China's Belt and Road Initiative in the Global Trade, Investment and Finance Landscape

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China's Belt and Road Initiative (BRI) development strategy aims to build connectivity and co-operation across six main economic corridors encompassing China and: Mongolia and Russia; Eurasian countries; Central and West Asia; Pakistan; other countries of the Indian sub-continent; and Indochina. Asia needs USD 26 trillion in infrastructure investment to 2030 (Asian Development Bank, 2017), and China can certainly help to provide some of this. Its investments, by building infrastructure, have positive impacts on countries involved. Mutual benefit is a feature of the BRI which will also help to develop markets for China's products in the long term and to alleviate industrial excess capacity in the short term. The BRI prioritises hardware (infrastructure) and funding first.

This report explores and quantifies parts of the BRI strategy, the impact on other BRI-participating economies and some of the implications for OECD countries. It reproduces Chapter 2 from the 2018 edition of the *OECD Business and Financial Outlook*.

1. Introduction

The world has a large infrastructure gap constraining trade, openness and future prosperity. Multilateral development banks (MDBs) are working hard to help close this gap. Most recently China has commenced a major global effort to bolster this trend, a plan known as the Belt and Road Initiative (BRI). China and economies that have signed co-operation agreements with China on the BRI (henceforth BRI-participating economies[1]) have been rising as a share of the world economy. The BRI is overseen by the "Leading Group" for promoting its work hosted by the National Development and Reform Commission (NDRC) which oversees and coordinates all BRI projects (including inter alia with the Ministry of Commerce (MOFCOM), the Ministry of Foreign Affairs (MFA), and the Development Research Centre of the State Council (DRC)).[2]

BRI investment projects are estimated to add over USD 1 trillion of outward funding for foreign infrastructure over the 10-year period from 2017.[3] While new vehicles have been formed to help with the financing, such as the Silk Road Fund, most of the Chinese funding for these projects will actually come from state-directed development and commercial banks. China is also supporting a multilateral approach to investment including MDBs and private-public partnerships (see Xi, J., 2017a, page 5).

Because the Belt and Road is a Chinese initiative, it is important to give weight to how the authorities there state and characterise its objectives, as would be the case for policy statements for any country. Countries may or may not carry out and/or achieve all of their goals but, as a first step, it is important to document the stated aims and not to second-guess

what these might be. This report adopts that approach using statements of the most senior policy makers in China. It then provides data on various aspects of the initiative and considers areas that may pose problems in the future with a view to help in the implementation of the BRI. How to deal with these latter issues is the subject taken up in Chapter 3 of OECD, 2018a.

The BRI is best summarised by President Xi: "*China will actively promote international co-operation through the Belt and Road Initiative. In doing so, we hope to achieve policy, infrastructure, trade, financial, and people-to-people connectivity and thus build a new platform for international co-operation to create new drivers of shared development"* (Xi, J., 2017b, page 61).

While the Belt and Road may also have some geopolitical goals associated in the linking of its neighbours economically more closely to China, this repport focuses only on the economic aspects of the initiative. It discusses the BRI within the context of broader global infrastructure needs and China's longer-term economic strategy for itself and other participating economies, both those in the Asian region and beyond (Africa, Europe, Australasia and Latin America have all been mentioned). Considerations of ways in which OECD instruments and codes can best help China and BRI-participating economies to gain better integration within the world economy, and thereby benefit more from the BRI process, are taken up in Chapter 3 of OECD, 2018a.

President Xi emphasises "*policy, infrastructure, trade, financial, and people-to-people connectivity".* The latter involves education, cultural and scientific exchanges to help other countries learn from China's development experience and the President has launched the *Centre for International Knowledge on Development*[4] and *China's National Plan on Implementation of the 2030 Agenda for Sustainable Development* along with other related initiatives.[5]

Section 2 sets out the huge infrastructure requirements of the global economy and particular needs in Asia that the BRI is playing some role in alleviating. Section 3 presents the essence of the BRI as a global strategy from the viewpoint of how China explains what it is doing. The motivations for this important initiative, which cover both connectivity and more sustainable growth for China are set out in section 4. China's global infrastructure investment strategy, focusing on connectivity for the BRI, is discussed in section 5. Debt in China as a major policy issue was discussed in Chapter 1 of OECD, 2018a. While that chapter focused on bank and shadow bank debt at the macro level, this report looks at the more micro issues linked to the BRI. One concern discussed in section 5 relates to the extent of investments in economies that are below-investment-grade or, in some cases, not rated at all. Debt associated with these economies could prove to be more problematic for lenders in the future, regardless of whether the loans are to Chinese companies or to foreign governments. Potential problems to watch out for on the debt funding of construction investment therefore are considered in section 6. Section 7 focuses on China's high-technology corporate investment, often acquired from abroad and used in its strategy to move up in the value-added chain while also supporting its role in development, both nationally (e.g. the Western provinces) and in BRI-participating economies. The amount and location of the sums invested and the issues that have arisen with troubled assets are presented. Debt issues from the viewpoint of developing borrower countries are taken up later in Chapter 3 of OECD, 2018a,[6] The BRI as a platform for expanding global trade is assessed in section 8. Concluding remarks are made in section 9.

2. Global infrastructure needs

A stocktaking of global infrastructure needs reveals varying numbers and methods, yet all sources point to a growing global infrastructure investment deficit. Much of the global investment deficit covers key connectivity sectors important to the BRI, such as transportation, energy, water and telecommunications. Table 1 presents a selection of reviewed global estimates, covering different time frames as well as different sectoral scopes.

Based on these sources, annual investment needs range between USD 2.9 trillion and USD 6.3 trillion. At current investment trends, this is expected to translate into a cumulative investment gap of between USD 5.2 trillion until 2030 (McKinsey, 2016), or as high as USD 14.9 trillion until 2040 when the achievement of the sustainable development goals (SDGs) is taken into account (GI Hub, 2017). On an annual basis, this means that global infrastructure investments are, on average, falling short by USD 0.35 - 0.37 trillion per year (GI Hub, 2017 and McKinsey, 2016).

Table 1. Comparison of estimates of global infrastructure investment needs

Source	Sectoral scope	Actual / expected annual investment (USD trillion) [1]	Investment need (USD trillion)		
			Time frame	Total	Per annum
Bhattacharya et al. (2016)	Including power generation, transmission and distribution, primary energy supply, energy demand and efficiency, transport, water and sanitation and telecommunication	3.4 (2015)	2015 - 2030	75–86	5–6
NCE (2014)		-	2015 - 2030	96	6.4
OECD (2017a)		3.4–4.4 (2017)	2016 - 2030	95	6.3 (or 6.9 under a 2°C scenario)
GI Hub (2017)	Including roads, railways, airports, electricity generation, transmission and distribution, water and telecommunication	2.3 (2015) growing to 3.8 (2040)	2015 - 2040	94	2.9 (2015)–4.6 (2040)
McKinsey (2016)	Including transport (roads, railways, airports, and ports), water, power and telecommunication	2.5	2016 - 2030	49	3.3

1. The approaches to estimating actual investment needs and expected investment trends vary widely among studies. See also OECD (2017b).

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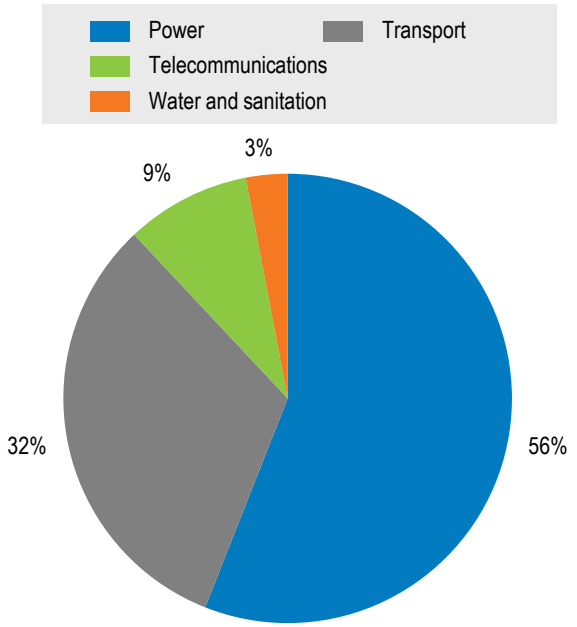
Globally, by sector, the largest investment needs lie in transport and energy infrastructure. In particular, road transport and energy supply infrastructure are expected to comprise around 60% of global investment needs (GI Hub, 2017; OECD, 2017a and McKinsey, 2016). They are followed by rail transport, telecommunications and water infrastructure. The highest rates of underinvestment are expected in the road and energy infrastructure sectors. GI Hub (2017), for instance, expects global investments in road infrastructure in the coming decades to fall short by almost USD 0.4 trillion annually, along with an annual investment deficit in energy infrastructure of around USD 0.15 trillion. Looking in particular at transport connectivity, around USD 0.44 trillion of expected annual investment needs will not be met (see Miyamoto, K. and Y. Wu, forthcoming, 2018).

For Asia alone, estimates by the Asian Development Bank (ADB, 2017) point to investment needs of around USD 26 trillion until 2030 (including climate-related needs). This is supported by GI Hub (2017) and McKinsey (2016) who see around 50% of their respective investment need estimates related to the Asian region.[7] Spending under the BRI strongly contributes to financing Asia's infrastructure needs. Nonetheless, a cumulative gap of about USD 4.6 trillion, or over four times USD 1 trillion estimated for BRI foreshadowed projects, is expected to emerge by 2040 (GI Hub, 2017). In particular, investments in sustainable and quality infrastructure in the region are needed to allow Asia to maintain its growth momentum, adequately address climate change and bring down high levels of persistent poverty.

The highest investment needs, in percent of GDP, within the region are seen in the Pacific (9.1%) as well as in South (8.8%) and Central Asia (7.8%) (ADB, 2017). This compares to around 5.7% in Southeast Asia and 5.2% of GDP in East Asian economies.[8] With current investment trends not expected to meet these needs, Asia's annual infrastructure investment gap will widen to USD 459 billion until 2020, equal to 2.4% of the region's projected GDP (ADB, 2017).[9] In particular, lower-income economies in South Asia are faced with higher gaps (on average 5.7% of projected GDP) compared to more developed nations in Southeast Asia (on average 4.1 % of GDP). Distinctively setting itself apart from most of its Asian neighbours, China's domestic infrastructure gap is estimated at only around 1.2 % of its projected GDP until 2020 (ADB, 2017).

On a sectoral level, around USD 14.7 trillion, or over half of Asia's infrastructure needs until 2030, lie in the energy and power sector, as 400 million people still lack access to electricity (Figure 1). Transport infrastructure needs rank second at USD 8 trillion, amounting to just under one-third of the investment needs in Asia's infrastructure landscape. These are followed by investment needs in telecommunications infrastructure of around USD 2.3 trillion, or 9% of the total. With 300 million Asians also lacking access to safe drinking water and about 1.5 billion people lacking access to basic sanitation, such investment needs are expected to account for 3%, or USD 800 billion, of Asia's total infrastructure needs until 2030.[10]

Figure 1. Infrastructure investment needs in Asia by sector, 2017



Source: ADB, 2017.

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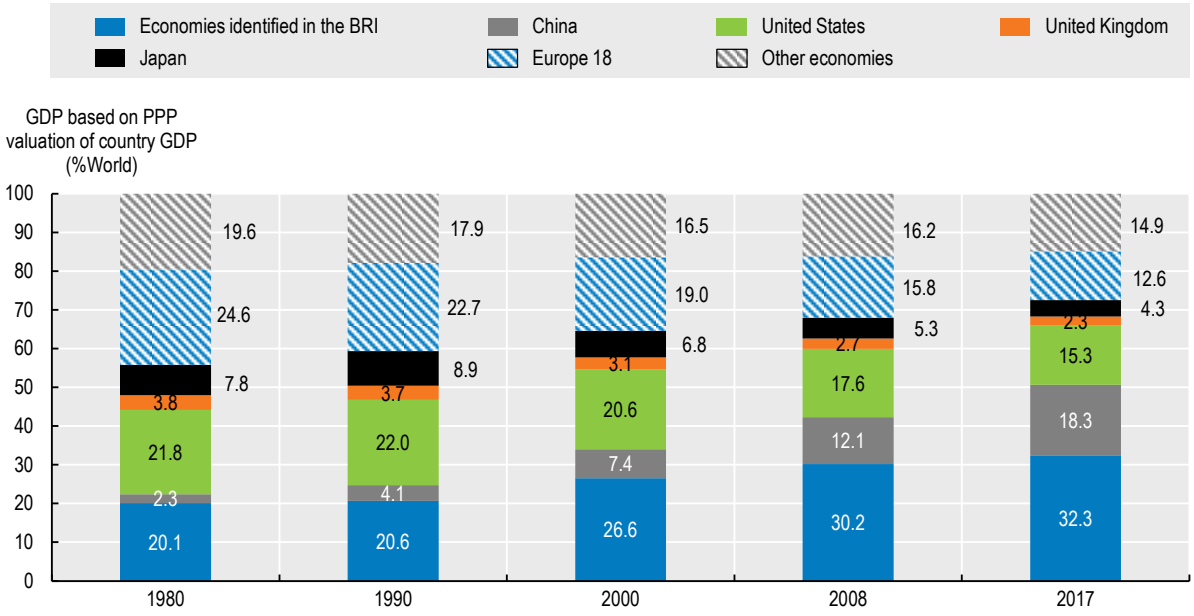
Asia's infrastructure financing needs widely exceed current and planned investments under the BRI. Addressing these needs will therefore remain an essential priority on the international development agenda. In particular, regions not lying within the current six BRI corridors will also require increased investment in infrastructure to support economic development and avoid the widening of geographical divides. There is some risk that investment in other critical sectors, such as water and sanitation, could be under addressed in these countries. It is also critical that investments in low-carbon, sustainable and high-quality infrastructure, which are a focus of the BRI, are given adequate support elsewhere, along with the maintenance, rehabilitation and upgrading of existing infrastructure. This is going to require the involvement of multiple investors, including China, other government groupings and multilateral development banks, an issue that is returned to at the end of this report. But there can be little doubt that the BRI is, by far, the most significant contribution to these needs.

Figure 2. Size comparison of selected regions and those identified in the BRI, 1980-2017



Notes: The "Europe 18" includes: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden and Switzerland. "BRI-participating" includes 66 of the 72 BRI-participating economies. No data are available for Kenya, Morocco, Palestinian Authority or West Bank and Gaza Strip, Panama and Timor-Leste. See Box 2.1 for the full list of BRI-participating economies. "Other" includes 99 economies, namely: Algeria, Angola, Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Benin, Plurinational State of Bolivia, Botswana, Brazil, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, People's Republic of China, Colombia, Comoros, Democratic Republic of the Congo, Republic of the Congo, Costa Rica, Côte d'Ivoire, Djibouti, Dominica, Dominican Republic, Ecuador, El Salvador, Equatorial Guinea, Eritrea, Fiji, Gabon, Gambia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong (China), Jamaica, Kenya, Kiribati, Kosovo, Lesotho, Liberia, Libya, Macau, Madagascar, Malawi, Mali, Marshall Islands, Mauritania, Mauritius, Federated States of Micronesia, Morocco, Mozambique, Namibia, Nauru, Nicaragua, Niger, Nigeria, Palau, Panama, Papua New Guinea, Paraguay, Peru, Puerto Rico, Rwanda, Samoa, San Marino, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Solomon Islands, South Sudan, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sudan, Suriname, Swaziland, Chinese Taipei, United Republic of Tanzania, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Tuvalu, Uganda, Uruguay, Vanuatu, Bolivarian Republic of Venezuela, Zambia and Zimbabwe.

* Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

* Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

GDP = Gross Domestic Product. PPP = Purchasing Power Parity.

Source: IMF World Economic Outlook Database. 2017 estimates.

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3. The Belt and Road Initiative as a strategy to promote and sustain growth

In March 2015, China issued an action plan which described the main objectives of the BRI (see Box 2.1 which states the broad objective and lists the economies included for the purposes of this study).[11] The BRI-participating economies represent more than one-third of global GDP, and over half of the world's population (Figure 2). While infrastructure investment is a key aspect of the BRI, China states that it is much broader in its objectives, encompassing all aspects of the sustainable growth for itself and including more balanced regional growth, the upgrading of its industry and greener economic growth at home. Problems of excess capacity in some products have led to the WTO and the OECD, amongst others, to highlight the issues to watch out for at a global level. China will need to ensure that the BRI does not simply shift excess capacity and less environmentally-friendly energy sources to other countries with little net gain from a global perspective. In this way the BRI could make a strong contribution to 2030 sustainable development goals.

Box Error! No text of specified style in document.**1. Which economies are related to the Belt and Road Initiative?**

The Belt and Road Initiative is a large project aiming at improving regional co-operation through better connectivity among countries lying on the ancient Silk Road and beyond. It includes the Silk Road Economic Belt for the land part and the 21st Century Maritime Silk Road for the naval part. At the start, it involved 64 economies but its scope has since broadened over 100 in some form. Table 2 shows the list of economies that have co-operation agreements with China.

Table 2. List of the 72 BRI-participating economies included in this study

Region	Economy
East Asia	People's Republic of China, Mongolia
Southeast Asia	Brunei, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Viet Nam
South Asia	Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka
Central Asia	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
Middle East and North Africa	Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Palestinian Authority, Syria, United Arab Emirates, Yemen
Europe and Central Asia	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Former Yugoslav Republic of Macedonia, Moldova, Montenegro, Poland, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Turkey, Ukraine
21st Century Maritime Silk Road	Ethiopia[1], Kenya[1], Morocco[1], New Zealand[1], Panama[1], Korea[1], South Africa[1]

1. Economies not listed in the 2015 Official Action Plan.
Economies are grouped based on the World Bank Group's classification by region.
Source: China International Trade Institute.

Specific objectives for the BRI: growth through connectivity

As stated by China, the focus on connectivity within the BRI is both about facilitating trade and investment, and thereby development of neighbouring countries, as well as strategically shoring up its own security of energy, resources and food by taking a regional leadership role with its most important neighbours.[12] It has a very broad scope encompassing economic, strategic and cultural connectivity. The objectives have been stated in the speeches referenced earlier; they are also set out clearly in Chapter 51 and other parts of the 13th Five-Year Plan (see People's Republic of China, 2016).

- To increase trade and investment in the BRI: *"We will improve the bilateral and multilateral co-operation mechanisms of the Belt and Road Initiative focusing on policy communication, infrastructure connectivity, trade facilitation, capital flow, and people-to-people exchanges."*
- Free trade zones along the Silk Road: *"We will speed up efforts to implement the free trade area strategy, gradually establishing a network of high-standard free trade areas. We will actively engage in negotiations with countries and regions along the routes of the Belt and Road Initiative on the building of free trade areas."*[13]
- To enhance financial co-operation in the region to fund infrastructure: *"We will strengthen co-operation with international organizations including international financial organizations and institutions, work actively to promote the development of the Asian Infrastructure Investment Bank and the New Development Bank, put the Silk Road Fund to effective use, and attract international capital for the creation of a financial co-operation platform that is open, pluralistic, and mutually beneficial."*
- To gain access to natural resources: *"We will strengthen international co-operation on energy and resources and production chains, and increase local processing and conversion."*
- To strengthen transport infrastructure in the BRI corridors: *"We will advance the development of multi-modal transportation that integrates expressways, railways, waterways, and airways, build international logistics thoroughfares, and strengthen infrastructure development along major routes and at major ports of entry. We will work to develop Xinjiang as the core region for the Silk Road Economic Belt and Fujian as the core region for the 21st Century Maritime Silk Road."*
- To deepen cultural exchanges in the region: *"We will conduct extensive international co-operation in the areas of education, science, technology, culture, sports, tourism, environmental protection, health care, and traditional Chinese medicine."*

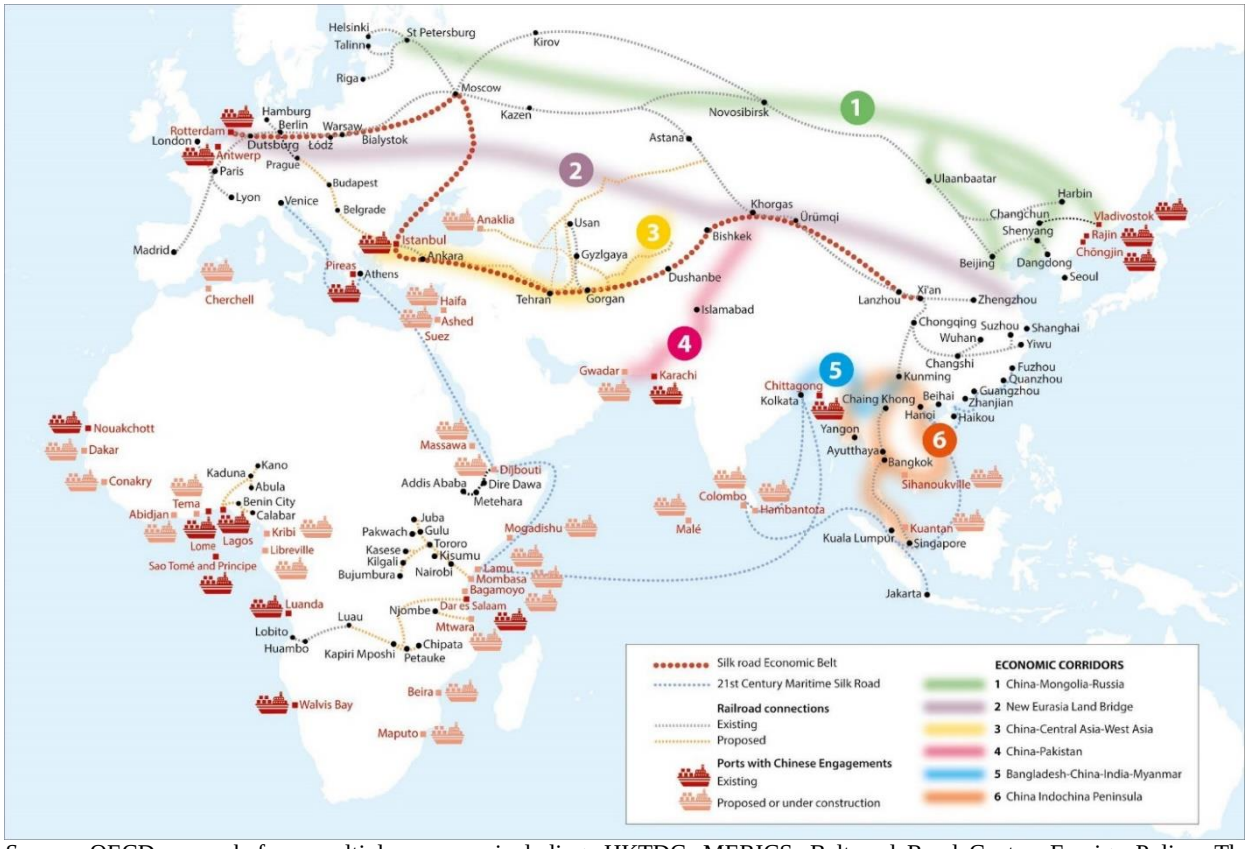
The "high-standard free trade areas" noted above presumably refer to dealing with illicit activities in free trade zones. There are some 1 843 global free trade areas, with 802 in Asia. These zones are correlated with fake and pirated goods exports (see OECD, 2018b). Eliminating this in the BRI would enhance the environment for cooperative outcomes in the global economy that are discussed in Chapter 3 of OECD, 20128a.

The six economic corridors of the BRI

Thinking about development in terms of economic corridors has been an important aspect of China's development model. Infrastructure investment along the Belt and Road is concerned with six economic corridors covering a large energy- and resource-rich part of the world:

1. *New Eurasia Land Bridge*: involving rail to Europe via Kazakhstan, Russia, Belarus, and Poland.
2. *China, Mongolia, Russia Economic Corridor*: including rail links and the steppe road—this will link with the land bridge.
3. *China, Central Asia, West Asia Economic Corridor*: linking to Kazakhstan, Kyrgyztan, Tajikistan, Uzbekistan, Turkmenistan, Iran, and Turkey.
4. *China Indochina Peninsula Economic Corridor*: Viet Nam, Thailand, Lao People's Democratic Republic, Cambodia, Myanmar, and Malaysia.
5. *China, Pakistan Economic Corridor*: Xinjiang Province will be most affected. This important project links Kashgar city (free economic zone) in landlocked Xinjiang with the Pakistan port of Gwadar, a deep water port used for commercial and military purposes.
6. *China, Bangladesh, India, Myanmar Economic Corridor*: This is likely to move more slowly due to mistrust over security issues between India and China.[14]

Figure 3. One (land) belt one (maritime) road



Source: OECD research from multiple sources, including: HKTDC, MERICS, Belt and Road Center, Foreign Policy, The Diplomat, Silk Routes, State Council Information Office of the People's Republic of China, WWF Hong Kong (China).

Linking up road and rail connections with global ports is essential for the functioning of the maritime road aspects of the BRI. Figure 3 shows the broad pattern of these connections.

Table 3. BRI-participating economies and economic corridors

	Economy	Economic Corridor		Economy	Economic Corridor
1	People's Republic of China	-	37	Singapore	China-Indochina Peninsula
2	Bangladesh	Bangladesh-China-India-Myanmar	38	Thailand	China-Indochina Peninsula
3	Bhutan	Bangladesh-China-India-Myanmar	39	Timor-Leste	China-Indochina Peninsula
4	India	Bangladesh-China-India-Myanmar	40	Viet Nam	China-Indochina Peninsula
5	Myanmar	Bangladesh-China-India-Myanmar	41	Belarus	China-Mongolia-Russian Federation
6	Nepal	Bangladesh-China-India-Myanmar	42	Estonia	China-Mongolia-Russian Federation
7	Sri Lanka	Bangladesh-China-India-Myanmar	43	Latvia	China-Mongolia-Russian Federation
8	Albania	China-Central West Asia	44	Lithuania	China-Mongolia-Russian Federation
9	Armenia	China-Central West Asia	45	Mongolia	China-Mongolia-Russian Federation
10	Azerbaijan	China-Central West Asia	46	Russian Federation	China-Mongolia-Russian Federation
11	Bosnia and Herzegovina	China-Central West Asia	47	Afghanistan	China-Pakistan
12	Bulgaria	China-Central West Asia	48	Pakistan	China-Pakistan
13	Croatia	China-Central West Asia	49	Bahrain	China-Pakistan[1]
14	Georgia	China-Central West Asia	50	Kuwait	China-Pakistan[1]
15	Islamic Republic of Iran	China-Central West Asia	51	Oman	China-Pakistan[1]
16	Iraq	China-Central West Asia	52	Qatar	China-Pakistan[1]
17	Israel	China-Central West Asia	53	Saudi Arabia	China-Pakistan[1]
18	Jordan	China-Central West Asia	54	United Arab Emirates	China-Pakistan[1]
19	Kyrgyzstan	China-Central West Asia	55	Yemen	China-Pakistan[1]
20	Lebanon	China-Central West Asia	56	Czech Republic	New Eurasian Land Bridge
21	Former Yugoslav Republic of Macedonia	China-Central West Asia	57	Hungary	New Eurasian Land Bridge
22	Republic of Moldova	China-Central West Asia	58	Slovak Republic	New Eurasian Land Bridge
23	Montenegro	China-Central West Asia	59	Slovenia	New Eurasian Land Bridge
24	Palestinian Authority or West Bank and Gaza Strip	China-Central West Asia	60	Poland	New Eurasian Land Bridge
25	Romania	China-Central West Asia	61	Kazakhstan	New Eurasian Land Bridge[1]
26	Serbia	China-Central West Asia	62	Ukraine	New Eurasian Land Bridge[1]
27	Syrian Arab Republic	China-Central West Asia	63	Egypt	21st-C Maritime Silk Road
28	Tajikistan	China-Central West Asia	64	Ethiopia	21st-C Maritime Silk Road
29	Turkey	China-Central West Asia	65	Indonesia	21st-C Maritime Silk Road
30	Turkmenistan	China-Central West Asia	66	Kenya	21st-C Maritime Silk Road
31	Uzbekistan	China-Central West Asia	67	Maldives	21st-C Maritime Silk Road
32	Brunei Darussalam	China-Indochina Peninsula	68	Morocco	21st-C Maritime Silk Road
33	Cambodia	China-Indochina Peninsula	69	New Zealand	21st-C Maritime Silk Road
34	Lao People's Democratic Republic	China-Indochina Peninsula	70	Panama	21st-C Maritime Silk Road
35	Malaysia	China-Indochina Peninsula	71	Korea	21st-C Maritime Silk Road
36	Philippines	China-Indochina Peninsula	72	South Africa	21st-C Maritime Silk Road

Note: This list contains the 65 economies listed in China's Official Action Plan for the BRI launched in March 2015 and seven economies that have been associated with the initiative more recently.
1. May also be counted as part of the China-Central West Asia Economic Corridor
Source: OECD research from multiple sources, including: HKTDC, MERICS, Belt and Road Center, Foreign Policy, The Diplomat, Silk Routes, State Council Information Office of the People's Republic of China, WWF Hong Kong (China).

4. Motivations for the Belt and Road Initiative

Connectivity

This is clear in the 13th Five Year Plan and has been emphasised by the highest ranking leaders and key ministries: "*We should deepen industrial co-operation so that industrial development plans of different countries will complement and reinforce each other…. create new models of investment and financing, encourage greater co-operation between government and private capital and build a diversified financing system and a multi-tiered capital market…. Infrastructure connectivity is the foundation of development through co-operation. We should promote land, maritime, air and cyberspace connectivity, concentrate our efforts on key passageways, cities and projects and connect networks of highways, railways and sea ports. The goal of building six major economic corridors under the Belt and Road Initiative has been set, and we should endeavour to meet it" (*Xi, J., 2017a).

How best to achieve these goals while levelling the playing field to maximise the benefits of global trade and investment is taken up fully in Chapter 3 of OECD, 2018a.

Openness

"*We should embrace the outside world with an open mind, uphold the multilateral trading regime, advance the building of free trade areas and promote liberalization and facilitation of trade and investment. Of course, we should also focus on resolving issues such as imbalances in development, difficulties in governance, digital divide and income disparity and make economic globalization open, inclusive, balanced and beneficial to all.*" *(*Xi, J., 2017a)

Innovation

"*We should pursue innovation-driven development and intensify co-operation in frontier areas such as digital economy, artificial intelligence, nanotechnology and quantum computing, and advance the development of big data, cloud computing and smart cities so as to turn them into a digital silk road of the 21st century." (*Xi, J., 2017a)

Sustainable development motivations

China is proposing a holistic implementation of the BRI, covering a number of broad aspects that will be important for achieving the 2030 sustainable development goals. Aspects of this much broader approach include:

- Peace: *"All countries should respect each other's sovereignty, dignity and territorial integrity, each other's development paths and social systems, and each other's core interests and major concerns."* (Xi, J., 2017a)
- Ecology and environment: *"We need to seize opportunities presented by the new round of change in energy mix and the revolution in energy technologies to develop global energy interconnection and achieve green and low-carbon development. We should improve trans-regional logistics network and promote connectivity of policies, rules and standards so as to provide institutional safeguards for enhancing connectivity"* (Xi, J., 2017a). This issue is taken up by the relevant ministry: *"China will improve green and low-carbon operation, management and*

maintenance of infrastructure by clarifying environmental protection requirements in infrastructure construction standards and enforcing environmental standards and practices in such sectors as green transportation, green building and green energy. ...and ..."China will jointly create eco-industrial parks with focus on enterprise agglomerations, eco-industrial chains and service platforms. Environmental protection facilities will be constructed, centralized sewage treatment and recycling and corresponding demonstration be promoted, and public service platforms on eco-environmental information, technology and business put in place in industrial parks" (Ministry of Ecology and Environment, 2017). Table 7 documents some of the clean energy projects China is investing in across the Belt and Road, though against this must be balanced reports that China is also building a large number of coal-fired power stations along with a number of other countries.[15]

- Water Conservation: *"The Chinese government proactively promotes policy coordination, technology sharing and engineering co-operation with neighbouring countries in the protection and development of cross-border rivers. It has launched joint studies with the countries concerned on the protection and use of water resources of cross-border rivers, in order to better protect these resources. China encourages the sharing of hydrological data during the flood season, and has established a Sino Russian mechanism for co-operation in flood prevention and control."* (Office of the Leading Group, 2017)
- Civil Society: *"We should establish a multi-tiered mechanism for cultural and people-to-people exchanges, build more co-operation platforms and open more co-operation channels. Educational co-operation should be boosted, more exchange students should be encouraged and the performance of cooperatively run schools should be enhanced. … efforts should be made to establish think tank networks and partnerships…(and co-operation in) cultural, sports and health sectors… Historical and cultural heritage should be fully tapped to jointly develop tourist products and protect heritage …. We should strengthen exchanges between parliaments, political parties and non-governmental organizations… women, youths and people with disabilities... We should also strengthen international counter-corruption co-operation so that the Belt and Road will be a road with high ethical standards."* (Xi, J., 2017a)

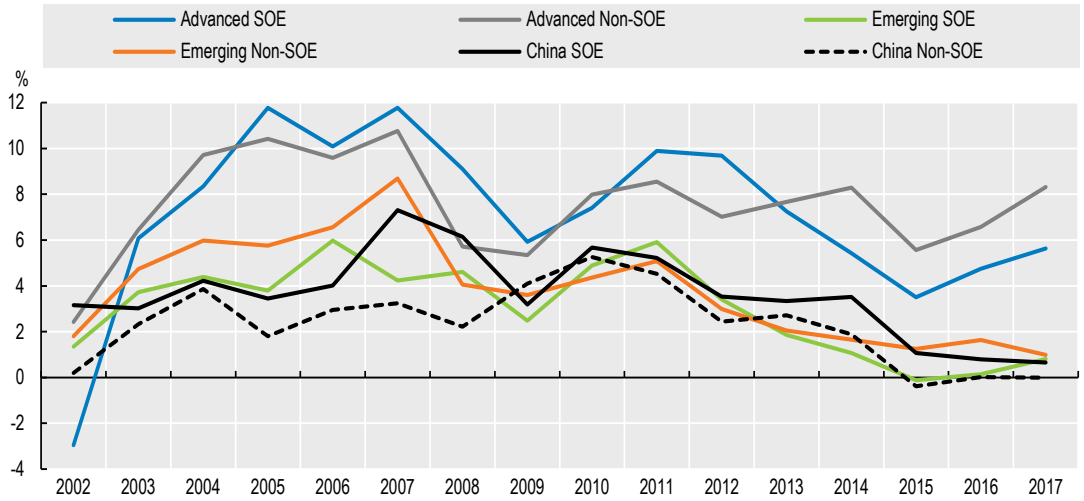
Energy and food security motivations

The 13th Five Year Plan also focuses on food and energy security, expressed most clearly in chapters other than that dedicated to the Belt and Road. Thus, in Chapter 30: "*We will build a modern energy system that is clean, low-carbon, safe, and efficient, and will safeguard the country's energy security*"… and …"*We will accelerate the construction of strategic land corridors for importing oil and gas. We will make progress in building oil and gas storage facilities and strengthen capacity for oil and gas storage and peak shaving*." Some more details on China's energy strategy are presented further below. With respect to food security in Chapter 18: *"We will actively pursue agricultural co-operation and development overseas, establish large-scale offshore centres for farm product production, processing, storage, and transportation, and cultivate internationally competitive multinational agricultural companies".* These motivations for food and energy security and regional development in the BRI intersect with each other and it will be important to ensure they are mutually beneficial.

More balanced regional development

The western provinces of China, including the Xinjiang Uygur autonomous region of Xinjiang, and Gansu, Tibet, and Qinghai are very poor and a source of tensions with various ethnic groups. One aim of the BRI is to promote growth in China's west and the north-eastern provinces in order to reduce economic inequality. In President Xi's speech to the opening of the 19th Party Congress, he stresses: *"We will devote more energy to speeding up the development of old revolutionary base areas, areas with large ethnic minority populations, border areas, and poor areas. We will strengthen measures to reach a new stage in the large-scale development of the western region; deepen reform to accelerate the revitalization of old industrial bases in the northeast and other parts of the country; help the central region rise by tapping into local strengths; and support the eastern region in taking the lead in pursuing optimal development through innovation...We will create networks of cities and towns based on city clusters, enabling the coordinated development of cities of different sizes and small towns, and speed up work on granting permanent urban residency to people who move from rural to urban areas."* (Xi, J., 2017b, pages 28 and 29)

Figure 4. ROE minus COK: Private non-financial companies versus SOEs, 2002-2017



Source: Bloomberg, OECD calculations. See Annex B.

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Improving efficiency

Reforms have supported an impressive growth in China over several decades. China's unfinished transition to introduce and consolidate market mechanisms and institutions, has been associated in the past with problems of capital misallocation in some industries, as shown by the downward pressure on the return on equity (ROE) versus the cost of capital (COK) across a range of firms and industries. Dealing with past poorly-oriented investments and encouraging less-competitive firm exits is a part of this process, including where state support has maintained inefficient state firms (particularly those which depend on borrowing to survive, a point also noted by the IMF).[16] This transition process is normal for emerging economies looking to improve efficiency. In Figure 4, the ROE minus the COK has fallen for emerging economies, including China. This trend appears to have accelerated both in 2015 and has not yet reversed in 2016 and 2017.[17]

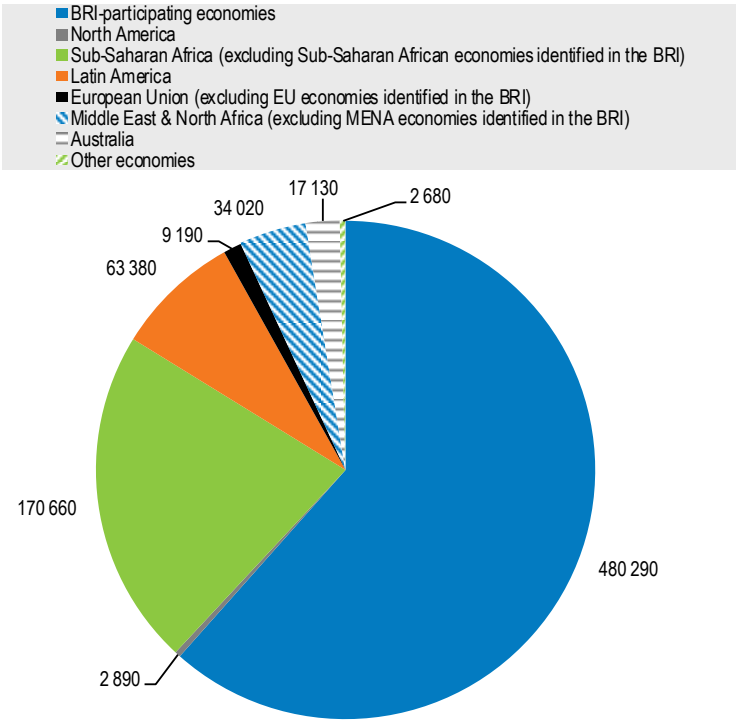
In his speech to the 19th Party Congress, President Xi puts these issues at the centre of China's development strategy: "*We should pursue supply-side structural reform as our main task, and work hard for better quality, higher efficiency, and more robust drivers of economic growth through reform. We need to raise total factor productivity and accelerate the building of an industrial system that promotes coordinated development of the real economy with technological innovation, modern finance, and human resources. We should endeavour to develop an economy with more effective market mechanisms, dynamic micro-entities, and sound macro-regulation. This will steadily strengthen the innovation capacity and competitiveness of China's economy*." (Xi, J., 2017b, page 26)

Firm exits from industries and/or bankruptcies are the intended consequences of competitive processes when more efficient firms outperform the less efficient. When this competitive process does not function well, more efficient firms can be driven out of the market over time. These issues are difficult to deal with in countries where SOEs play an important role, since the role of market discipline can be reduced in these circumstances—an issue which is taken up in detail in Chapter 3 of OECD, 2018a. A part of the transition process for dealing with these issues for China and its neighbours is implementing the BRI. The BRI aims to create new markets, facilitate trade as well as investment, including with a shift of production capacity to where there is ready demand (arising, for example, from new infrastructure investment) or where production factors are cheaper—a process that has also characterised past development in advanced countries. This could fit with the near-term economic imperative for China to do something about the emergence of excess capacity across some of its industries where SOEs are involved and, as noted earlier, where debt levels have grown. It will be important for China to manage this process in a manner that addresses global excess capacity and does not simply shift capacity to from one country to another, as noted earlier in section 3.

The BRI will also support China's need to move up in the value-added chain towards high-technology and services sectors. The 'hardware-first' strategy creates an external demand for materials and for China's technology and knowhow. Extending the life of older industries by creating demand and shifting locations helps debt-laden SOEs and other companies to cover variable costs, thereby avoiding defaults. Such a strategy, however, is unlikely to work in the long run. For the longer term, gradual deleveraging policies are already underway (including via debt-for-equity swaps and some asset transfers) and production targets are intended to set in motion longer-term restructuring of SOEs. It will be important for targets to be related to market mechanisms, and an interesting proposal for how this could be encouraged is set out in Chapter 3 of OECD, 2018a, Section 3.2). At the same time, the BRI lays longer-run economic foundations for economic growth based on connectivity and trade in the region (see Xi, J., 2017b and Johnson, 2016). All countries can benefit from this process if it is carried through with the openness and inclusiveness principles espoused by President Xi.

China is a large economy which is itself in transition. Speeding up its development with level playing field considerations in mind while also remaining consistent with the motivations stated above would be beneficial to trade, global growth and prosperity within the region. These objectives for broad sustainable growth sit very well with those of the OECD, with whom China could benefit with even greater engagement to help speed the transition process. This issue is taken up in Chapter 3 of OECD, 2018a.

Figure 5. Chinese outward investment in the construction sector, cumulative notional amount expressed in USD million, 2005-2018



Note: 2018 data are to end-June.
Source: American Enterprise Institute (AEI), China Global Investment Tracker Database. It includes all investments of USD 100 million or greater. Ministry of Commerce, Republic of China (MoFCOM) data totals are around 10% higher for the same period due to the inclusion of small investments.

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5. Size of investment for construction in the Belt and Road Initiative

Figure 5 shows China's global construction projects (mainly infrastructure) in millions of dollars from 2005 to 2017. The cumulative total is USD 480.3 billion for the BRI-participating economies, some 59% of the global total of USD 814.3 billion. The next most popular destination for Chinese construction is sub-Saharan Africa (USD 170.7 billion), then Latin America (USD 63.4 billion) and the Middle East and North Africa (MENA) countries not in the BRI at USD 34.0 billion. Chinese construction projects are smaller in OECD countries, with Australia being the most significant at around USD 17.1 billion (six times that of the United States and Canada together).

Relocation of low-technology industries abroad

Following general global patterns to shift low-technology abroad, the iron, steel and cement industries are being moved to provinces in the west of China and to the BRI-participating economies. The Premier of China, Li Keqiang, explicitly highlighted this objective in his

remarks to the 17th ASEAN conference: *"After years of development, China now has a strong capacity in infrastructure development and Chinese equipment is of high quality. We encourage competitive Chinese producers of iron and steel, cement and plate glass, etc. to shift their operation to ASEAN countries to meet the local need of infrastructure development through investment, leasing and loan lending so as to achieve mutual benefit"* (Li Keqiang, 2014).

Table 4. Belt and Road Initiative financing

Institution (excluding Ministry of Finance and Ministry Commerce Aid, etc.)	Features	Estimated exposure (USD°billion)	Project examples
China Development Bank (notably the world's largest development finance institution)	Non-concessional loans and credit lines Concessionary loans Overseas investment support Can be tied to exports in most cases Imposes limits to sovereign borrowers (such as the IMF) Controls concentration of loans Government capital injections and access to PBoC pledged Supplementary lending programme keeps funding very cheap	110	By the end of December 2015, CDB had supported 400-plus projects in 37 countries along the Belt and Road Initiative, with banks totalling USD 110 billion. The projects covered energy resource co-operation, technical facility construction and other fields. These include foreign governments, foreign companies and Chinese corporations. An example is the 40-year concessionary loan to Indonesia, with no guarantee, for 75% of the USD 5.29 billion Jakarta Bandung high-speed railway. There is a 10-year grace period. 60% is denominated in US dollars at a low 2% interest rate. 40% is denominated in Renminbi at a 3.4% interest rate. The concessions that allowed it to win were mainly the absence of guarantees by Indonesia and local content agreements.
China Exim Bank	Preferential export credits (tied to exports) Export buyer's credit (tied to exports) Export seller's credit (tied to exports) Concessional loans (at least 50% are tied to exports) Non-concession loans and credit lines (can be tied) Overseas investment support (can be tied) Debt ceillings for each country Government capital injections and access to the PBoC pledged Supplementary lending programme keeps funding very cheap	80	By the end of 2015, EXIM Bank had supported 1000-plus projects in 49 countries along the Belt and Road Initiative, with loan balances exceeding CNY 520 billion (i.e. USD 80 billion). The projects include roads, railways, electricity, ports, communications and other fields. For example, EXIM Bank provided a USD 800 million low-interest rate loan to Malaysia to build the 22.5 kilometre second Penang bridge, the longest cross-sea bridge in Southeast Asia. Contribution to the USD 7 billion Lao People's Democratic Republic railway (5% GDP), provided at a low 3% interest rate. Exim Bank lends to foreign governments, foreign companies and Chinese corporations.
Agricultural Development Bank of China	Overseas investment support (can be tied to exports)		Supporting Silk Road Fund and for Chinese companies.
Industrial and Commercial Bank of China	Non-concessionary loans	159	212 BRI-related projects to a total of USD°67.4 billion to date. Potential projects expected to bring this to USD°159 billion.

Institution (excluding Ministry of Finance and Ministry Commerce Aid, etc.)	Features	Estimated exposure (USD°billion)	Project examples
Bank of China	Non-concessionary loans	100	Expected to have BRI-related project loans totalling USD°100 billion by the end of 2017.
Silk Road Fund	All BRI-related projects (ultimate full capitalisation shown)	40	The Silk Road Fund mainly invests in infrastructure projects in the energy sector. Their ongoing projects include the Karot Hydropower Project on the Jhelum River of Pakistan, the UAE Egypt Power Plant Project co-invested and developed by Chinese investors including the China Gezhouba (Group) Corporation. The Pakistan Karot Hydropower Project signed in April 2015 is a prioritised energy project in the "China-Pakistan Economic Corridor". It will be developed by the South Asia Company under the China Three Gorges Corporation and financed by the Silk Road Fund. The syndicate formed by the Silk Road Fund, the Export-Import Bank of China, the Chinese Development Bank and the International Finance Corporation has provided a USD°200 million loan to the project.
China Construction Bank	Contributing to BRI related projects	10	MofCom states that it has provided USD°10 billion.
New Development Bank (NDB)	To play a larger role in BRI projects	1.261	NDB provides loans to its member countries in the infrastructure sector. It announced the first batch of loan projects in April 2016, providing total loans of USD°811 million to renewable energy projects in Brazil, China, South Africa and India to support the member countries' 2370 Mega Watt generating capacity of renewable energy. In July 2016, NDB resolved to provide USD°100 million in loans to small-scale energy projects in Karelia, Russia. In November 2016, NDB approved a USD°350 million loan in regions along the Belt and Road Initiative area.
China Export and Credit Insurance Corporation		570.56	By December 2015, SINOSURE had underwritten USD°570.56 billion for China's export, investment and contracting projects in the countries along the Belt and Road Initiative area, with USD°1.855 billion paid out as indemnities. In July 2015, SINOSURE signed a co-operation agreement on the Belt and Road Initiative with the Industrial and Commercial Bank of China, focusing on supporting projects in regions along the Belt and Road Initiative area.
Asia Infrastructure Investment Bank (AIIB)	Not BRI-related projects (China 36% voting)	2.33	By December 2016, AIIB had approved nine infrastructure projects involving a total investment of USD 1.73 billion. The nine projects are all located in the countries along the Belt and Road Initiative area, namely Tajikistan, Bangladesh, Pakistan, Indonesia, Myanmar, Oman and Azerbaijan. The projects mainly focus on energy, transportation and slum upgrading. The latest approved project is the Trans-Anatolian Natural Gas Pipeline Project (TANAP) in Azerbaijan, which as part of the Southern Gas Corridor of the European Union, will transport natural gas in the Caspian Sea to Europe via Turkey. The project requires a total investment of USD 8.6 billion, of which AIIB is contributing USD 600 million, the World Bank USD 800 million, and the remaining will be provided by other international financial institutions and commercial loans.

Note: It is difficult to dig deeper in the Chinese data to ascertain how much of the loans are to Chinese companies and how much are to foreign obligers.
Source: Chinese Academy, et al., (2017); Reuters (2017); US-China ESRC (2017); Silk Road Fund, www.silkroadfund.com.cn/enweb/23775/23767/index.html; and MOFCOM, http://caiec.mofcom.gov.cn/article/g/201709/20170902639797.shtml.

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This has some benefit for China of reducing air pollution in Beijing to the extent that these industries move further away—though what it does for the global situation will depend on the policies that accompany this restructuring process to other locations. China's new environmental "polluter pays" regulations have reduced profits in cement industries within China, giving them a market incentive to move out along the Silk Road (see Kley, 2016; Chun, 2015). Once more, however, it should be underlined that it is the global "adding up" that matters for capacity utilisation and environmental issues as opposed to outcomes in any specific country.

The policy to move old iron and steel capacity out along the Belt and Road is associated with China (within the metals industry) moving up into cleaner, higher-tech, steel products and metal trading. According to the Global Times (2014), Hebei Province is moving capacity for 5.2 million tons of steel, 5 million tons of cement and 3 million units of glass abroad in 2017, and 20 million tons of steel, 30 million tons of cement and 10 million units of glass by 2023. Meanwhile, the Hebei Iron and Steel Group (HBIS) bought the controlling 51% interest in the Swiss-based steel trading firm Duferco reported to underline the shift to production abroad and trading the metal globally.[18]

By improving connectivity via infrastructure, the Initiative also has the potential to lay the foundation for a platform for trade and investment with China at its centre.

6. The financing of connectivity projects within the BRI

The main sources of funding for the bulk of these BRI-participating projects are the Chinese development banks, the USD 40 billion Silk Road Fund, and two of the large state-owned commercial banks. The main funding vehicles are set out in Table 4, along with examples of key projects.

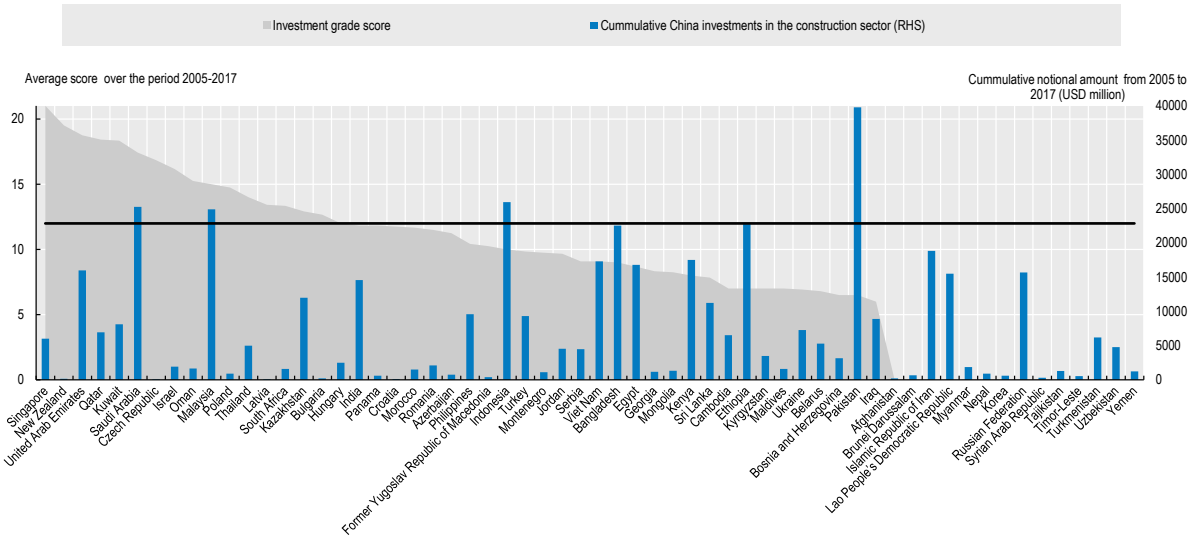
Finance for the infrastructure goals of the BRI is already well underway.

- The China Development Bank has supported 400 projects in 37 economies worth USD 110 billion and is tracking more potential projects.[19]
- The Industrial and Commercial Bank of China (ICBC) is involved in 212 projects worth USD 67 billion, and is expected to arrive at around USD 159 billion.
- The Bank of China is pledging USD 100 billion for the period 2016-2018.
- China Exim Bank supported 1 000 projects in 49 economies worth USD 80 billion.
- The China Construction Bank also supports BRI projects.
- The Silk Road Fund, with pledged capital of USD 40 billion, is smaller in comparison, but works with other institutions in consortiums.[20]
- The New Development Bank has small investments thus far but is expected to play a larger global role in the future.
- The Asian Infrastructure Investment Bank (AIIB) is small in comparison to the above, at USD 2.3 billion of loans, and is in any case not formally a part of the BRI.

Nevertheless, China contributed around half of the AIIB subscribed capital (voting rights), and all of the initial projects have been along the Belt and Road.

The president of the World Bank, an institution which is able to tap resources from all economies in the world, recently stated it had ongoing projects worth USD 86.8 billion in the (then) 65 BRI-participating economies (Kim, 2017). This compares with USD 420 billion already invested by China in BRI construction, with much more on the way.

Figure 6. Credit rating score by BRI-participating economy versus construction project investment



Source: S&P, Fitch, Moody's. AAA and Aaa are given a score of 21; AA+ and Aa1 are given a score of 20, and so on, down to 1 for D and C at the junk end. Investment grade ends at BBB-/Baa3 at a score of 12.

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Potential debt issues to watch out for

Figure 6 shows the sovereign credit ratings calculated by scoring the ratings from Moody's and S&P/Fitch (the grey area) and the investment by China in construction projects for each economy. There are 17 economies with investment grade at or above BBB- with a score of at or above 12). There are 29 economies rated below investment grade and 14 with no rating at all (economies to the right of Iraq in the graph). Investment in construction infrastructure projects in these latter economies constitutes well over half of the cumulative totals since 2005: i.e. USD 253.8 billion compared to a total cumulative investment of USD 420 billion since 2005. It remains to be seen how viable these projects in below-investment-grade economies will prove to be.

Chapter 1 of OECD, 2018a discusses in detail some of the problems building up in China's financial system. These present two issues for the BRI:

- China is beginning to restrict the expansion of credit and reduce levels of indebtedness in its domestic economy, while also still having strong needs for investment in poorer regions. This is likely to mean it will run into constraints on its ability to fund more of the huge needs of BRI-participating economies. Other

large economies and multilateral institutions will need to become involved to meet the size of the gaps illustrated in section 2.

- It will be important not to waste resources by financing non-economic projects. One of the great lessons of the past is that funding to finance excessive investment that does not pay an adequate return will ultimately result in problem loans for the lenders.

Ansar et al. (2016) examine the benefit/cost ratios of Chinese investments (within China) using detailed project data. They report results on 95 transport infrastructure projects (road and rail) built in China between 1984 and 2008 and compare these to 806 transport projects built in advanced economies. Data on 24 variables are collected for each investment, including cost variables, time aspects (decision, implementation and completion), competitiveness of the procurement process, proportion of foreign exchange costs, and benefits (such as freight usage). Their findings were as follows:

- There is a tendency to underestimate project costs in China—actual costs, on average, are 30.6% higher than the final business case estimates (i.e. excluding preparation time) in real terms (removing the effects of inflation). This was particularly so in rail projects. Preliminary evidence suggests (since the size of projects could not be controlled for) that these overruns are not significantly different, statistically, compared to a rich democracies sample.
- Projects in China were found to be finished with less time overruns than in advanced economies. However, they also find that this is associated with trading off quality, safety, social equity and the environment. These are outcomes that will need to be changed in order for China to meet its stated environmental objectives for the BRI.
- With respect to benefits in traffic performance, the study finds evidence of poor resource allocation. The majority of routes have poor traffic volumes, while some have the opposite problem of extreme congestion.

The benefit/cost ratios were less than 1.0 on average, reflecting cost overruns and benefit shortfalls. The authors also compare the cost data with macroeconomic variables, and find cost overruns at the time of the study were equivalent to approximately one-third of China's debt. There is no suggestion that these findings will translate to the BRI investments. Nevertheless, they raise an issue about how best to improve efficiency and avoid any related excess indebtedness.[21]

7. High-technology corporate investments, China's technology and troubled assets

The strategy *Made in China 2025* aims to encourage Chinese technology, standards, equipment and engineering knowhow, which can also be adopted within the BRI in competition with advanced economies trying to do the same thing: i.e. to win business and lock-in future projects through sound benefit/cost outcomes. *Made in China 2025* also fits naturally with the strategy to move lower technology activities towards the Belt and Road, much as western countries have done in the post-war period.

Table 5. Selected targets for *Made in China 2025*

Selected higher value added indicators	2015	2020	2025
Manufacturing labour productivity (% change over 2015)	-	6.5	5.5
Manufacturing value added rate (% increase over 2015)	-	2	4
Penetration of broad band internet (% number of households)	50	70	82
Use of digital design in R&D (% number of firms)	58	72	84
Change in CO2 emissions versus 2015 (%)	-	-22	-40

Source: State Council of the People's Republic of China (2015).

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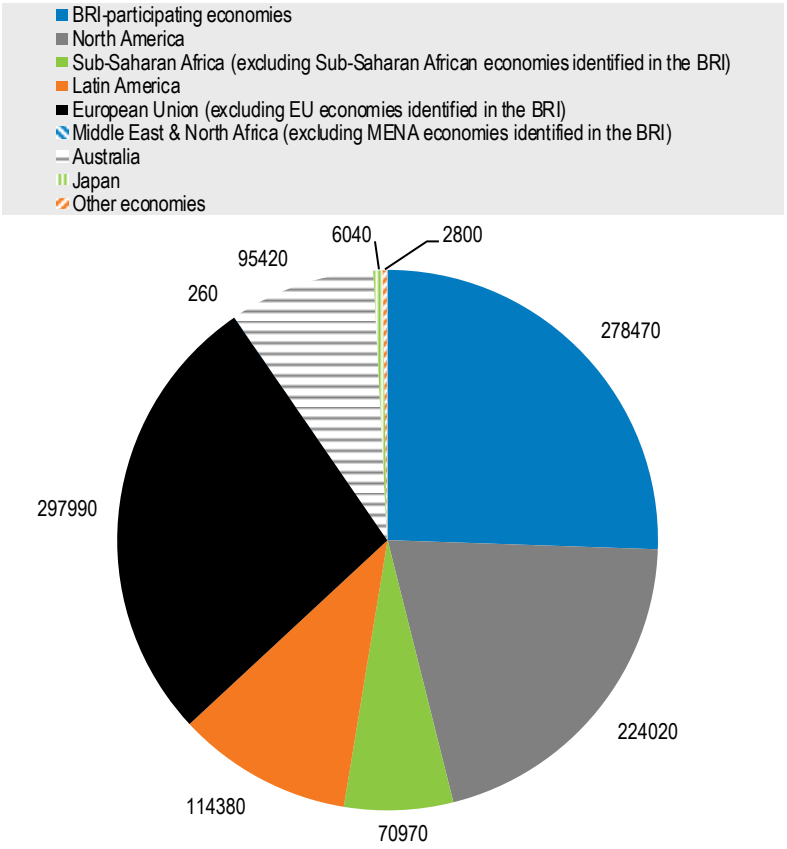
Figure 7. Chinese investment in foreign companies, cumulative notional amount expressed in USD million, 2005-2018



Note: 2018 data are to end-June.
Source: American Enterprise Institute (AEI), China Global Investment Tracker Database. It includes all investments of USD 100 million or greater. Ministry of Commerce, Republic of China (MoFCOM) data totals are around 10% higher for the same period due to the inclusion of small USD investments.

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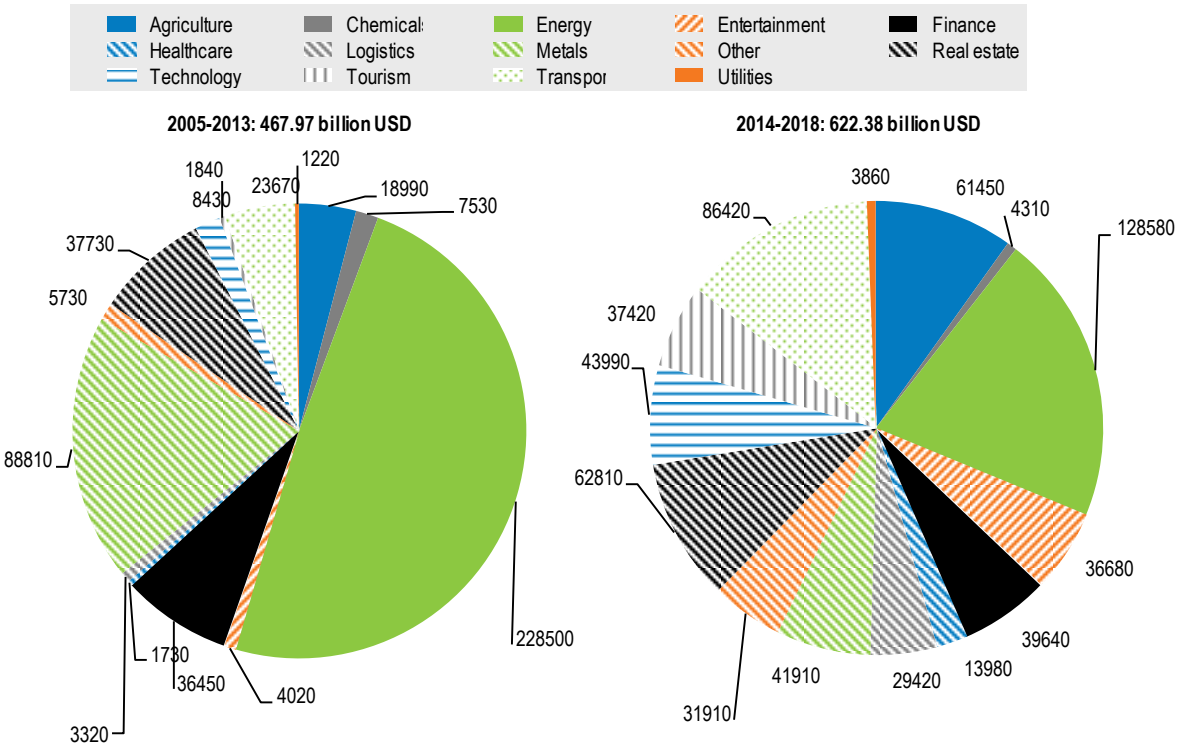
Figure 7 shows China's investment in established foreign companies, which help in goals such as upgrading industry through technology transfer. These investments sum to a total much larger than for construction projects (see Figure 6). Here the BRI-participating economies together amount to only USD 278.5 billion, or around 26% of the total of

USD 1090.3 billion. The United States, Canada and Europe, at USD 522.0 billion, together account for 48% of the total. Australia alone, at USD 95.4 billion, accounts for 9% of the total, mainly in energy, mining and agricultural companies related to China's resource, energy and food security goals.

To move up in the value added chain to 2025 and beyond, requires China to shift away from energy, heavy industry (iron, steel, non-ferrous metals, basic machinery, and traditional automobiles) and construction, towards more sophisticated industries. This is a specific objective of the 13th Five-Year Plan, which supports the *Made in China 2025* initiative and the *Internet Plus* strategy (see State Council of the People's Republic of China, 2015 and SESEC, 2015). The breakthrough industries for 2025 include: next generation IT; high-end digital control machine tools and robots; aerospace; oceanographic engineering equipment and high-technology shipping; advanced rail transportation; energy efficient and new-energy automobiles; electrical power equipment with a focus on renewables; agricultural machinery; high-performance structural metals and materials; bio-pharmaceuticals; high-performance medical equipment; and high-end equipment innovation projects. Some selected targets for *Made in China 2025* are shown in Table 5.

Figure 8. Chinese investment by sector in the global economy, cumulative notional amount expressed in USD million, 2005-2013 versus 2014-2018



Note: 2018 data are to end-June.
Source: American Enterprise Institute (AEI), China Global Investment Tracker Database. It includes all investments of USD 100 million or greater. Ministry of Commerce, Republic of China (MoFCOM) data totals are around 10% higher for the same period due to the inclusion of small investments.

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The composition of outward corporate investment has changed in recent years in line with China's changing economic priorities. Figure 8 shows the USD 1 090.4 billion foreign company investments broken down into the main industrial sectors and two sub-periods: 2005-2013, and the shorter, more recent 2014-2017 period. Prior to 2014, half of the USD 468 billion was in the energy sector and USD 88.8 billion was in metals (together around 68% of the total). Real Estate at USD 38.3 billion and Finance at USD 37.7 billion (mainly due to considerable investments in advanced-economy banks around 2008) were the third and fourth most important investments in the earlier nine-year period. In the period 2015-2018 the amount of investment is larger than in the preceding nine years, and its composition has shifted away from energy, metals and finance, towards a much more diversified set of industries. The main beneficiaries of the switch are: agriculture (seeds, agro-chemicals and processing); technology (especially robotics, medical, cloud computing, imaging and telecommunications), transport (mainly aviation, shipping, and rail); tourism; real estate; and the "other" category (including consumer goods and textiles).

While China had followed other emerging economies with a "copy and improve" approach in earlier years, this has since been replaced in large part by policies to accelerate indigenous innovation and large scale investment in human resources through training professionals overseas, and the (relatively new) programmes attracting foreign professionals, scientists, and researchers to work in China.

Indigenous innovation is pursued by promoting "global champions"; giving favourable access to capital for acquisitions in technology; by investing in joint ventures and/or buying companies in advanced economies; encouraging joint ventures; giving preferential treatment for high technology imports (while protecting local innovation); helping facilitation of lower technology and spare capacity transfer to BRI-participating economies (see People's Republic of China, 2016); and promoting Chinese technology standards within the BRI-participating economies to help open up markets for China's products (see also, Cheung et al., 2016).

Table 6 drills down to a few examples of firm-specific acquisitions, illustrating the wide range of areas covered by some of the deals in recent years: high-tech agriculture (agro-chemicals, seeds, packaging), cloud computing, aviation, mobile telephony, digital imaging, robotics, base metals, video and social games, shale gas, oil sands, hydro power, and clean energy.

Table 6. Examples of recent Chinese acquisitions and high-technology construct-and-operate projects

Sector	Year	Investor	Party Acquired	Notional amount (USD billion)	Percent of ownership
Agriculture	2017	China Reform Holdings and Chem China	Syngenta / Swiss / Agro-Chemicals / Seeds	41.2	95
	2013	Shuanghui	Smithfield Foods / United States / Pork / Packaging	7.2	100
	2012	Bright Foods	Weetabix / UK	1.94	60
Technology	2016	HNA	IngramMicro Tech / United States / Computers / Cloud	6	100
	2014	Lenovo	Motorola Mobility / United States / Mobile Telephony	2.91	100
	2015	Hua Capital and CITIC	Omnivision Technologies / United States / Digital Imaging	1.9	100
	2016	Midea	Kuka / Germany / Robotics	5.1	95
Metals	2014	Minmetals, Suzhou Guoxin, and CITIC	Glencore / Peru / Copper	6.99	63 / 22 / 15
	2014	Hebei Iron and Steel	Duferco / Switzerland / Metal Trading	0.4	51
Transport	2015	Chem China	Pirelli / Italy	7.86	52
	2017	HNA	CIT Group / United States / Aviation	10.38	100
	2015	HNA	Avolon / Ireland / Aviation	5.17	100
Entertainment	2016	Tencent	Supercall / Finland / Video Games	8.6	84
	2016	Shanghai Giant-Led Consortium	Playtika / Israel / Social Games	4.4	100
Energy	2012	CNOOC	Nexen / Canada / Oil Sands / Shale Gas	15.1	100
	2015	China General Nuclear	Edra / Malaysia / Clean Energy	5.96	100
	2015	Three Gorges	Pakistan Karot Hydropower	2	100

Source: American Enterprise Institute (AEI), Investment Tracker, all investments of USD 100 million or greater. MoFCOM data totals are around 10% higher for the same period due to the inclusion of small investments.

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Promoting Chinese technical standards and services

The sheer scale of Chinese activity abroad puts it in a very strong position to establish its technical standards as "global defaults" in a number of fields. This is a strategy that many countries before China have also pursued for business reasons. One example includes ultra-high voltage (UHV) power lines, where China's indigenous technology programme has put it in a global leadership position. Scale is important, and the State Grid Corporation of China is establishing UHV standards throughout China and is in a solid position to allow Chinese companies operating within and outside of China to include national preferences in international UHV standards (see Paulson Institute, 2015).

Other examples of potential to promote Chinese standards and services can be found in aspects of the Digital Belt and Road. This is an attempt to harness 'big data' to tackle and solve some of the sustainable development challenges facing the planet. Smart buildings, smart electricity grids, and smart transport logistics would, if successful, help to reduce greenhouse gas emissions and water needs in BRI-participating economies.[22] Co-operation in respect to common standards for telecommunications, infrastructure for the 'internet of things' and e-commerce provides significant opportunities for Chinese multinationals. Examples include rolling out optical fibre built in China and Russia, the Beidou satellite program which is a competitor to GPS (currently being trialled in Pakistan), and the e-commerce push in the BRI-participating economies by Alibaba and JD.com, which may allow less developed economies to jump some of the need for more supermarket chains and shopping malls (see Brown, 2017).

China Telecom Corporation, China Mobile and China Unicom are investing and working with equipment providers like Huawei and ZTE in the 5G area where the race is on to push for standards that suit network objectives (see, for example, Forbes, 2018). 5G will be a key driver of the internet of things, autonomous vehicle operations, drones, smart cities and other major trends. The standards for each generation are set by those with the required intellectual property rights and network market share. China (unlike for previous generations of mobile telephony) is vying with the United States, Korea and Europe for 5G leadership status. 5G has two key aspects: millimetre wave band (that above 24 gigahertz); and Massive-Multiple-In-Multiple-Out (MMIMO), whereby hundreds of antennas and receivers can operate from one base station instead of the current few. China is well placed in trialing 5G and Huawei is now the largest producer of mobile phone equipment in the world.

Promoting Chinese energy solution technologies

The BRI requires energy, and there is little doubt that China is leading the world in many energy technology areas, notably: ultra-high voltage lines (discussed above), solar power cells where it controls 60% of production; advanced wind power; hydroelectric developments; and batteries, where it is expected to dwarf companies like Tesla by 2020, and particularly as it becomes dominant in cobalt mining where it controls around 62% of world production (see Buckley et al., 2017). For the BRI, power grid transmission technology is a key element, linking up multiple sources of energy (coal, gas, hydro, wind and solar) across the region.

Table 7. China energy development projects in 2017

Entity	Notional amount (USD billion)	Projects 2017	Country
China Three Gorges	6	Karot Hydro (USD 2 billion) / two Hydro Corporations / 3 Solar Projects	Pakistan
China Genzhouba / China Power	5.8	3GW Mambilla Hydro Development	Nigeria
CK Infrastructure (consortium)	5.3	Acquisitions of Ista Energy Solutions (Meters/Management)	Germany
Shanghai Electric (with ACWA Power)	3.9	Construct 700 Mega Watt CSP Solar in Dubai	United Arab Emirates
China Energy Investment Corporation	3.5	75% Stake in 4 Greek Wind Farms	Greece
SCIG / CXIG / QYEC	3	1 Giga Watt Hydro Project Developments	Nepal
State Power Investment Corporation	2.4	Sao Simao Hydroelectric Project	Brazil
China Genzhouba Group	1.8	Suki Kinari 870 Mega Watt Hydro Project	Pakistan
China Three Gorges	1.6	West Seti Hydro 750 Mega Watt Hydro Project Development	Nepal
State Grid Corporation	1.5	Matiari to Lahore Power Transmission Line	Pakistan
State Grid Corporation	1.5	Matiari (Port Qasim) to Falsalabad Transmission Line	Pakistan
SANY Group	1.5	Wind Energy Developements in Punjab	Pakistan
China Three Gorges / Hubel Energy	1.4	Purchase of 456 Mega Watt Chagila Hydro project	Peru
Pacific Hydro (SPIC)	1.3	Houghton Solar Farm in Queensland Australia	Australia
Power China	1	EPC for 500 Mega Watt AWA Pumped Hydro and Storage Project	Philippines
State Grid Corporation	1	2nd Phase of Egypt Transmission Development	Egypt
Shanghai Electric	1	Takeover of Rio Grande Do Sul Transmission project	Brazil
CIC Capital	0.5-1.0	10-20% of Equis Energy (Solar/Wind)	Singapore
Total, 38% Year-on-Year Growth	44.3		

Note: CK (Chueng Kong) Infrastructure is based in Hong Kong (China) and is the world's largest infrastructure company. ACWA Power is a huge developer, investor, operator and co-owner all over the BRI-participating economies. SCIG is Sichuan Communications Investment Group, a logistics company. CXIG is Chengdu Xincheng Investment Group. QYEC is Qing Yuan Engineering Consulting Company. SPIC is State Power Investment Corporation. CIC is China Investment Corporation, a sovereign wealth fund.
Source: Buckley *et al*. (2017), Company reports, OECD.

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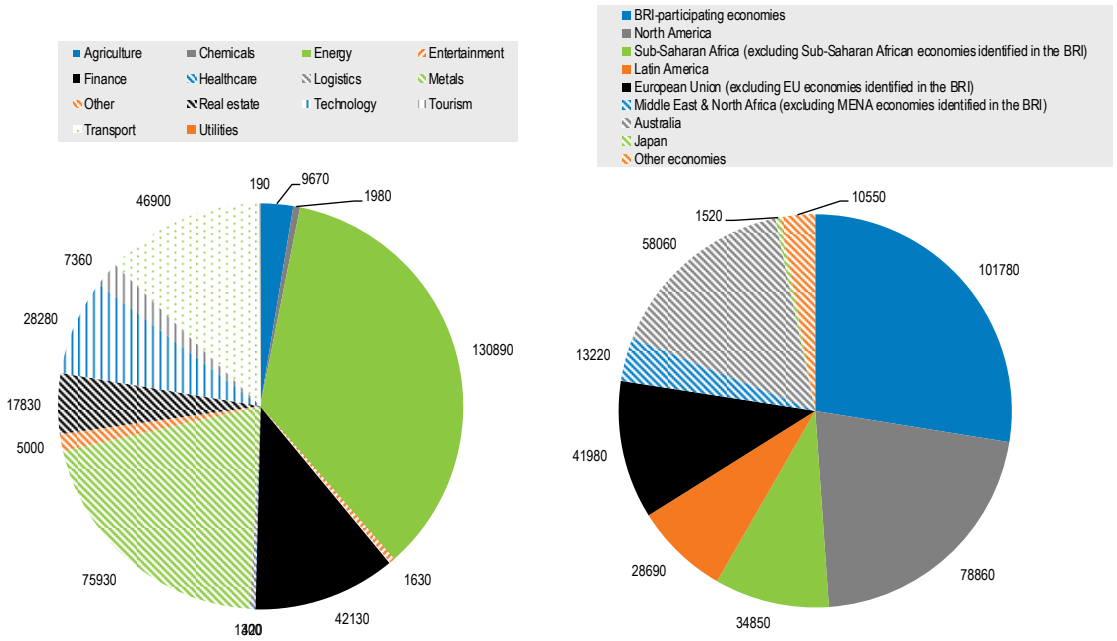
Thus, for example, the Karot Hydropower Co. special purpose vehicle (operating in the China-Pakistan economic corridor) is putting together a large-scale hydro project in Pakistan on a build-own-operate-transfer basis. The project, estimated to cost USD 2 billion, is being developed by the China Three Gorges South Asia Investment Limited, which is an investment arm of China Three Gorges Corporation (CTG) in South Asia (a wholly state-owned enterprise). China Machine Engineering Co. is a part of the project. This 720-MW high technology project will be built by 2020. The company has received a 35-year concession to run the station (including the five-year build phase). State Grid is playing a large role in developing power transmission in the BRI (USD 4 billion in projects in Table 7 for 2017) and is planning an ambitious, transcontinental, "super-grid" that would link China, Japan, Mongolia, Russia and Korea.

Building these projects and linking them up requires more than construction. The table also shows that China is buying into smart metering companies and energy management skills and high-technology energy companies in advanced economies.

Figure 9. Troubled assets related to past BRI/SOE corporate investments, cumulative notional amount expressed USD million over the period 2005-2018



Note: 2018 data are to end-June.
Source: American Enterprise Institute (AEI), China Global Investment Tracker Database. All investments of USD 100 million or greater are included. Ministry of Commerce, Republic of China (MoFCOM) data totals are around 10% higher for the same period due to the inclusion of small investments.

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Potential investment issues to watch out for

BRI investment projects have to be debt funded, often in difficult business environments, and financial difficulties can result. The risks that come with the BRI are already becoming apparent. Figure 9 shows the cumulative value of assets described as "troubled" since 2005, where: the collateral value of the investment is below its liabilities; where loans are not performing (due to benefit/cost outcome discussed above); where the deal has been cancelled for delays in reviews or political opposition, and so on. Troubled programmes are estimated to be associated with around USD 369.5 billion worth of transactions globally. The largest problem area concerns the BRI with USD 101.8 billion of troubled assets.

The BRI includes economies in less stable parts of the world, where deals get into trouble because of political violence, war, sanctions (e.g. those against Iran) and excessive dependence on single commodities such as oil and gas which are subject to price volatility.

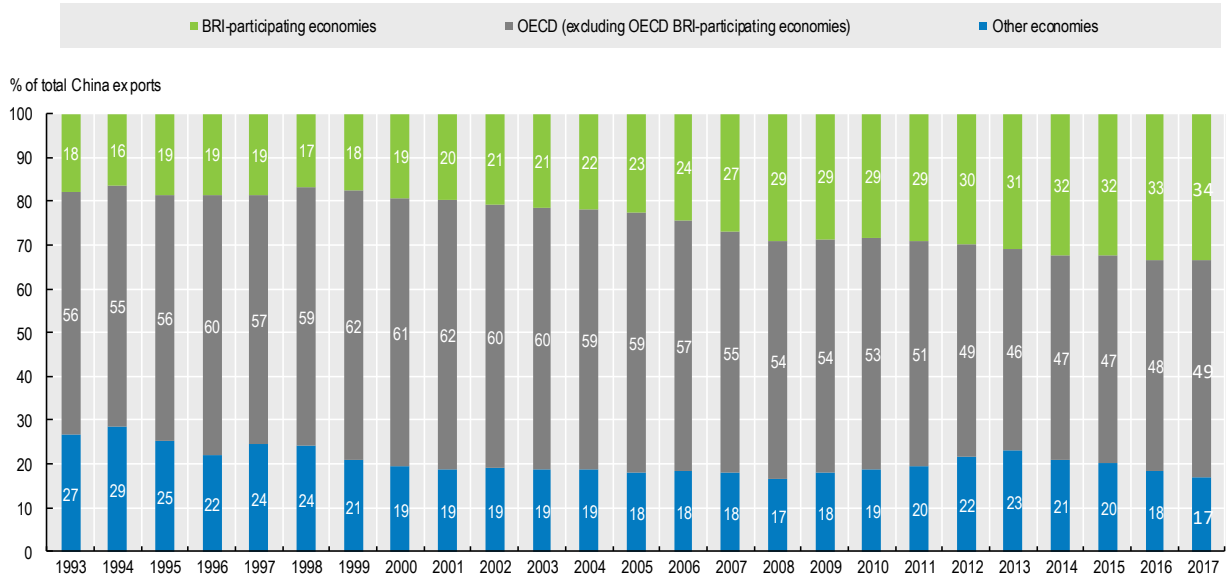
For example, in Iran alone Chinese SOEs are associated with USD 25 billion of troubled energy projects (CNOOC, CNPC and Sinohydro). There are USD 12 billion of troubled

real estate and rail construction projects in Libya, USD 4.6 billion energy projects in Pakistan and USD 3.8 billion of oil projects in Syria. The next most problematic regions for Chinese SOEs are North America and Australia.

In the left-hand panel of Figure 9, the main sectors where troubled assets are found globally are energy, metals, transport, finance and technology. Some of the issues that might help China reduce risk in this area are taken up in Chapter 3 of OECD, 2018a.

8. The BRI as a platform for promoting trade

Figure 10. Chinese exports to BRI-participating economies versus OECD countries, 1993-2017



Source: IMF Direction of Trade Statistic Database, OECD calculations.

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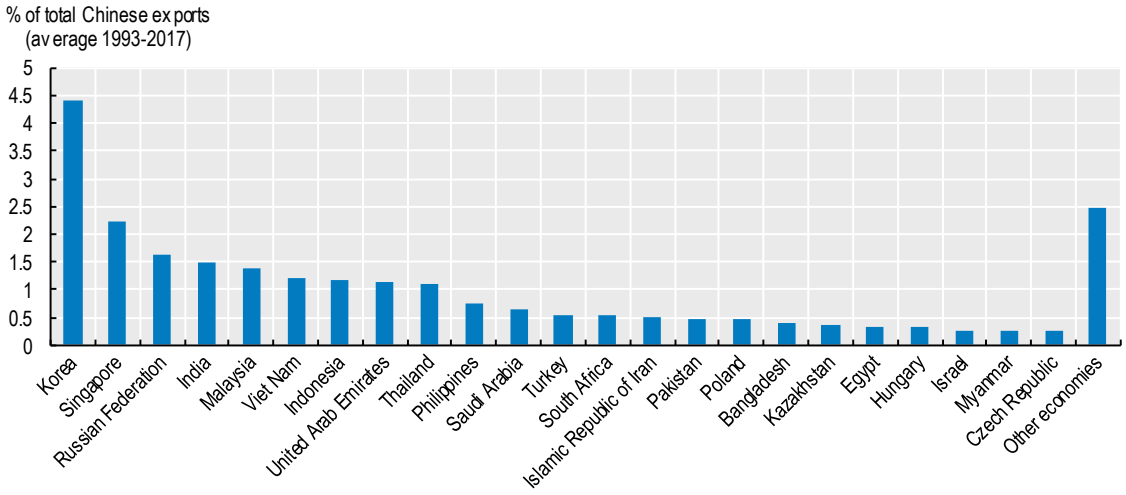
Figure 10 shows the share of Chinese exports going to BRI-participating economies, OECD countries and the group of all other economies. In 2000, exports to the OECD as a share of Chinese exports were around 61% while, for the BRI-participating economies, it was 19%. Subsequently, the trend in the share of BRI-participating economies has been continually upwards, reaching 34% in 2016, while that for the OECD declined gradually to around 49%.[23] This suggests that further progress in the region could have significant benefits for BRI-participating countries.

The main destination BRI-participating economies (as a share of Chinese exports) are shown in Figure 11. Consistent with gravity theories of trade, the larger shares are associated with larger, closer and/or richer economies in the group.

Figure 11. Percentage of Chinese exports to selected BRI-participating economies, 1993-2017



Source: IMF Direction of Trade Statistics Database, OECD calculations.

StatLink http://dx.doi.org/10.1787/888933786496

Trade blocs and regional trade agreements

In the earlier discussion, it was pointed out that creating and improving free trade blocks along the Belt and Road is an explicit objective of the BRI. It is important to stress the BRI is not a trading bloc as such. However, it does contain within it a number of trading blocs and these interact with the EU and NAFTA blocs. Some part of the success of the BRI strategy will ultimately turn on the 'connectivity' dividends of China's infrastructure investment for facilitating commerce between these blocs and with other countries generally. Some very preliminary evidence is set out based on a *gravity model* of bilateral trade and explained in Annex A. The dependent variable (X_{ijt}) is the exports from origin country i to destination country j at time t, so that there is a large sample of every country's exports to all of the others. The sample is split into two: (i) for exports that originate from countries that are linked to the BRI (to each bilateral pair of every other country in the sample), and (ii) for where the bilateral export origin is from an OECD country (to each bilateral pair of every other country).

It uses a full complement of variables, including: relative size (the *similarity* index based on GDP); bilateral exchange rates; relative factor endowments; presence of a common language; investment openness (infrastructure investment builds connectivity and investing in distribution and joint ventures helps exports); physical distance between the trade partners; presence of common borders; presence of political instability; and whether the partner was a former colony. The gravity model works well, though a few variables are not well-supported by the data (mainly in the case of BRI export origin economies). The reason for developing this model is to explore where linkages are strongest and weakest and where the most advantages might be obtained via connectivity improvements. There are two types of influences tested simultaneously:

- One set of dummy variables (RTA_I and RTA_O in Annex A) allow precisely for each bilateral pair to be a member of the same bloc, or one is a member and the other is not. These variables deal with trade creation and diversion for insiders

versus outsiders. Presumably if two countries belong to the same bloc then more trade should be created (a positive coefficient is expected) (see Ekanayake et al., 2010). If one country belongs to a regional trade agreement and the other does not, trade might be diverted between the two, offsetting the gains from trade creation, so the expected sign on the coefficient is negative.

- Having allowed for trade creation and diversion, the regional dummy variables for explicit trading blocs (like NAFTA, ASEAN+1, and the Bangkok Agreement) should be interpreted as the extra-bloc exports and imports effect. The idea is that being a member of a group might create synergies in supply chains and income effects that are positive for exports and imports versus non-members.

The trading blocs considered are:

- The Association of Southeast Asian Nations (ASEAN) and China Free Trade Area (ASEAN+1): Brunei-Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam and China.
- The Bangkok Agreement (BA): Bangladesh, China, Lao People's Democratic Republic, India, Korea, and Sri Lanka.
- The Economic Co-operation Organisation (ECO): Afghanistan, Azerbaijan, Iran, Kazakhstan, Kyrgyz Republic, Pakistan, Tajikistan, Turkey, Turkmenistan, and Uzbekistan.
- The South Asian Association of Regional Co-operation (SAARC): Bangladesh, India, Pakistan, Maldives, Nepal and Sri Lanka.
- The European Union (EU): 28 members of the union.
- The North American Free Trade Association (NAFTA): the United States, Canada and Mexico.

The results suggest that trade creation is definitely present for OECD-origin countries and less so in BRI-origin countries. The results for trade diversion suggest that it is not generally present in the data. That is, being a member of a bloc while a bilateral partner is not in that bloc, has no discernible impact on exports and imports between the two, a finding consistent with others using more recent trade data.[24] The finding for trade creation is not surprising if we take into account that infrastructure connectivity is currently weak in the Belt and Road. This underlines the importance of improving connectivity in the BRI. The whole point of the BRI is to reduce this source of weakness via infrastructure investment which, if successful, will improve connectivity over time. The results here are suggestive of significant dividends deriving from an improvement in connectivity.

Having allowed for member trade creation (with little diversion for non-members) does the existence of a trade bloc create extra-bloc benefits? The theory here is that the bloc creates income effects and interconnections that benefit all other countries outside of the bloc. If there are additional benefits from the bloc, then the sign should be positive. The results for these tests are as follows:

- For groupings where China is a member (ASEAN+1 and the BA), the regional membership is positive and statistically significant. That is, it benefits non-members, whether they are OECD countries or BRI-participating economies.

- For the ECO bloc, the results are opposite between the OECD-origin countries and BRI-origin economies. OECD-origin countries benefit in a statistically significant way, while the effect for BRI-participating economies is clearly negative.
- For SAARC-origin countries the relationship is negative and highly significant for OECD-origin countries and neutral with respect to the BRI.
- The extra-bloc effects of NAFTA are good for all countries regardless of origin (and especially so for the BRI-origin economy's exports).

In summary, the most important results are that both China and the United States are very important partners to have in free trade zones. While free trade zones that do not involve these countries are less positive, the important point to note is that China's BRI is precisely focused on changing this via connectivity investment. These results are suggestive only, but it appears that connectivity is stronger in some parts of the world than others, and it makes a lot of sense to invest in infrastructure where it is lacking to strengthen trade linkages for these countries.

As Chapter 1 of OECD, 2018a mentions, the 19th Party Congress endorsed greater openness and more use of the CNY in international transactions. The BRI provides a good opportunity to further the internationalisation of the CNY, and in this respect the People's Bank of China has announced a number of currency reforms specifically targeted at facilitating the Initiative. These relate to permitting cross-border settlement in CNY resulting from: enterprises investing and exporting; Chinese workers receiving salaries and making social security and family payments; and foreign investors in the BRI being able to receive dividends and related payments.[25]

9. Concluding comments

China has driven strong growth at home and has shown itself prepared to put money into projects on a large-scale basis to develop infrastructure trade and other aspects of connectivity in the BRI. The BRI is affecting the global trade, investment and finance landscape in significant ways:

1. **Investment**: From China's perspective, the strategy to develop markets for its products via hardware connectivity in the BRI, while investing in technology transfer to move quickly up the value-added chain, fits in with the need to alleviate industrial excess capacity at home in the short term, and in the longer run to create a global platform that will facilitate trade and investment with the countries involved in the Initiative, with China playing a central role. Like China, many BRI-participating economies see benefits in a strong role for the state and commercial relationships in line with the Bandung principles.[26]

   An important part of the hardware-first strategy is connectivity in energy supplies and electricity grids along the Belt and Road. There are multiple sources of energy across the BRI, and how best to link these up and price them is also an important issue. China has leadership in ultra-high voltage lines. China is also well advanced in 5G broadband that is expected to play an important role in the use of big data and in the development of smart grids and cities, remote transport and other projects. Nevertheless, other countries also have a large role to play in these areas and openness in procurement practices may

be useful for achieving the lowest-cost outcomes, as may a general strengthening of the investment environment (Ang et al., 2017).

2. **Trade**: Some very preliminary evidence was presented in this chapter on trade, distinguishing trade creation effects within a trade bloc from extra-bloc effects for other countries resulting from any positive flow-on income and other effects. Trade creation is greater in regions where connectivity is likely to be less problematic, and extra-bloc effects on exports and imports for BRI-participating economies are strong when they originate from trade blocs where either China or the United States are members. This underlines the need for investment that promotes greater connectivity and China's role in the BRI is especially important given the gravity effects of its economy.

3. **Finance**: China alone cannot fund all of the infrastructure needs of developing Asia; these needs are very large and China faces its own financial constraints at home (see Chapter 1 of OECD, 2018a). This means that there is a need for more effort by OECD countries to engage with those of the BRI and vice versa. The future of all economies is improved when well-being rises around the world. This requires a sound investment environment to attract the capital required and to ensure that host countries get the best value for money.

4. **Co-operation**: the OECD is in a sound position to help countries to improve their investment environments. As living standards rise, history teaches that the role of markets becomes more important in allocation decisions. Property rights, competition, level playing fields, and sound governance based on voice and accountability have helped to manage the transition. This is likely to become necessary in BRI-participating economies too, and moving in this direction will encourage more funding from advanced economies and multilateral lending institutions. The OECD has a number of regional initiatives under way that are proving fruitful. The Central Asia Competitiveness Initiative (which is part of the OECD Eurasia Competitiveness Programme) aims to help countries to enhance productivity by supporting entrepreneurship, private sector development, inclusiveness and the building of suitable knowledge-based economies. The OECD South-East Asia Regional programme also works to achieve similar goals. Countries work with OECD Committees covering a number of areas such as corporate governance, foreign direct investment, competition, bribery and corruption, pensions, the environment, social policies and taxation. Some of these issues are taken up in Chapter 3 of OECD, 2018a.

Notes

[1] This is the term used by President Xi in his Belt and Road speech.

[2] Leading Groups are coordinating bodies that address important policy areas. Often led by members of the Politburo or State Councils, they help to ensure strategic coordination from Beijing.

[3] This figure is the most often quoted from an adding up of projects already invested and foreshadowed for the next 10 years, using their own staff and expert consultants—see www.pwc.com/gx/en/growth-markets-center/assets/pdf/china-new-silk-route.pdf. In this study, the figure seems in the right ballpark, based on actual investment from the start of the BRI and multiple references to a large number of foreshadowed projects.

[4] See: www.cikd.org/cikd/English_Version/E_AboutUS_CIKD.aspx?leafid=1324&chnid=374&acid=1.

[5] The goal is: "Keeping in mind both the domestic and international situations, China will implement the comprehensive strategy of building a moderately prosperous society in all respects, deepening reform, advancing the law-based governance of China, and strengthening Party self-conduct, seeking coordinated development in the economic, political, cultural, social and ecological fields as well as Party building under the guidance of the development concept featuring innovative, coordinated, green, open and shared development" (Chinese Government, 2016, page 7). The relevant departments of the Chinese government have also issued the following documents: Building the Belt and Road: Concept, Practice and China's Contribution, Vision and Actions on Promoting Energy Cooperation on the Belt and Road, Vision and Actions on Jointly Promoting Agricultural Cooperation on the Belt and Road, Guidance on Promoting Green Belt and Road and Vision for Maritime Cooperation on the Belt and Road Initiative. The Green Belt and Road can be traced back to 2012, when China's green credit guidelines were published. A full list of official documents can be found at: eng.yidaiyilu.gov.cn/info/iList.jsp?cat_id=10059.

[6] The United States has expressed concern in this area on a number of occasions. See The White House (2018) and references therein.

[7] The GI Hub estimate of USD 94 trillion is cumulative until 2040, making 50% of this number comparable to a 2030 estimate of around USD 28 trillion for Asia's infrastructure needs.

[8] Older estimates by Bhattacharyay (2010) quantify annual infrastructure investment needs for developing Asia at 6.52% of its GDP (USD 776 billion) for the period between 2010 and 2020.

[9] When excluding China from these calculations, the investment gap rises to 5% of projected GDP for the remaining economies (ADB, 2017).

[10] It is also worth noting that maintenance and rehabilitation investments account for a larger share of projected investment needs than actual new investments (ADB, 2017).

[11] See http://english.gov.cn/archive/publications/2015/03/30/content_281475080249035.htm.

[12] See Johnson (2016) and Paal (2013). Paal analyses the Peripheral Diplomacy Week Conference of October 2013, which saw the end to Deng's *'hide your strength and bide your time'* approach. See also Cai (2017) for the economic aspects of BRI objectives.

[13] From Chapter 2, section 2, of the 13th Five Year Plan.

[14] See, for example, Patil (2015). India lies between two countries with which it has fought wars in the last 60 years and mistrusts the strategic objectives of the BRI. It has repeatedly asked that the BRI project be designed with India's participation as an equal partner.

[15] See, for example, www.mining.com/chinese-companies-build-700-coal-plants-outside-china/ where it is reported that the environmental group Urgewald has documented that China will build 700 new coal fired power plants inside and outside China.

[16] See IMF (2017). According to the IMF, the Chinese government defines 'zombie companies' as "firms that incur three years of losses, cannot meet environmental and technological standards, do not align with national industrial policies, and rely heavily on government or bank support to survive." The IMF also focuses on over-capacity sectors and suggests measures to deal with this are not ambitious, and the debt in overcapacity sectors has not fallen (see IMF, 2017, pp 23-27). See also Girma et al. (2008) for a subsidies study. Problems with exit issues are well known and recent attempts to improve them are reported in www.ft.com/content/35fa6886-fcc9-11e6-96f8-3700c5664d30.

[17] The non-SOE sector measure, as defined, sits just under that of the SOE sector in China. SOEs may still be underperforming given their subsidisation and subsequent lower cost of debts. Globally, the steel and shipbuilding industries are a useful illustration of these issues, where internal OECD reports have shown they are still dominated by state firms globally and that closures in state enterprises proceed at a much slower rate than private firms in these industries around the world, even though they are less profitable.

[18] See www.reuters.com/article/duferco-ma-hebei-ir-st/china-steel-company-takes-controlling-stake-in-swiss-trader-duferco-idUSL6N0T83BM20141118; www.chinadaily.com.cn/business/2014-11/19/content_18938457.htm; and www.metalbulletin.com/Article/3312695/Delong-enters-joint-venture-for-600000-tpy-flat-steel-mill-in-Thailand.html.

[19] It is said to be tracking some 900 projects in 60 economies to a total of USD 890 billion, as was cited in the 21st Century Business Herald, 20 May 2015.

[20] And the government has pledged even more funds, see www.reuters.com/article/us-china-silkroad-africa/china-pledges-124-billion-for-new-silk-road-as-champion-of-globalization-idUSKBN18A02I.

[21] One issue here concerns bidding for BRI contracts. This often tends to occur outside of the WTO General Procurement Agreement and 'rules of the game' common in OECD countries.

[22] See, for example, www.xinhuanet.com/english/2017-12/04/c_136797807.htm.

[23] It is worth recalling that China is now the largest merchandise exporter in the world with a share of over 14%.

[24] Structural change in world trade where global value chain interactions at all points in the supply chain have become more important in recent data so that, regardless of source, the effect may trump treaty effects. Thus, Ekanayake et al., (2010) find evidence of trade diversion in a gravity model for sample periods 1980-2009, 1980-1989, 1990-1999, but not for the recent period closest to our own 2000-2009.

[25] See: www.pbc.gov.cn/english/130721/3459067/index.html.

[26] In response to retreating colonial powers, at the 1955 Bandung Conference principles consistent with the non-aligned movement were enunciated: self-determination, mutual respect for sovereignty, non-aggression, non-interference in internal affairs and equality.

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Annex A. Trade Gravity Model

The econometric analysis uses a Poisson model proposed by Santos Silva and Teneyro (2006). Santos Silva and Teneyro (2006) showed that a linear estimation of the log-linearised gravity equation is valid only with a specific assumption on the distribution of the residuals. This specific assumption does not necessarily hold in practice. In particular, estimates can be biased in the presence of heteroskedasticity. In addition, the Poisson model makes it possible to take into account cases where the dependent variable is equal to zero. For these reasons, the following model[1] is estimated in this paper using a Poisson pseudo-maximum likelihood (PPML) estimator:

$$X_{ijt} = \beta_0 + \beta_1 RTA\_I + \beta_2 RTA\_O + \beta_3 ASEAN_j + \beta_4 BA_j + \beta_5 ECO_j + \beta_6 SAARC_j + \beta_7 NAFTA_j + \beta_8 EU_j + \sum_{k=1}^{K} \beta_k Z_{j,t-1} + \sum_{g=1}^{G} \beta_g Z_{ij,t-1} + u_{it} + v_{jt} + \varepsilon_{ijt}$$

Time-varying origin country (u_{it}) and destination country (v_{jt}) dummies are included in the model. Such time-varying fixed effects capture influences such as the stringency of regulation, policy settings that can change over time (e.g. taxation) and of other country-specific developments (e.g. exchange rate changes, local financial market developments). The standard errors are clustered by country-pair because there can be a high persistence of the level of exports within each country pair over time.

The dependent variable (X_{ijt}) is the exports from origin country i to destination country j at time t. The bilateral export data are from the OECD Bilateral Trade in Goods Database. Data for GDP in millions of US dollars are taken from the International Monetary Fund's (IMF) World Economic Outlook. Data for trade openness indicator are taken from the Chinn-Ito website (http://web.pdx.edu/~ito/Chinn-Ito_website.htm). The political instability variable is taken from the World Bank's Worldwide Governance Indicators database (www.govindicators.org). The exchange rate data are from the IMF database. Data on distance, colonial past, common language, contiguity are taken from the CEPII GeoDist database (http://www.cepii.fr). The sample is based on an unbalanced panel dataset of annual data on 52 origin economies and 141 destination economies over the period 1997 to 2014.

The dummy RTA_I measures the degree of trade-creation effects of the regional trade agreement between members, while the dummy RTA_O captures the degree of trade-diverting effects between members and non-members, compared to "normal" bilateral trade flows.

The relative factor endowment variable (RFE) is defined as the absolute value of the difference between natural logarithm of per capita GDPs between country i and country j. The choice of this variable as an explanatory variable is based on the standard comparative advantage explanation of trade. This variable aims to capture technology differences between countries in explaining trade patterns. Though this variable is generally measured as the absolute value of the difference between natural logarithm of capital-labour ratio, due to the unavailability of that data, per capita GDP is used in place of capital-labour ratios. Thus, relative factor endowment is defined as:

$$RFE_{ijt} = |lnPGDP_{it} - lnPGDP_{jt}|$$

The similarity index (SIM) is defined as:

$$SIM_{ijt} = ln\left[1 - \left(\frac{GDP_{it}}{GDP_{it} + GDP_{jt}}\right)^2 - \left(\frac{GDP_{jt}}{GDP_{it} + GDP_{jt}}\right)^2\right]$$

Similarity with respect to GDP per capita implies increased similarity in size of country-specific product diversity in the differentiated goods sector and that leads to an increased trade volume.

The natural logarithm of Chinn-Ito financial openness indicator of country (FIOP) is an indicator of capital account openness in the destination country. The index was initially introduced in Chinn and Ito (2006). It is the natural logarithm of normalised Chinn-Ito index. Investment openness influences trade (export linked investment in distribution, infrastructure connectivity, etc.).

The World Bank political instability (PI) indicator of destination country j measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. The indicator has a spread of -2.5 (high political instability) to 2.5 (low political instability). It is rescaled to facilitate the interpretation of the results by deducting it from 2.5 so that a higher number represents higher political instability.

Note

[1] This model has benefited greatly from discussions with the OECD Trade Directorate.

Annex Table 1. Gravity model for trade, and the effect of free trade zones

Mnemonic	Variable definition	BRI origin countries	OECD origin countries
RBER	Natural logarithm of real bilateral exchange rate	0.197***	0.245***
		(6.04)	(13.21)
FIOP	Natural logarithm of Chinn-Ito financial openess indicator of country j	2.097***	2.339***
		(5.62)	(12.82)
SIM	Similarity index between country i and country j	-0.01	0.0590*
		(-0.18)	(1.95)
RFE	Relative factor endowment between country i and country j	0.02	0.034
		(0.52)	(0.79)
DIST	Natural logarithm of distance between country i and country j	-0.938***	-0.823***
		(-16.33)	(-19.22)
BORDER	Dummy variable equals 1 if countries i and j share a contiguous border and zero otherwise	0.212*	0.313***
		(1.95)	(4.45)
LANG	Dummy variable equals 1 if countries i and j share a common language	0.191	0.194**
		(1.58)	(2.37)
COLONY	Dummy variable equals 1 if country j is a former colony of country i or if the two countries share a common colonial linkage and zero otherwise	0.057	-0.042
		(0.26)	(-0.43)
PI	World Bank political instability indicator of country j	0.136	0.146**
		(1.10)	(2.00)
RTA_I	Dummy variable equals 1 if countries i and j belong to the same regional trade agreement and zero otherwise	-0.235	0.383**
		(-1.57)	(2.28)
RTA_O	Dummy variable equals 1 if country i belong to a regional trade agreement and country j does not, or vice versa and zero otherwise	-0.156	0.05
		(-1.35)	(0.43)
ASEAN	Dummy variable equals 1 if country j is a member of the Association of Southeast Asian Nations and zero otherwise	3.678***	3.069***
		(12.79)	(10.86)
BA	Dummy variable equals 1 if country j is a member of the Bangkok Agreement and zero otherwise	1.126***	2.545***
		(3.67)	(10.25)
ECO	Dummy variable equals 1 if country j is a member of the Economic Co-operation Organization and zero otherwise	-1.040***	1.537***
		(-2.69)	(5.89)
SAARC	Dummy variable equals 1 if country j is a member of the South Asia Association for Regional Cooperation and zero otherwise	-0.265	-2.177***
		(-0.67)	(-8.90)
NAFTA	Dummy variable equals 1 if country j is a member of the NAFTA trade agreement and zero otherwise	5.095***	3.242***
		(14.04)	(10.33)
EU	Dummy variable equals 1 if country j is a member of the European Union and zero otherwise	1.523***	0.461
		(3.76)	(1.40)
C	Constant	7.175***	10.75***
		(6.78)	(21.51)
	Observations	49529	77983

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Standard errors adjusted for country-pair clusters are in parentheses.

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Annex B. List of economies by group

Two groups of economies are defined following the IMF country group classification: advanced economies and emerging and developing economies.

Advanced economies

Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong (China), Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Macau, China, Malta, Netherlands, New Zealand, Norway, Portugal, Puerto Rico, San Marino, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Chinese Taipei.

Emerging and developing economies

Afghanistan, Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Azerbaijan, Bahamas , Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bhutan, Plurinational State of Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Democratic Republic of the Congo, Republic of the Congo , Costa Rica, Côte d'Ivoire, Croatia, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Islamic Republic of Iran, Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kosovo, Kuwait, Kyrgyzstan, Lao People's Democratic Republic, Lebanon, Lesotho, Liberia, Libya, Former Yugoslav Republic of Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Marshall Islands, Mauritania, Mauritius, Mexico, Federated States of Micronesia, Republic of Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Qatar, Romania, Russian Federation, Rwanda, Samoa, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Solomon Islands, Somalia, South Africa, South Sudan, Sri Lanka, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sudan, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, United Republic of Tanzania, Thailand, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, United Arab Emirates, Uruguay, Uzbekistan, Vanuatu, Bolivarian Republic of Venezuela, Viet Nam, Yemen.

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China's Belt and Road Initiative (BRI) development strategy aims to build connectivity and co-operation across six main economic corridors encompassing China and: Mongolia and Russia; Eurasian countries; Central and West Asia; Pakistan; other countries of the Indian sub-continent; and Indochina. Asia needs USD 26 trillion in infrastructure investment to 2030 and China can certainly help to provide some of this. Its investments, by building infrastructure, have positive impacts on countries involved. Mutual benefit is a feature of the BRI which will also help to develop markets for China's products in the long term and to alleviate industrial excess capacity in the short term. The BRI prioritises hardware (infrastructure) and funding first.

This report explores and quantifies parts of the BRI strategy, the impact on other BRI-participating economies and some of the implications for OECD countries.

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