0.131***
		(0.027)		(0.035)
Constant	0.594***	1.012***	−0.396***	0.000
	(0.101)	(0.100)	(0.112)	(0.114)
Sector FE	Yes	Yes	Yes	Yes
Observations	1,586	1,508	1,586	1,508
Pseudo R^2	0.102	0.106	0.101	0.096

Notes: *** and ** represent significance at the 1 and 5 percent levels, respectively. Robust standard errors are in parentheses. FE, fixed effects.

Table 4. Intermediate trade with China and projects recipients

	$Export^{CHN}$		$Import^{CHN}$	
	(1)	(2)	(3)	(4)
Projects	0.073	0.141**	−0.157***	−0.151***
	(0.057)	(0.060)	(0.030)	(0.031)
Log (GDP per capita)	−0.078***		−0.108***	
	(0.021)		(0.012)	
Logistics index		−0.093		0.000
		(0.069)		(0.043)
Constant	−0.754***	−1.218***	−0.625***	−1.539***
	(0.230)	(0.246)	(0.138)	(0.146)
Sector FE	Yes	Yes	Yes	Yes
Observations	1,586	1,508	1,586	1,508
Pseudo R^2	0.044	0.042	0.091	0.087

Notes: *** and ** represent significance at the 1 and 5 percent levels, respectively. Robust standard errors are in parentheses. FE, fixed effects. $Export^{CHN}$ is defined as the shares of total intermediates exported to China. $Import^{CHN}$ is defined as the shares of total intermediates imported from China.

3. Export specialization

Intermediate trade relations provide a first indication that production linkages matter; however, the aggregate numbers overlook sectoral heterogeneity and countries' comparative advantages. Hence, we investigated whether countries with completed projects share common sectoral specialization patterns. We computed RCA using the Balassa (1965) index, considering relative sectoral export shares (we use the normalized version).

The hypothesis we want to investigate is whether projects tend to favor countries whose specialization is similar to that of China. In this case, carrying-out an infrastructural project could suggest that China would like to move up the global value chains to more value-added phases of production.

To assess similarity in specialization, we use two measures: (i) the shares of country–sector observations for which the sign of the RCA index coincides with that of China; (ii) a continuous RCA overlap index, which varies from 0 to 1, measuring the degree of similarity in sectoral specialization with China (Table 5).

Table 5. Revealed comparative advantage index overlap with China

	Country–sector observations with same sign of RCA (Share, %)	Sectoral RCA overlap index (Mean)	Country-level RCA overlap index (Mean)
BRI countries	52.7	0.748	0.400
with projects	52.7	0.752	0.409
with no projects	52.6	0.737	0.374
Non-BRI countries	47.6	0.706	0.299
Total (world)	49.2	0.720	0.332

Sources: Data compiled by the authors from the Eora database and the Reconnecting Asia project database of the CSIS.

Notes: "With projects" refers to BRI countries with at least one completed infrastructure project, and "with no projects" refers to BRI countries without any completed projects. Results are based on the Balassa RCA index. Details on the variable's construction are provided in Appendix B. BRI, the Belt and Road Initiative; RCA, revealed comparative advantage index.

The first column shows the shares of country–sector observations with a specialization similar to China. The second column shows the sectoral overlap index. On average, BRI countries have a high degree of overlap with China, with countries that received projects showing a slightly larger overlap. As a check, we also compute aggregate country-level overlap indicators (last column). Although the degree of overlap is lower (this in part happens by construction), results are qualitatively similar and the difference between groups is larger. Among BRI countries, 52.7 percent of country–sector observations share the same sign of RCA as China, while the share is only 47.6 percent among non-BRI countries. Within BRI countries, instead, the RCA sign overlap with China does not differ between countries with and without projects, meaning that the simple direction of RCA is not sufficient to capture any difference. However, the continuous RCA overlap indicators (either sectoral or country level) show that BRI countries with projects tend to overlap more with China. This result implies that the similarity lies in the strength of RCA rather than in its sectoral composition (which, as we have seen, does not differ much by project status).

The BRI countries overlap more with China, and countries that received projects show a particularly high degree of overlap. This seems to suggest that investments tend to favor countries with a specialization close to that of China.

These results are confirmed in the econometric analysis (Table 6). The project dummy coefficient is always positive, and statistically significant for the aggregate RCA overlap index. The BRI countries with projects and China, therefore, have similar specializations even after controlling for country characteristics like GDP per capita and logistics and sector fixed effects. The BRI investments thus tend to reflect China's comparative advantages in different segments within the same sectors.

Table 6. Balassa revealed comparative advantage index overlap and project recipients

	Sectoral RCA overlap index	
	(1)	(2)
Projects	0.096*** (0.034)	0.071** (0.034)
Log (GDP per capita)	0.059*** (0.012)	
Logistics index		0.343*** (0.039)
Constant	−0.031 (0.123)	−0.468*** (0.122)
Sector FE	Yes	Yes
Observations	1,586	1,508
Pseudo R^2	0.0602	0.0672

Notes: *** and ** represent significance at the 1 and 5 percent levels, respectively. Robust standard errors are in parentheses. FE, fixed effects; RCA, revealed comparative advantage index.

Another aspect of export specialization regards its strength across sectors. Two countries may have comparative advantages in the same sectors but one of them may concentrate its exports more on a few sectors (i.e., lower export diversification), and hence have a stronger specialization (which, comparative advantage being a relative concept, also implies a greater despecialization elsewhere). The overall strength of specialization/despecialization is captured by the so-called polarization. The RCA polarization is measured by the Lafay index, which is based on the normalized trade balance and has the useful property that it sums to zero across sectors so that the specialization sectors (positive) correspond to despecialization sectors (negative), and the sum of the positive values provides a measure of RCA polarization (see Appendix B for details).

The RCA polarization is reported in Table 7. A lower value signals a more diversified economy. In this regard, BRI and non-BRI countries are remarkably similar; however, BRI countries with projects tend to have a more diversified trade structure. This could suggest that investments do not seek a specific sectoral specialization.

Overall, the evidence gathered is consistent with the idea that sectoral specialization and comparative advantage matter for project allocation and, specifically, that similarity with China plays a role in attracting investments as discussed in Hypothesis 3 stylized fact (sectoral specialization): the BRI countries with completed projects had more diversified exports relative to other countries and their sectoral specialization overlapped with that of China.

Table 7. Revealed comparative advantage index polarization

	RCA polarization index
BRI countries	19.713
with projects	18.585
with no projects	23.246
Non-BRI countries	19.589
Total (world)	19.609

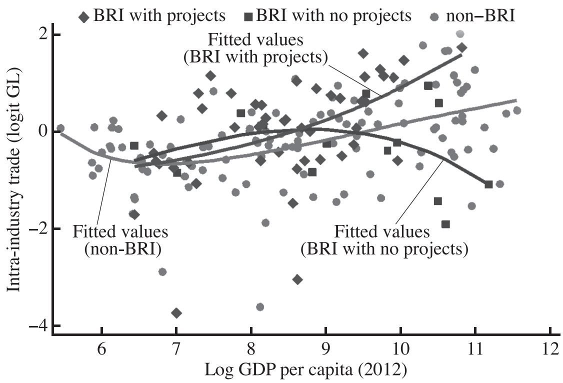
Sources: Data compiled by the authors from the Eora database and the Reconnecting Asia project database of the CSIS.

Notes: “With Projects” refers to BRI countries with at least one completed infrastructure project, and “with no projects” refers to BRI countries without any completed projects. Results based on the Lafay RCA index. Details on the construction of the variables are provided in Appendix B. BRI, the Belt and Road Initiative; RCA, revealed comparative advantage index.

4. Intra-industry trade

To better investigate product differentiation and production fragmentation, let us focus on IIT. This is particularly relevant for China because the country is a major importer of manufactured inputs used in the production of its exports. In this context, intra-industry linkages typically constitute the larger share of trade, especially with broader sector definition (as in Eora). By investigating IIT, we can keep track of product differentiation and production fragmentation concerning trade flows within broadly defined sectors. The most commonly used IIT indicator is the Grubel and Lloyd (1971, 1975) index (GL) (see Appendix B for details). Plotting GL against GDP per capita, as in Figure 2, reveals a positive correlation: richer countries tend to trade more within sectors. In the figure, however, we see that middle-high income BRI countries with completed projects tend to be more involved in IIT than their income level would imply. Table 8 reports the statistics also by income group (World Bank definitions).

Figure 2. Intra-industry trade and GDP per capita



Sources: Data compiled by the authors from the Eora database, the Reconnecting Asia project database of the CSIS and World Development Indicators.

Note: BRI, the Belt and Road Initiative.

Table 8. Intra-industry trade by BRI participation and income

	All countries	By income level (GDP per capita)		
		Low income (Median= US$600)	Middle income (Median = US$3,600)	High income (Median = US$35,000)
BRI countries	0.50	0.33	0.48	0.60
with projects	0.52	0.28	0.48	0.72
with no projects	0.43	0.37	0.47	0.44
Non-BRI countries	0.47	0.39	0.42	0.57
Total (world)	0.48	0.38	0.45	0.57

Sources: Data compiled by the authors from the Eora database, the Reconnecting Asia project database of the CSIS and World Development Indicators.

Notes: “With projects” refers to BRI countries with at least one completed infrastructure project, and “with no projects” refers to BRI countries without any completed projects. BRI, the Belt and Road Initiative.

Table 9 reports the econometric results for IIT, as discussed in the methodology section. Model (1) is run on all countries (BRI and non-BRI) and includes a dummy for BRI countries with projects and a dummy for BRI countries with no projects. Model (2) instead includes BRI countries only. The results are in line with the evidence presented above. The interaction terms provide the most interesting results confirming that IIT increases faster with income among BRI countries with projects and that, among them, higher income countries are particularly involved in IIT, while the opposite seems to apply to countries that did not receive investments. Belt and Road investments are more likely among more developed countries that are more involved in IIT. These results corroborate

Hypothesis 4 stylized fact (intra-industry trade): upper middle-income BRI countries are more involved in IIT relative to non-BRI countries; the share of IIT is much higher for upper middle-income BRI countries with projects and increases faster with income.

Table 9. Intra-industry trade of the BRI countries

	Intra-industry trade (GL, logit)	
	All	BRI
	(1)	(2)
Log (GDP per capita)	0.225*** (0.049)	−0.085 (0.184)
Projects	−1.929* (1.103)	−4.512** (2.057)
Projects × GDP per capita	0.259** (0.129)	0.569** (0.227)
No projects	2.582 (1.613)	
No projects × GDP per capita	−0.310* (0.173)	
Constant	−2.096*** (0.432)	0.487 (1.722)
Observations (countries)	172	61
R^2	0.195	0.209

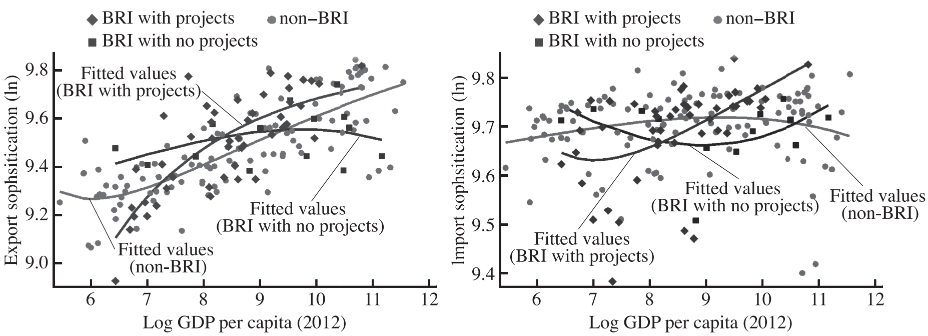
Notes: ***, **, and * represent significance at the 1, 5, and 10 percent levels, respectively. Robust standard errors are in parentheses. BRI, the Belt and Road Initiative; GL, Grubel–Lloyd index.

5. Export and import sophistication

The above analysis shows that the allocation of BRI projects is associated with pre-existing trade patterns. The type of goods traded may also matter. The import–export bundle of goods of a country is related to its stage of development. Some of the existing literature has suggested that more advanced countries supply on average more complex or sophisticated products. China is an outlier in this pattern – a finding that has been summarized by Rodrik (2006) as “China is special.” Rodrik (2006) and subsequent studies highlight the fact that China’s export is highly sophisticated given its level of development. We build on Marvasi (2013) to investigate whether export and import sophistication were associated with BRI involvement.

Figure 3 shows export and import sophistication. Export sophistication is more closely related to the level of income (Rodrik, 2006). Import sophistication tends to be higher than export sophistication, indicating that less developed countries tend to import sophisticated products and export less sophisticated ones, while more advanced countries trade highly sophisticated products. Consequently, the gap between import and export sophistication decreases with income. The figure suggests that we can generalize the "China is special" finding to middle-income BRI countries. In this regard, the BRI may contribute to creating a group of interconnected sophisticated exporters. Marvasi (2013) shows that China's surprisingly high level of sophistication is due to intermediates, for which export sophistication surpassed import sophistication in the early 2000s. Over time, increasing export sophistication shows that China is upgrading through the global value chains to more value-added phases of production. However, such improvement also implies that, relative to its income, China is becoming "less special." This adds to the possibility that the BRI can help China upgrade its suppliers' networks.

Figure 3. Export and import sophistication



Sources: Data compiled by the authors from the Eora database and World Development Indicators.
Note: BRI, the Belt and Road Initiative.

Figure 3 shows that middle-high income BRI countries with completed infrastructure projects have on average higher export and import sophistication, while lower income countries have lower sophistication. Furthermore, the fitted slope is different from BRI countries with no projects, especially at higher income levels. Table 10 supports the descriptive statistical evidence.

Econometric results for sophistication are reported in Table 11. Columns (1)–(2) and (3)–(4) refer to export and import sophistication, respectively. Again, the regression analysis confirms the descriptive evidence. In BRI countries with projects, both export and import sophistication levels increase faster with income than in the other countries. Other things being equal, BRI countries gain sophistication faster or, from a distinct perspective, investments have favored countries with lower import–export sophistication among less developed countries and those with higher import–export sophistication among more developed countries.

Table 10. Export and import sophistication by BRI participation and level of income

	All countries	By income (GDP per capita) Low income (Median = US$600)	Middle income (Median = US$3,600)	High income (Median = US$35,000)
		Export sophistication (US$)		
BRI countries	13,613	10,690	13,157	15,414
with projects	13,627	8,437	13,143	16,359
with no projects	13,571	12,191	13,282	14,234
Non-BRI countries	13,253	11,018	12,528	15,239
Total (world)	13,371	10,967	12,800	15,286
		Import sophistication (US$)		
BRI countries	16,243	16,284	15,894	16,986
with projects	16,229	15,291	15,926	17,476
with no projects	16,286	16,945	15,615	16,374
Non-BRI countries	16,271	16,043	16,333	16,333
Total (world)	16,262	16,081	16,143	16,508

Sources: Data compiled by the authors from the Eora database, the Reconnecting Asia project database of the CSIS and World Development Indicators.

Notes: "With projects" refers to BRI countries with at least one completed infrastructure project, and "with no projects" refers to BRI countries without any completed projects. BRI, the Belt and Road Initiative.

The evidence on sophistication shows that sophistication tends to grow faster with GDP per capita among countries with projects. Consistently with Hypothesis 5, this suggests that countries with a greater scope for upgrading are more likely to receive projects. Stylized fact (export sophistication): exports and imports of low-middle income BRI countries with completed projects have low-sophistication levels; the sophistication of BRI countries with projects increases faster with income per capita relative to other countries.

Table 11. Export and import sophistication of the BRI countries

	Log (Export sophistication) All (1)	Log (Export sophistication) BRI (2)	Log (Import sophistication) All (3)	Log (Import sophistication) BRI (4)
Log (GDP per capita)	0.090*** (0.007)	0.023 (0.025)	0.004 (0.00)	0.000 (0.016)
Projects	−0.425*** (0.155)	−1.035*** (0.275)	−0.357*** (0.097)	−0.378** (0.174)
Projects × GDP per capita	0.055*** (0.018)	0.123*** (0.030)	0.041*** (0.011)	0.048** (0.019)
No projects	0.610*** (0.227)		0.021 (0.142)	
No projects × GDP per capita	−0.067*** (0.024)		−0.004 (0.015)	
Constant	8.700*** (0.061)	9.311*** (0.230)	9.671*** (0.038)	9.691*** (0.146)
Observations (countries)	172	61	172	61
R^2	0.600	0.547	0.108	0.218

Notes: *** and ** represent significance at the 1 and 5 percent levels, respectively. Robust standard errors are in parentheses. BRI, the Belt and Road Initiative.

6. Robustness

A concern with the interpretation of our stylized facts relates to the fact that the allocation of BRI projects can be determined by factors other than trade patterns. Specifically, project allocation could also depend on the BRI geography. This implies that the selection of project-recipient countries might be skewed because exogenous geographic characteristics could position some countries as more likely to receive projects. Moreover, geographical factors also generally affect trade. Hence, the association between pre-existing trade patterns and BRI projects could partially reflect geographic factors that influence the selection of countries. To address this possible selection bias, we performed a two-step Heckman correction (Heckman, 1974, 1976). The procedure involves a first stage in which the probability of receiving projects is estimated based on geographical factors, and a second stage in which the inverse Mill's ratio obtained from the first step is used to control for selection bias. We run several robustness checks on each stylized fact discussed in the paper. The first stage is specified as a probit regression of the probability of having completed projects on geographical characteristics such as distance from China, common borders, regional fixed effects, and explanatory variables.[8] The results of the second stage on the different trade variables used in the paper are reported in Tables 12 and 13.

Table 12. Robustness check: Intermediate trade and comparative advantage

	Intermediate export	Intermediate import	$Export^{CHN}$	$Import^{CHN}$	Sectoral RCA overlap index
	(1)	(2)	(3)	(4)	(5)
Projects	0.141***	0.246***	0.019	−0.120***	0.069
	(0.029)	(0.036)	(0.071)	(0.039)	(0.042)
Log (GDP per capita)	−0.023**	0.092***	−0.076***	−0.105***	
	(0.009)	(0.011)	(0.021)	(0.011)	
Logistics index					0.337***
					(0.040)
Inverse Mills ratio	−0.015	0.040	−0.110**	0.101***	0.012
	(0.027)	(0.037)	(0.046)	(0.037)	(0.042)
Constant	0.577***	−0.478***	−0.668***	−0.697***	−0.458***
	(0.106)	(0.120)	(0.244)	(0.146)	(0.138)
Sector FE	Yes	Yes	Yes	Yes	Yes
Observations	1,508	1,508	1,508	1,508	1,404
Pseudo R^2	0.108	0.109	0.048	0.093	0.066

Notes: *** and ** represent significance at the 1 and 5 percent levels, respectively. Robust standard errors in parentheses. FE, fixed effects; RCA, revealed comparative advantage index. $Export^{CHN}$ is defined as the shares of total intermediates exported to China. $Import^{CHN}$ is defined as the shares of total intermediates imported from China.

[8]Results from the first stage, not surprisingly, show that the probability of having completed projects decreases with distance from China. Results available on request.

Table 13. Robustness check: Intra-industry trade and sophistication

	Intra-industry trade (GL, logit)	Log (export sophistication)	Log (import sophistication)
	(1)	(2)	(3)
Projects	−6.165***	−1.212***	−0.417***
	(2.036)	(0.265)	(0.114)
Log (GDP per capita)	−0.191	0.011	−0.003
	(0.171)	(0.021)	(0.005)
Projects × GDP per capita	0.722***	0.137***	0.048***
	(0.223)	(0.029)	(0.012)
Inverse Mills ratio	−0.573	−0.058	0.003
	(0.414)	(0.051)	(0.018)
Constant	1.922	9.475***	9.729***
	(1.616)	(0.201)	(0.055)
Observations	58	58	58
R^2	0.302	0.563	0.273

Notes: *** represents significance at the 1 percent level. Robust standard errors are in parentheses. GL, Grubel–Lloyd index.

The results in Table 12 are consistent with estimates underlying stylized facts 2 and 3. The coefficient of the project is positive and statistically significant with both intermediate export and intermediate import as obtained in Table 3 in the main estimates. The estimates in columns (3) and (4) of Table 12 are consistent with estimates in Table 4, and estimates in column (5) are consistent with those of Table 6. Apart from intermediate imports from China or intermediate exports to China, the estimated coefficient of the inverse Mill's ratio is not statistically significant, suggesting that there is no selection bias.

As observed in the main estimates, the coefficient for the project is negative and statistically significant for intermediate import.

Results in Table 13 report robustness checks on those of Tables 9 and 11. All coefficients are consistent with those obtained in the main estimates, while the coefficient of the inverse Mill's ratio is not statistically significant thus suggesting an absence of selection bias.

Overall, our results are robust to selection bias stemming from geographical characteristics. This suggests that BRI projects accrue to countries with different pre-existing trade patterns as highlighted in the stylized facts and that these results are not driven by geographical factors such as distance from China or countries being positioned along the BRI corridors.

VI. Trade opportunities along the Belt and Road

The BRI represents an opportunity for China to strengthen its trade relationships with neighboring countries by developing new export markets in Central, South, and

Southeast Asian countries and securing suppliers for its manufacturing. By virtue of BRI-related investments, existing value chains are likely to be reconfigured in the region with new countries joining while participating countries are likely to move along the chain to different value-added phases.

According to Huang (2016), the BRI was promoted as an attempt to sustain China's economic growth and transition towards a more balanced development pattern while also enhancing the country's role in the international setting. Cai (2017, p.8) highlights that China's "comparative advantages in manufacturing, such as low labor costs, have begun to disappear. For this reason, the Chinese leadership wants to capture the higher end of the global value chains. To do this, China will need to upgrade its industry."

The stylized facts presented in this paper are in line with these perspectives and show that pre-existing trade patterns play a role in the allocation of investment projects across countries. Looking at completed projects, our findings suggest that priority was given to poor and large countries whose intermediate trade with China is intense and whose specialization tends to align with that of China.

Promoters of the initiative often stress the mutual benefits and the creation of win–win situations. However, not everyone shares such positive attitudes. India represents an interesting case, being one of the most important countries in the region as well as one in which skepticism has arisen. Nataraj and Sekhani (2015) and Banerjee (2016) argue that, despite some distrust towards the initiative, India should welcome the projects as it is likely to gain from trade with China and from infrastructure building, while an ineffective involvement may lead to isolation risks. Yet, the perception of a China-centric approach might create friction with other countries involved, as some of their sectors are competing directly with China. This aspect is clearly of primary economic importance for China's trade and development and, therefore, for the entire investment strategy behind the projects.

Whether the BRI will succeed in increasing trade and contribute to the development of the countries involved is an open question. Our results suggest that there is much to gain for BRI countries and that the sophistication level of the exported products might increase fast, benefiting all the countries involved.

Infrastructure investments (new roads, railways, ports, and communications) reduce transport costs and facilitate the movement of goods and people. Along the BRI corridors, firms will be able to better coordinate production and the division of labor across regions. Landlocked economies will benefit from easier access to important routes. For several of them, participating in GVCs can help a transition from being a supplier of natural resources and raw materials to becoming a manufacturer of goods and services. More generally, developing countries involved in the BRI are likely to be strongly impacted by Chinese investments as the returns, even for small projects, are likely to be large. This is beneficial to the regional value chains.

BRI countries can provide a reliable base of suppliers for China, which in turn may be able to upgrade its production and alleviate its problems of overcapacity by finding "new" markets (which are also likely to be "grateful" because of the investments). The BRI is likely to reinforce China's comparative advantages by building on the specialization of other countries in the same sectors in different phases.

China is already an important GVC player at the world level and especially in Asia, as well as being the main central node in the Asian intermediate trade network. The BRI provides an opportunity for China to engage other developing countries in GVCs trade and benefit from importing intermediate inputs and moving up in the value chain to higher value-added phases. At the same time, the BRI is likely to reinforce the inter-regional connections by increasing the importance of strategic countries that are most likely to have a role as gates towards distant relevant markets such as Western Europe.

VII. Conclusion

Our paper highlights and discusses five stylized facts regarding trade along the BRI corridors. Large and poor countries are more likely to have completed BRI-related investment projects. Countries where projects have been implemented and completed have a more diversified export structure than their peers, and their specializations tend to overlap with those of China. Projects are more likely to accrue in countries that supply intermediates to China. The pre-existing trade patterns can therefore help explaining the allocation of completed infrastructural investments.

These findings contribute to characterizing the driving factors of BRI investments. The fact that investments respond to trade considerations has relevant policy implications. Other than gains from trade directly due to a more efficient division of labor at the international level, improving trade linkages has the potential to benefit countries by making them more attractive for investments. Reinforcing certain trade patterns (e.g., specialization and intermediate trade with China, among others) may help countries to reap the gains from future BRI investments. This suggests priority areas for interventions. Some sectors are more likely to bring long-term benefits than others. The finding that the similarity of revealed comparative advantage with China matters suggests that countries may reinforce their specialization in specific sectors to become more attractive partners. Currently, the BRI is focused on infrastructure projects and physical connectivity but countries may work on other trade-enhancing aspects. For instance, trade and regulatory cooperation with China, financial integration, and institutional quality are likely to have positive effects on trade and GVC participation as well as on future BRI investment decisions. Policies that foster trade integration therefore not only have direct benefits but may contribute to further BRI investments.

In summary, our findings highlight that the geographical allocation of BRI infrastructural projects is closely related to the pre-existing trade patterns. Opportunities are there, along the silk road. The extent to which they will be exploited is another matter.

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Appendix A

Table A1. List of the BRI countries

Corridors	Belt and Road Initiative countries	Completed projects as of December 2020	Corridors	Belt and Road Initiative countries	Completed projects as of December 2020
New Eurasia Land Bridge Economic Corridor	Armenia	Yes	South Asia	Bangladesh	Yes
	Azerbaijan	Yes		Bhutan	Yes
	Belarus	Yes		India	Yes
	Georgia	Yes		Maldives	Yes
	Kazakhstan	Yes		Nepal	Yes
	Montenegro	Yes		Pakistan	Yes
	Poland	Yes		Sri Lanka	Yes
	Romania	Yes			
	Russia	Yes			
	Ukraine	Yes			
China–Central Asia–West Asia Economic Corridor	Afghanistan	Yes	Middle East and Africa	Bahrain	Yes
	Albania	Yes		Egypt	No
	Bulgaria	Yes		Iraq	Yes
	Croatia	Yes		Israel	No
	Iran	Yes		Jordan	No
	Kyrgyzstan	Yes		Kuwait	No
	Mongolia	Yes		Lebanon	No
	Serbia	Yes		Oman	No
	Tajikistan	Yes		Palestine	No
	Turkey	Yes		Qatar	No
	Turkmenistan	Yes		Saudi Arabia	Yes
	Uzbekistan	Yes		Syria	No
				United Arab Emirates	No
				Yemen	No
Southeast Asia	Brunei	No	Central Europe	Bosnia and Herzegovina	Yes
	Cambodia	Yes		Czech Republic	No
	Indonesia	Yes		Estonia	Yes
	Laos	Yes		Hungary	Yes
	Malaysia	Yes		Latvia	Yes
	Myanmar	Yes		Lithuania	No
	Philippines	Yes		Macedonia	Yes
	Singapore	Yes		Moldova	Yes
	Thailand	Yes		Slovakia	Yes
	Timor-Leste	No		Slovenia	Yes
	Vietnam	Yes			

Source: Reconnecting Asia project database of the Center for Strategic and International Studies (CSIS) (see https://reconnectingasia.csis.org/database/initiatives/one-belt-one-road/).

Table A2. Summary statistics of main variables

Variables	Observations	Mean	Standard deviation	Min	Max
Country-level variables					
Dummy of whether the country is BRI	172	0.355	0.480	0.000	1.000
BRI country with completed projects	61	0.758	0.432	0.000	1.000
Overall trade logistics performance index	58	2.826	0.405	2.035	4.126
Log (GDP per capita)	61	8.620	1.200	6.441	11.16
Log (population)	61	16.20	1.67	12.86	20.96
Grubel and Lloyd	61	−0.034	1.039	−3.735	1.760
Log (export sophistication)	61	9.503	0.184	8.929	9.816
Log (import sophistication)	61	9.692	0.089	9.385	9.837
Contiguity	58	0.220	0.418	0.000	1.000
Log (distance between capitals) (km)	58	8.551	0.384	7.067	8.952
Country–sector-level variables					
Share of intermediate export to China	1,586	0.042	0.090	0.000	0.944
Share of intermediate import from China	1,586	0.050	0.073	0.000	0.685
Share of intermediate export	1,586	0.701	0.211	0.101	0.999
Share of intermediate import	1,586	0.635	0.251	0.004	1.000
Revealed comparative advantage overlap	1,586	0.748	0.205	0.013	1.000
Revealed comparative advantage overlap Lafay	1,586	0.551	0.497	0.000	1.000

Appendix B

1. Revealed comparative advantage indexes

(1) Balassa revealed the comparative advantage index (RCA)

The Balassa RCA index is computed as:

$$BRCA_{ij} = \frac{\frac{x_{ij}}{X_i}}{\frac{X_j}{X}}, \tag{2}$$

where x_{ij} is exports of sector *j* from country *i*, $X_i = \sum_j x_{ij}$ is total exports from country *i*, $X_j = \sum_i x_{ij}$ is the world's exports of sector *j* and $X = \sum_i \sum_j x_{ij}$ is the world's exports. The index goes from 0 to infinity, with specialization sectors being those with $RCA_{ij} > 1$. The index is asymmetric, so its normalized version is commonly used. The normalized Balassa index can be computed as:

$$\widetilde{BRCA_{ij}} = \frac{RCA_{ij} - 1}{RCA_{ij} + 1}. \tag{3}$$

The normalized index goes from −1 to + 1. Positive (negative) values denote (de)specialization sectors.

(2) Revealed comparative advantage overlap

The overlap index (OI_{ij}) between the RCA_{ij} index of sector *j* of country *i* and the respective index for China, $RCA_{CHN,j}$, is computed as:

$$OI_{ij} = 1 - \frac{\Delta RCA_{ij}}{\max\{j\}}, \tag{4}$$

where $\Delta RCA_{ij} = \left|RCA_{ij} - RCA_{CNH,j}\right|$ is the absolute difference between the indexes, $\max\{j\}$ is the cross-country largest sectoral absolute difference (note that the smallest sectoral absolute difference is 0 by construction). For the normalized Balassa index, the $\Delta RCA_{ij\max} = 2$, because the index goes from −1 to + 1. The overlap index goes from 0 (no overlap) to 1 (perfect overlap).

The country-level overlap index can be easily computed, starting from the aggregate absolute difference in RCA with China, as:

$$OI_{i} = 1 - \frac{\sum_{j} \Delta RCA_{ij}}{\max\left\{\sum_{j} \Delta RCA_{ij}\right\}}. \tag{5}$$

(3) Lafay revealed comparative advantage

The Lafay (1992) RCA index measures the sectoral contribution to the overall normalized trade balance. The Balassa index only considers exports but the Lafay index also considers imports.

The Lafay RCA index is computed as:

$$LRCA_{ij} = \left(\frac{x_{ij} - m_{ij}}{x_{ij} + m_{ij}} - \frac{X_i - M_i}{X_i + M_i}\right)\frac{x_{ij} + m_{ij}}{X_i + M_i}, \tag{6}$$

where *m* and *M* denote imports. The index may take values in (−∞, +∞), with positive values indicating specialization sectors.

2. Intra-industry trade: Grubel–Lloyd index

The most used IIT indicator is the Grubel–Lloyd index. For each sector, the index simply considers the degree of overlap between import and export. Its formulation for sector *j* of country *i* is the following:

$$GL_{ij} = 1 - \frac{\left|x_{ij} - m_{ij}\right|}{x_{ij} + m_{ij}} = \frac{2 \times \min\{x_{ij}, m_{ij}\}}{x_{ij} + m_{ij}}. \tag{7}$$

The GL_{ij} index takes values from 0 to 1, where 0 means no IIT, i.e., one of the two trade flows is 0, and 1 indicates the maximum degree of IIT or a prefect sectoral import-export overlap.

3. Export and import sophistication indexes

The export sophistication index takes two steps. First, we calculate product sophistication as the average income level of exporting countries with weights equal to their RCA. A product is thus sophisticated if exported by specialized advanced economies. The index is computed as:

$$prody_j = \sum_i \frac{BRCA_{ij}}{\sum_i BRCA_{ij}} y_i = \sum_i \frac{\frac{x_{ij}}{X_i}}{\sum_i \frac{x_{ij}}{X_i}} y_i, \quad (8)$$

where y_i denotes GDP per capita and $BRCA_{ij}$ is the Balassa RCA index for sector j of country i.

The country level export sophistication is obtained as a weighted average of the sophistication level of its export bundle:

$$expy_i = \sum_j \frac{x_{ij}}{X_i} prody_j. \quad (9)$$

Import sophistication is computed in a similar way to a weighted average of the sophistication level of a country's import bundle:

$$impy_i = \sum_j \frac{m_{ij}}{M_i} prody_j. \quad (10)$$

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