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Trade impacts of the Belt and Road Initiative

The major global trade boost which could come from significant cost reductions, and what might get in the way

The Belt and Road Initiative is increasing transport connections between Asia and Europe with potential consequences for international trade. Trade between the countries involved accounts for more than a quarter of world trade, so better connections and the lower trade costs that come with them could have a significant global impact. A halving in trade costs between countries involved in the BRI could increase world trade by 12%. Countries in Eastern Europe and central Asia stand to benefit most, but the benefits will depend on where trade costs fall. There are already some opportunities to transport goods via rail between China and Europe, which may appeal to the wide range of industries with time-sensitive inputs and products. It could take many years before other impacts of the BRI are seen. Many projects are under construction, and the BRI is open-ended. Trade facilitation barriers between countries also need to be addressed.

Belt and Road

President Xi Jinping launched the Belt and Road Initiative in 2013 (at the time, it was known as the 'One Belt One Road' Initiative). China has highlighted five different priorities for the BRI: policy co-ordination, unimpeded trade, facilitating connectivity, financial integration, and bonds between peoples (*Source: China National Development and Reform Commission (2015)*). The BRI is often also discussed as a policy for rebalancing the Chinese economy, stimulating Western regions, and advancing its strategic and geopolitical goals.

This report focuses on the BRI as a large and long-term programme of investment in transport infrastructure across Asia and Europe. It looks at the infrastructure being built and how trade in goods could change as a result, setting other aspects of the BRI (and trade in services) to one side.

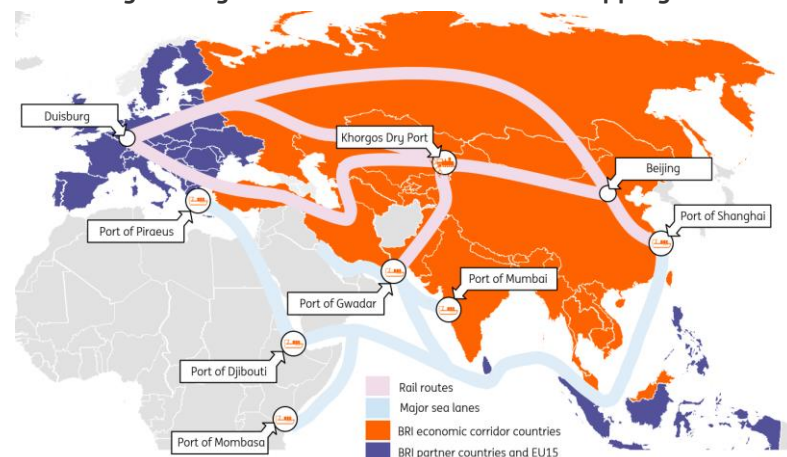
Transport infrastructure projects across Asia and Europe are a key part of the Belt and Road Initiative

The Belt and Road refer to the overland and maritime trade routes between China, Europe, the Middle East, and East Africa. The BRI will see these routes renewed and improved through a number of large-scale infrastructure projects. Along the Belt, roads, rail links, dry ports and industrial zones are being developed. Along the Road, sea ports and their connections to overland trade routes are being modernised (**Figure 1**).

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Fig 1 The Belt consists of overland economic corridors while ports along the Road are gateways to and from international shipping routes



Source: ING

Progress and challenges

China-led development of transport infrastructure in Asia is not new. In the decade before the BRI was launched, China built pipelines to link its natural gas supply to pipelines in central Asia and Russia, developed its own national integrated transport system, and connected its railways with networks in South East Asia. Block train services began to run between China (Chongqing) and Germany (Duisberg) in 2011. However, the majority of projects identified with the BRI so far are still in their construction phases with completion dates in the coming five years.¹ The BRI is open-ended, so more projects are likely to be initiated during that time.

Rail services are running between new destinations in China and Europe

International rail services between China and Europe did not begin with the BRI, but have increased since its announcement. New services have started running between Yiwu, Hefei and Harbin – major inland cities in Central and Eastern China – and Madrid and Hamburg. Rail freight has increasingly been transported between China and Europe via Kazakhstan, benefiting from infrastructure in the northern parts of the Trans-Asian rail network that pre-dated the BRI.²

Other parts of the Trans-Asian rail network do not yet support international freight services to the same degree. Gaps in the network require around 12,400km of track to be laid (some 10% of the network).³ Routes through Iran and Turkey (designated as the BRI's China-central Asia-West Asia “economic corridor”) could offer an alternative route between China and Europe, as well as connecting China, the Middle East and North Africa by rail. However, this will only be feasible with more investment to construct and upgrade the network and its supporting infrastructure.

China aims to create a portfolio of efficient and well-connected ports

The majority of goods traded between China and the EU are transported by ship through the Suez Canal. The Road element of the BRI involves China – through its liner and terminal operator Cosco – developing a portfolio of ports with highly efficient terminal operations (loading and unloading container ships) and connections to overland transport networks. Ports along the Road may increasingly function as gateways inland rather than just handling the transshipment of containers to be unloaded elsewhere. Key ports along the Road are Piraeus (Greece), as an access point to and from the EU, and Gwadar (Pakistan), as a link between the Belt and the Road.

¹ Barisitz and Radyner (2017a, 2017b) provide a project-based stocktake of the BRI's progress. Steer Davies Gleave (2018) include a list of Chinese transport and infrastructure projects in other BRI countries.

² Pomfret (2018).

³ UNESCAP (2017).

BRI projects in and around ports could form new trade routes combining land and sea transport

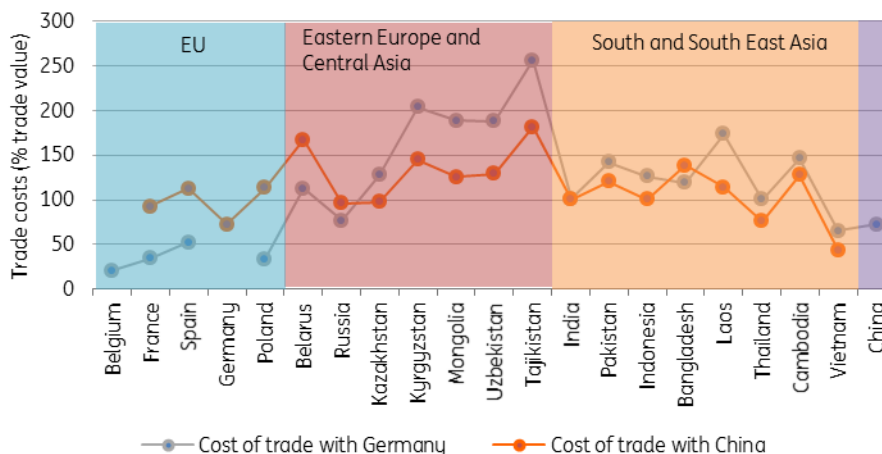
Cosco acquired a majority share of Piraeus port in 2016 and is investing in the port's capacity and operations. China envisions the creation of a "European Land-Sea Express Route" by constructing rail connections from Piraeus through Eastern Europe. Gwadar port has been operating since 2007, but BRI projects are expanding the port to enable it to handle different types of goods and larger container ships. Other BRI projects are connecting the port to the Trans-Asian rail network. Once complete, the port and onward connections at Gwadar could provide a route for oil imports into China from the Middle East. For landlocked Central Asian countries, they offer a connection to shipping routes.

Apart from infrastructure, trade facilitation is a barrier to trade for many countries involved in the BRI. Customs checks are part of the issue, although there are schemes which help to smooth the passage of goods between China and Europe. The 'Smart and Secure Trade Lanes' project operating in 16 ports aims to streamline customs processes and other checks. The use of standardised consignment notes on the block trains performs a similar function, helping to bridge the different legal requirements on goods transport in the EU and Asia.⁴

BRI countries have been costly to trade with for EU countries as well as China

These schemes and others of their kind do not cover all goods trade, however, let alone all barriers to trade. The distance between trade partners, the transport options available, the efficiency of logistics, border processes and many other factors all influence trade costs. Countries in Central Asia, and to a lesser extent South and South East Asia, face high costs when they trade with the EU and with China. In 2013, the year the BRI was launched (also the latest available data), trade costs were estimated to be twice as high as the value of the goods traded between BRI countries, China and Germany (Figure 2).

Fig 2 BRI countries are relatively costly to trade with, esp. in Central Asia



Note: Trade costs with Germany and China, 2013. Adapted from Rastogi and Arvis (2014). Source: UNESCAP-World Bank Trade Costs Database.

Improving trade facilitation is part of the BRI, with an emphasis on platforms for sharing information

Trade facilitation may improve as BRI projects are completed, but this may be piecemeal. Significant progress may have to wait for co-ordinated action along whole trade routes. This was the case with the standardised consignment notes for block trains (which were implemented before the BRI was launched). China has published a strategy for enhancing the customs co-ordination between BRI countries in 2018-2020, which includes plans to establish a platform for sharing information.⁵ Other published plans aim to achieve harmonisation of standards and mutual recognition of certification, which will remove barriers to trade but may take a long time.

⁴ Lobyrev et al (2018).
⁵ HKTDC Research (2018).

Opportunities and growth

Rail vs air and sea transport for EU-China trade

Rail transport is only used for a small share of trade between the EU and China, and the BRI is not expected to change this.⁶ Nonetheless, interest in rail transport between Europe and China is understandable because the speed of transport is a key dimension of EU-China trade. Time-sensitive goods account for more than three-quarters of the value of China's exports to the EU, and more than 60% of the EU's exports to China (see Appendix 2).

More accessible rail transport offers a new way to transport goods quickly between China and Europe

Speed is important where goods like the components of cars, phones and computers, are part of supply chains spanning many countries. For finished products, like seasonal clothing, fast delivery can be important where demand is very changeable. As rail transport becomes more accessible, importers and exporters can use rail transport when previously they have only had the options of air and sea transport. Faster delivery frees up working capital and reduces capital costs, and rail transport also offers a much greener alternative to air transport for the most time-sensitive trade flows.

Impacts on international trade

Trade between Asia and Europe (not including trade between EU countries) accounts for 28% of world trade, so making those trade flows easier has a large potential impact. The size of this impact depends on the sensitivity of trade to changes in relative costs, which can be estimated in gravity models of international trade. These models describe trade flows in terms of countries' size and the relative costs of trade between them. The relationships in the gravity model also allow us to calculate approximate individual country effects when trade costs change (see Technical Appendix).

The impact of the BRI will depend on where trade costs fall, and by how much

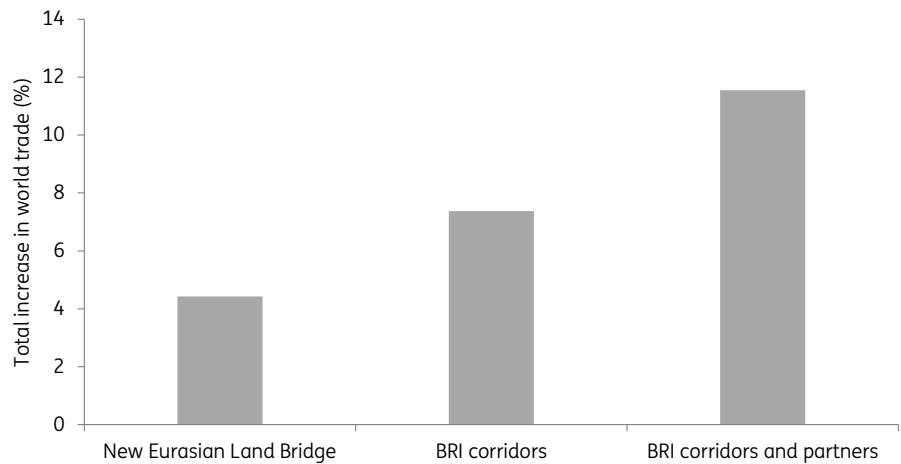
The impact of the BRI will also depend on *where* trade costs fall as a result of BRI projects. Trade costs may fall between a very small set of countries, or much more widely across Asia and Europe. We investigate this using three scenarios. In each case, we assume that the BRI will in the long run lead to a 50% fall in trade costs between a different set of countries:

- **New Eurasian Land Bridge:** countries along the New Eurasian Land Bridge economic corridor (China, Kazakhstan, Russia, Belarus and Poland), which is broadly the route of most current international rail services between China and Europe. Trade costs are also assumed to halve between countries along the New Eurasian Land Bridge economic corridor and the EU15, Cyprus and Malta (costs are not assumed to fall between the EU countries).
- **BRI corridors:** countries along all BRI economic corridors, covering the majority of Asia and the EU (again, costs are not assumed to fall between EU countries)
- **BRI corridors and partners:** as in the BRI corridors scenario plus countries in Europe and Asia which have signed BRI implementation and co-operation agreements with China, including Central and Eastern European countries, Indonesia, Singapore, Saudi Arabia and Egypt (see Appendix 1 for a full list).

When trade costs fall between these countries, trade between them increases. The resulting impacts on world trade range from a 4% increase in the scenario involving the New Eurasian Land Bridge countries, to 12% when trade costs fall between all countries involved in the BRI (**Figure 3**).

⁶ Steer Davies Gleave (2018) assess the potential extent of substitution of air and sea transport for rail in EU-China trade flows. Rail transport is expected to grow in importance, taking more cargo out of the air, in relative terms, than off container ships.

Fig 3 More trade along the Belt and Road could increase world trade by 12%

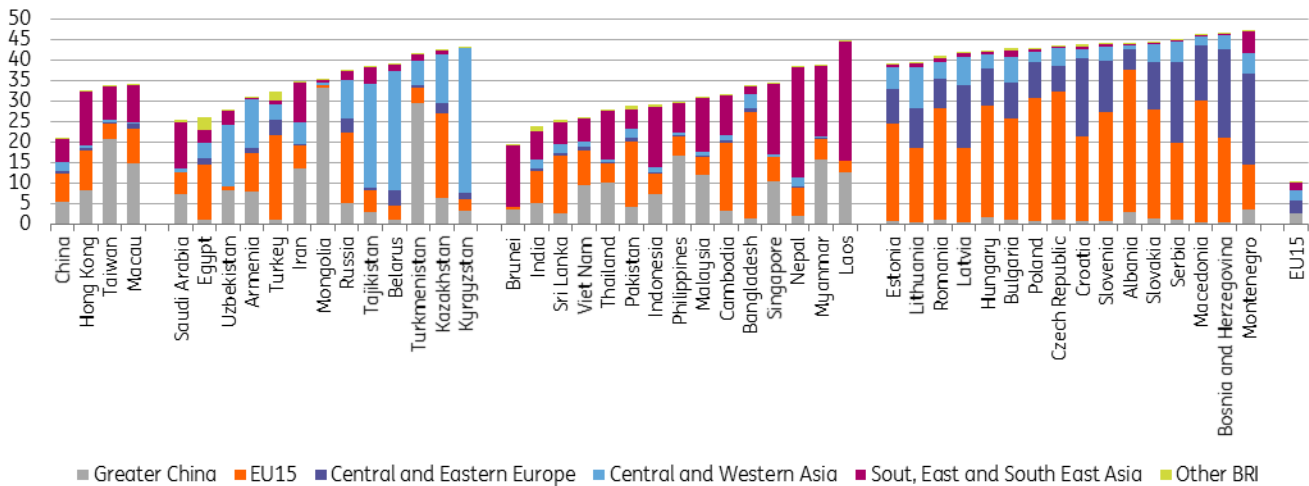


Note: Increases in world trade in three different scenarios. Source: ING calculations based on UNCTAD data

Individual countries see large increases in exports to other BRI countries

As mentioned above, the relationships in the gravity model allow us to calculate approximate individual country effects when trade costs change. When trade costs are halved between all countries involved in the BRI, there are estimated increases in trade of 35% to 45% for Russia, Kazakhstan, Poland, Nepal and Myanmar. Overall, countries in Central Asia and Eastern Europe see the largest increases (Figure 4).

Fig 4 Eastern Europe and Central Asia could see large increases in trade



Note: increases in exports following a halving in trade costs between BRI corridors and partners. Source: ING calculations based on UNCTAD data

Some countries involved in the BRI do most of their trade with other BRI countries (China and the EU15 countries, on the other hand, do a relatively small amount of their total trade with other BRI countries). Those countries benefit from the fall in trade costs affecting the majority of their trade. Although all countries increase their exports to Greater China, the fall in costs also benefits the bloc of EU15 countries, as the other large trade partner of most countries in the region. This is especially the case for Eastern European countries, highlighting the importance of where trade costs fall in determining which countries will benefit from the BRI. If, the BRI did not produce a fall in trade costs between countries in Eastern Europe and the bloc of EU15 countries, then the overall impact of the BRI on Eastern European countries would instead be relatively small.

Within countries, different industries may feel the effects of competition in other countries having been brought a step closer through lower trade costs. This will stimulate competition and potentially also innovation, with benefits for consumers, but some industries and sectors may lose out to competitors from other BRI countries.

Transport and trade facilitation can change countries' trade costs significantly

50% is undeniably a large fall in trade costs, but it is chosen due to the influence that the BRI will have on transport costs and trade facilitation, which are also factors that research suggests are big influences on trade costs. The WTO have calculated that improvements in trade facilitation could reduce BRI countries' trade costs between 12 and 23%.⁷ Transport costs are consistently found to be an important part of trade costs, though estimates vary widely (partly because of the many different measures of transport costs in empirical studies).⁸ The combined effect of trade facilitation improvements estimated by the WTO (12-23%) and a halving in transport costs (33%, on the assumption that transport costs are two-thirds of trade costs) would be one way of reaching a 50% reduction in overall trade costs.

The mix of transport and trade facilitation cost reductions is likely to differ for every trade flow. For some, a significant fall in costs might come through switching from air transport to rail or rail and sea. Others might benefit from a new shorter route opening up to a destination market, or more efficient border crossings or port operations along a particular route. In practice the composition of the fall in costs is likely to make a difference: Ramasamy et al (2017) show that trade facilitation is critical to realising the trade gains from improvements in infrastructure in BRI countries. And transport infrastructure needs to increase to some extent to handle the higher trade flows (though the current practice of slow steaming in the shipping industry also provides for some spare capacity within the current infrastructure).

Such a large fall in costs is likely to take at least five years, and likely even longer

How far costs may fall is really a question about how long the BRI policy will exist. The BRI projects currently under construction are expected to be completed in the coming 5 years, and the BRI is open-ended (and ultimately aiming for "unimpeded trade"), so new projects are likely to be initiated in that time. As a result, any significant fall in trade costs due to the BRI is likely to take at least five years, and more likely ten, or even longer. If trade costs are slow to fall, effects on world trade growth will be small in any given year. Significant falls in trade costs, even over a long period, could lead to large impacts on international trade.

⁷ WTO (2015).

⁸ Behar and Venables (2011).

Appendix 1: BRI country groupings

BRI economic corridors

The economic corridors of the BRI are the focus of improvements to transport infrastructure. Some countries have more than one economic corridor.

- **New Eurasian Land Bridge:** China, Kazakhstan, Russia, Belarus, Poland, Germany
- **China-Mongolia-Russia economic corridor:** China, Mongolia, Russia
- **China-Central Asia-West Asia economic corridor:** China, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Turkmenistan, Iran, Turkey
- **China-Pakistan economic corridor:** China, Pakistan
- **Bangladesh-China-India-Myanmar economic corridor:** China, Bangladesh, India, Myanmar
- **China-Indochina economic corridor:** China, Myanmar, Cambodia, Vietnam, Laos, Malaysia, Thailand
- **China-India-Nepal economic corridor:** China, India, Nepal

BRI partner countries

Some countries beyond the BRI economic corridors have signed BRI “implementation and partnership agreements” with China. These countries are referred to as BRI “partner countries” in the report. The agreements vary in detail, but signal countries’ support for the BRI. A list of the agreements can be accessed here: <http://china-trade-research.hktdc.com/business-news/article/The-Belt-and-Road-Initiative/The-Belt-and-Road-Initiative-Implementation-Plans-and-Cooperation-Agreements/obor/en/1/1X3CGF6L/1X0A3857.htm> (accessed 11 May 2018).

- Central and Eastern Europe (CEE) countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Montenegro, Romania, Serbia, Slovakia, Slovenia, Macedonia
- Armenia
- Egypt
- Saudi Arabia
- Indonesia
- Singapore
- Philippines
- Brunei
- Sri Lanka

Scenario groupings

The scenario analysis in this report uses the following country groupings:

- **New Eurasian Land Bridge plus EU15, Cyprus and Malta:** China, Kazakhstan, Russia, Belarus, Poland, EU15 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom), Cyprus, Malta.
- **BRI corridor countries:** China, Kazakhstan, Russia, Belarus, Poland, EU15, Cyprus, Malta, Mongolia, Kyrgyzstan, Tajikistan, Uzbekistan, Turkmenistan, Iran, Turkey, Pakistan, Bangladesh, India, Myanmar, Cambodia, Vietnam, Laos, Malaysia, Thailand, Nepal.
- **BRI partner countries:** BRI corridor countries plus Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Montenegro, Romania, Serbia, Slovakia, Slovenia, Macedonia, Armenia, Egypt, Indonesia, Singapore, Philippines, Brunei, Sri Lanka, Saudi Arabia.

Appendix 2: Identifying potential demand for rail transport in EU-China trade flows

Hummels (2001) estimates the time-sensitivity of product groups using data on exporting firms' choices of air or sea transportation for different products. The following product groups are identified as time-sensitive using this method:

SITC Rev 3 Product group	Share of China exports to EU	Share of EU exports to China
Meat and meat preparations	0.0%	1.8%
Dairy products and birds' eggs	0.0%	0.6%
Organic chemicals	2.2%	1.8%
Essential oils for perfume and cleaning	0.3%	0.7%
Fertilisers	0.0%	0.1%
Manufactures of metal	4.2%	2.2%
Power generating machinery and equipment	1.7%	4.0%
Specialised machinery	1.2%	5.1%
Other industrial machinery and parts	5.0%	8.0%
Office machines and computers	10.9%	0.6%
Telecommunication and sound recording apparatus	12.7%	1.4%
Electrical machinery, apparatus and appliances	10.1%	10.0%
Road vehicles	2.6%	18.3%
Prefabricated buildings, sanitary, heating and lighting fixtures	2.6%	0.2%
Travel goods, handbags	1.8%	0.3%
Articles of apparel and clothing accessories	10.9%	0.8%
Professional and scientific instruments	2.8%	5.0%
Photo apparatus, optical goods, watches and clocks	0.7%	0.4%
Miscellaneous manufactured articles	7.5%	1.8%
Total	77.2%	63.2%

Note: Time sensitive products and shares in EU-China trade. Source for trade shares: UNCTAD

The imported content of different industries' exports is an indicator of the presence of complex supply chains, which can make them more time-sensitive (Hornok, 2012). Some of the main trade flows between the EU and China are imports by time sensitive industries (those with an above-average imported content of exports based on the OECD import content of exports dataset). In China's imports from the EU, the largest flows imported by time-sensitive industries are: machinery and equipment (33% of total China imports from the EU), motor vehicles (18%), chemicals and chemical products (10%). In the EU's imports from China, the largest flows imported by time-sensitive industries are: machinery and equipment (50% of total EU imports from China), textiles (17%), and furniture (9%).

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Technical Appendix

Individual country effects from gravity models of international trade

Figures 3 and 4 are based on results from the gravity model of international trade, as set out by Andersen and van Wincoop (2003) and codified by Feenstra (2004) and Head and Mayer (2013). The estimated effects on aggregate trade in Figure 3 use an elasticity net of multilateral resistance estimated with fixed effects. The individual country effects in Figure 4 are approximated using Baier and Bergstrand (2009)'s method, as applied to trade partners of different sizes by Behar and Nelson (2014).

The key relationship is between trade and trade costs, as set out in the gravity equation,

$$M_{ij} = \frac{Y_i Y_j}{Y} \left(\frac{t_{ij}}{P_i P_j} \right)^{1-\sigma} \quad \text{Equation A}$$

Where M_{ij} is the trade flow between exporter j and importer i , σ is the elasticity of substitution, and, as Anderson and van Wincoop show, trade between j and i depends on the economic size of trading partners and trade costs, but also a dampening effect due to multilateral resistance, the barriers that countries face in their trade with other countries,

$$P_j = \sum_{i \in I_j} t_{ij}^{1-\sigma} s_i^{I_j} \quad \text{Equation B1}$$

$$P_i = \sum_{j \in J_i} t_{ij}^{1-\sigma} s_j^{J_i} \quad \text{Equation B2}$$

Where P_i and P_j are inward and outward multilateral resistance, I_j is the set of all importers from exporter j and $s_i^{I_j}$ is the ratio of importer i 's output to the output of all importers from exporter j . Baier and Bergstrand (2009) show the effects of multilateral resistance can be approximated by taking a first-order Taylor expansion of the indices in Equations B1 and B2 to give,

$$\ln P_i P_j = - \sum_{i \in I_j} s_i^{I_j} \sum_{h \in J_i} s_h^{J_i} \gamma d_{ih} + \sum_{j \in J_i} s_h^{J_i} d_{ih} + \sum_{i \in I_j} s_l^{I_j} d_{ij} \quad \text{Equation C}$$

Where γ is the gross effect of distance, d_{ij} on trade costs (estimated without controlling for multilateral resistance), which is equal to $(1-\sigma)\ln t_{ij}$, and h and l are the generic exporter and importer. Behar and Nelson (2014) apply Baier and Bergstrand's method to calculate approximate individual country effects from bilateral and multilateral falls in trade costs. The individual country effects in this report are calculated for bilateral falls in costs between trading partners,

$$\xi_{ij}^B = \gamma(1 + s_i^{I_j} s_j^{J_i} + s_j^{I_j} s_i^{J_i} - s_j^{J_i} - s_i^{I_j}) \quad \text{Equation D}$$

Where ξ_{ij}^B is the elasticity of bilateral trade between exporter j and importer i .

Distance between trade partners proxies for trade costs in the analysis. To calculate ξ_{ij}^B , the gross effect of distance on trade costs is assumed to be 1, in line with estimates in with the literature (see, e.g. pp41-42 in UNCTAD 2016). Output and trade (imports) data for all countries was taken from UNCTAD.

As Behar and Nelson show, the majority of countries have a negative elasticity with respect to a multilateral fall in trade costs (affecting all trading partners), reflecting a net effect from increases in trade with the largest countries and reductions in trade between small trading partners. The partial share of world trade affected by the BRI (and particular the lack of US involvement) should mean that the falls in costs resemble the bilateral setting.

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