

ORIGINAL ARTICLE

Development beyond aid: Utilizing comparative advantage in the Belt and Road Initiative to achieve win-win

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ABSTRACT

Against the backdrop of anti-globalization rhetoric, this paper summarizes our joint book entitled *Going Beyond Aid* (Lin and Wang, 2017a) and discusses the prospects for development finance in the broad context of Belt and Road Initiative (BRI). Based on the New Structural Economics (Lin, 2010; 2011), here we focus on China's demonstrated comparative advantages in infrastructure, *e.g.* in hydropower and high-speed railways (HSR). In addition, long-term orientation (LTO) and patient capital are latent comparative advantages that many Asian economies possess, and are critical for the Belt and Road Initiative. Only if these comparative advantages are utilized can these economies cooperate to potentially achieve win-win.

Keywords: *infrastructure; comparative advantage; developing financing*

1. Introduction

Despite the tranquility of the world economy in the early part of 2017, economic uncertainty is looming large, due in part to the United Kingdom's impending "hard" Brexit from the European Union and US President Donald Trump's anti-globalization policies. Having lost confidence in the Washington Consensus and the Neoliberalism,¹ developing countries are increasingly looking East for experiences and ideas—for what has worked, why, and how.

Chinese leaders, grounding on China's 37 years of economic success, proposed a grand vision: "The Silk Road Economic Belt and the 21st Century Maritime Silk Road" (the Belt and Road Initiative, in short). It focuses on connectivity, infrastructure development, and structural transformation. The Belt and Road Initiative (BRI) has been welcomed by over 60 countries, with 29 head of states attended, and 100 countries represented, the BRI Summit held in Beijing on May 14–15, 2017.

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1. On Neoliberalism, see for example, Ostry *et al.* 2016 "Neoliberalism: Oversold?" *Finance and Development*, June: 38-41.

What provides the confidence and economic rationale for China to propose such a grandiose vision? What is unique in China's approach for development cooperation? How to finance the BRI in a way to achieve win-win or multiple wins?

Our new book, '*Going beyond aid: Development cooperation for structural transformation*', published by Cambridge University Press (January 2017), is an attempt to explore these rationales and provide a theoretic foundation based on New Structural Economics (Lin, 2010; 2011). First of all, the idea that Official Development Assistance (ODA) must be concessional is questionable. Economic development is the main purpose of ODA, yet some of the more effective instruments of facilitating structural transformation, such as equity investment and large non-concessional loans for infrastructure, are excluded from the OECD definition of ODA.

In our view, we need to "go beyond aid" with a broader concept including trade, aid, and investment for development objectives. Differing from the OECD definition, South-South Development Cooperation (SSDC) combines trade, aid, and public and private investment, and utilizes comparative advantages of each countries and their intimate know-how on development, and hence is more effective in overcoming bottlenecks in partner countries. Whereas, the OECD definition of ODA separates aid from trade, delinks aid with private investment and foreign direct investment, and therefore, "comparative advantage", a trade concept, cannot be utilized in official aid.

In this short summary paper, we focus narrowly on China's demonstrated comparative advantages in infrastructure, *e.g.* in highways, hydropower, and high-speed railways (HSR). In addition, long-term orientation (LTO) and patient capital are latent comparative advantages that many Asian economies possess, and are critical for the Belt and Road Initiative. This latter topic was also explored in our earlier paper published by this Journal in February 2017.²

2. New Structure Economics and comparative advantages

In our book, we look at the above topic through the lens of New Structural Economics (NSE). NSE treats modern economic development as a process of continuous structural change in technologies, industries, and hard and soft infrastructure—all of which lowers transaction cost and increases labor productivity and, thus, per capita income in an economy (Lin, 2010; 2011).

According to the NSE, the most effective and sustainable way for a low-income country to develop is to jump-start the process of structural transformation by developing sectors of its latent comparative advantages, which the country has low-factor costs of production determined by its endowment structure, but has high-transaction costs due to inadequate hard and soft infrastructure. The government can help transform the sectors with latent comparative advantages into the nation's competitive advantages by reducing transaction costs through special economic zones (SEZ) or industrial parks with good infrastructure and an attractive business environment. If a developing country adopts this approach, it can immediately grow dynamically and launch a virtuous circle of

2. Lin JY and Wang Y (2017b). "New structural economics: Patient capital as a comparative advantage", *Journal of Infrastructure, Policy and Development* 1(1).
<http://systems.enpress-publisher.com/index.php/jipd/article/view/28>.

job generation, export expansion and poverty reduction, even though the overall infrastructure and business environment in the nation may be poor.

The rationales of BRI are related to China's own dramatic structural transformation in the last 37 years from an agrarian economy to an industrial powerhouse, and are deeply rooted in its thousand-year history of Confucianism, who said, "One who wishes himself to be successful must also help others to be successful; one who wishes to develop himself must also help others to develop".

China has the confidence now based on its three major comparative advantages. Firstly, China has proposed to enhance global connectivity by BRI in part because it has demonstrated comparative advantages in building infrastructure, including hydroelectric power stations, highways, ports, railways, and telecom. China's labor cost for project site foremen is one-eighth of those in OECD countries (shown in Figure 1). The vast domestic market and railway network allow China to realize the "economy of scale" that other countries cannot have: the overall construction cost for high speed rail is only two-thirds of those in industrial countries. Based on China's own experience, building infrastructure sooner rather than later could facilitate international trade by lower transaction cost (Lin and Wang, 2017a, chapter 5).

Secondly, China has constructed many Industrial Parks and Special Economic Zones overseas, in part as it has successful experiences. In addition, China has comparative advantage in 46 out of 97 subsectors, mostly in manufacturing sectors, and is using them to help other developing countries achieve win-win. As labor cost rises in China, its labor-intensive industries are relocating to other lower-wage developing countries, providing millions of job opportunities. This is already happening in Southeast Asia and in East Africa as shown by examples of Huajian Shoemaking Company located in Eastern Industrial Zone of Ethiopia, C&H Garments in Rwanda, and China JD Group, a giant apparel firm in Tanzania (Lin and Wang, 2017a, chapter 6).

Thirdly, a new concept of "patient capital" can be utilized to finance the BRI and infrastructure gaps. Based on a culture of Confucianism, China and several East Asian economies are ranked high in "long-term orientation" index (Hofstede, 1990: 2010). In our new joint paper (Lin and Wang, 2017b), we propose a concept of "patient capital" as those capitals to be invested in a "relationship" in which the stakeholder/investor is willing to take a stake in the host country's development, aiming for a win-win. Owners of patient capital are equity-like investors, but willing to "sink" money in the real sector or unlisted infrastructure projects for a long time—as long as 10 years or more. And they are willing and better able to take risks. In addition, we find that Net Foreign Asset is positively and significantly associated with Long-Term Orientation Index. On the other hand, countries with Short-Term Orientation and low savings rates would see their Net Foreign Asset positions deteriorating and their foreign debt mounting.

We now turn to discuss comparative advantages in the context of cooperation.

3. Why go beyond aid?

3.1 Definition issues

The history of international development has seen two types of development cooperation: North-South and South-South. North-South cooperation, or aid, “has been based on the obligation of developed countries to assist developing countries because the former has much more resources and have also benefited from their former colonies” (Martin Khor, 2015). According to the Organisation for Economic Co-operation and Development’s (OECD) definition, Official Development Assistance (ODA) includes grants and concessional loans (with a grant element of at least 25%) provided by governments and used for development.³ The basic idea is that ODA must be concessional. Export credits do not count. Infrastructure loans, if not concessional enough, do not count. This definition, subject to strong criticism, has recently been revised (OECD, 2014a). Countries in the OECD have committed to provide 0.7% of their gross national income (GNI) as development assistance, a target that only a few countries have achieved.

South-South Development Cooperation (SSDC), by contrast, is based on the principles of solidarity, mutual respect, mutual benefit, and non-interference in domestic affairs. According to the United Nations:

“South-South cooperation is a broad framework for political, economic, social, cultural, environmental and technical collaboration among countries of the global South, that is, excluding developed countries. Involving two or more developing countries, this may be on bilateral or other basis. ...Recent years have seen increased South-South trade and FDI flows, moves towards regional integration, technology transfer, sharing of solutions and expertise and other form of exchange.” (UN Office for South-South Cooperation)⁴

SSDC, however, does not have consistent definitions across countries, legal frameworks, monitoring mechanisms, or large datasets as those for North-South aid.

The ODA, as defined by OECD-Development Assistance Committee (DAC), has several contentious issues:

- The ODA definition excludes equity investment, long-term non-concessional loans, as well as export credit even if it is concessional. This and other practice of “**untying aid**” proposed by the OECD/DAC are questionable from the developing country’s perspective, as international trade is the most powerful force for job generation and poverty reduction, much more so than aid.
- The assumption of “**capital being homogeneous**” does not make sense in developing country context. This is also the problem underlying the misguided policy prescription

3. Under the OECD-Development Assistance Committee (DAC) definition, ODA must include grants and concessional loans to eligible recipients for the promotion of economic development and welfare from an official source (government or multilateral organization) to a set of developing countries agreed to by DAC.

4. For details on the characteristics and benefits of South-South Cooperation (http://ssc.undp.org/content/ssc/about/what_is_ssc.html).

of “Neoliberalism” on “complete capital account liberalization”. Has the ODA definition sufficiently distinguish “very patient long-term capital investment” in developing countries from those “footloose” and “round-tripping” aid which has marginal effect on development? In our joint paper published by this Journal in February 2017, we addressed this new concept of “**patient capital**” (see sections below).

3.2 The neglect of structural transformation

Despite many years of hard work by development professionals in multi- and bilateral development agencies, traditional development aid from advanced countries has not been as effective as it is intended to. One of the reasons is that ODA was not used for structural transformation. If traditional aid had been directed to augmenting the resources under the command of governments to ease the bottlenecks to growth in sectors with latent comparative advantages, it would have been better at reducing poverty and achieving inclusive and sustainable development in low-income countries.

In the past 30 years, China achieved the most rapid economic growth and poverty reduction – it has alone accounted for most of the decline in extreme poverty over the past three decades. Between 1981 and 2011, 753 million people in China moved above the US\$1.90-a-day threshold. During the same time, the developing world as a whole saw a reduction in poverty of 1.1 billion (World Bank, 2016).⁵

To end absolute poverty by 2030, international aid must be used in the context of other resources, such as non-concessional loans, direct investment, and government spending (Development Initiatives, 2013). Where aid is more effective—as in the Republic of Korea, China, Vietnam, and India—it has been used together with trade, foreign direct investment, commercial loans for infrastructure, bond and equity investments, and concessional or non-concessional export credits. Indeed, separating aid from trade and investment goes against market-orientation.

South-South Development Cooperation would be more effective for poverty reduction in a poor country if it created a home-grown or localized (not national) enabling environment such as SEZs or industrial parks for dynamic structural transformation, in an economy characterized by poor infrastructure and distorted institutional environment. This solution to promote industrial clustering and agglomeration is more effective in low-income countries.⁶

A dynamically growing developing country is in the best position to help a poor country to jump-start dynamic structural transformation and poverty reduction: it can share its experience of building a localized enabling environment in SEZs or industrial parks, and it can relocate its labor-intensive light manufacturing industries to the poor country in a “flying geese pattern” (Lin, 2012; Chandra, Lin and Wang 2013).

5. See the latest World Bank Poverty Overview, using a new international poverty line (<http://www.worldbank.org/en/topic/poverty/overview>).

6. How to create a localized enabling environment for dynamic structural transformation in an economy characterized by poor infrastructure and overall distorted institutional environment was discussed in Lin (2009a; 2012).

4. Combining infrastructure with Special Economic Zones

It is well established that infrastructure development contributes strongly to economic growth and poverty reduction.⁷ However, Africa's infrastructure, especially the power sector, has been neglected for too long. The World Bank (2013) estimates that annual investments of more than US\$1 trillion—about 7% of a developing country GDP—are required to meet basic infrastructure needs in the medium term. Countries that grew rapidly—such as China, Japan, and the Republic of Korea—invested upwards of 9% of GDP every year for decades. Assuming that infrastructure financing in developing countries continues at historical trends, an infrastructure financing gap of more than US\$500 billion a year remains over the medium term (World Bank 2011a).

However, investing in infrastructure alone is not sufficient to propel the growth engine and generate jobs unless it is combined with productive assets and human capital. Therefore, we argue that, based on the NSE, infrastructure investment needs to be associated with zone- or urban-development and structural transformation in order for it to become self-sustainable.

The NSE postulates economic development as a dynamic process that entails structural changes, involving industrial upgrading, which increases labor productivity, and corresponding improvements in “hard” (tangible) and “soft” (intangible) infrastructure, which reduce transaction costs, at each level of development. Such upgrading and improvements require coordination with large externalities to firms' transaction costs and returns to capital investment. Thus, in addition to assuring an effective market mechanism, the government should actively facilitate structural transformation, diversification, and industrial upgrading (Lin, 2012, p. 14–15).

Investment in appropriate infrastructure and industrial assets would increase the value of land (a commonly acceptable principle). Land-based financing offers powerful tools that can help pay for urban infrastructure investment.⁸ These options have been explored during China's experimentation on SEZs and the infrastructure around these zones (Wang, 2011).

The role of SEZs has been well accepted and proven by the successful experiences of emerging markets. In particular, SEZs can provide pragmatically a bundling of public services in a geographically concentrated area, improve the efficiency of limited government funding/budgeting for infrastructure, facilitate cluster development or the agglomeration of certain industries, and propel urban development and the conglomeration of services. They have been shown to be conducive to growth, job creation, and income generation (Farole and Akinici, 2011; Zeng, 2015; World Bank, 2011b).

One of our propositions is therefore to link infrastructure with industrial upgrading and SEZs:

Transformative infrastructure helps link a country's endowment structure with its existing and latent comparative advantages, and translate them into competitive advantages in the global market. Thus, it can be made financially viable.

(Lin and Wang, 2017a, p.108)

7. See, for example, Calderón and Servén (2010a; 2010b).

8. For legal and typical land-asset based infrastructure financing, see policy note by Peterson (2008).

In other words, combining infrastructure building with industrial upgrading, as well as urban development, can help make both financially sustainable. This approach potentially has high rates of return.

In the long term, if a country develops industries (and the specific infrastructure needed for those industries) according to the comparative advantage determined by its endowment structure, it will have the lowest factor and transaction costs in its production in the world, become most competitive, generate the most profits (surplus), have the largest savings, and have the fastest upgrading of endowment structure. That will build the foundation for upgrading and diversifying industries to more capital-intensive industries—a virtuous circle, potentially making infrastructure financially sustainable.

Comparatively, investing in the infrastructure of developing countries could have rates of returns ranging from zero to over 100% (Bai CE, Hsieh CT and Qian Y (2006); Canning and Bennathan, 2000). We have compared some estimated rates of return from infrastructure with the benchmark US 10-year bond yields (at around 2.3%). In the current low-yield environment, more and more sovereign wealth funds, government agencies, and pension funds are seeking higher risk-adjusted returns. Recent evidence suggests that private infrastructure investment funds have higher rates of returns than private equity funds.⁹

5. China has a comparative advantage in infrastructure

Development is a process of learning, selective adaption, and innovation. Over the years, China has developed comparative advantages in construction, learning from donor-financed projects and accumulating experiences in domestic construction projects, including hydropower generation and later transport, especially highway and railroad construction (Box 1 and 2).

5.1 Two examples: Hydropower and HSR

Box 1. China's comparative advantage in infrastructure: hydropower

China is the world's largest producer of renewable energy, and hydropower is one of its dominant clean energy sources. Over 281.5 GW of hydroelectric power are installed domestically, making it the largest hydropower-producing country in the world, even though just 6% of the country's power comes from hydropower. The government has signaled its intention to increase hydropower capacity to 290 GW by 2015.

In 2013, China's hydro-installed capacity increased by 28.8 GW to 260 GW, with a further 1.2 GW of pumped storage commissioned to reach a total of 21.5 GW. Total investment in hydropower of RMB124.6 billion (US\$20 billion) that year was roughly the same as for the previous year. China now has more installed pure hydropower capacity than the next three countries combined (Brazil, United States, and Canada).

China has a demonstrated comparative advantage in exporting construction services in hydropower, including design, engineering, and implementation, based on, (1) existing domestic capacity of hydropower built by Chinese companies; (2) lower cost of workers, engineers, and site foremen (Figure 1); (3) ability to bring financiers to these projects; and (4) large hydropower projects implemented in Africa and the rest of the world.

9. Prequin Global Infrastructure Report, 2015, available online at: <https://www.prequin.com/docs/reports/2015-Prequin-Global-Infrastructure-Report-Sample-Pages.pdf>.

Box 2. China’s comparative advantage in infrastructure: High-speed railway construction

In the last 10 years, China has introduced and studied foreign technology, and gradually developed its comparative advantage in high-speed rail systems. Our 2008 paper documented this learning and innovation process (Lin and Wang 2008). Each year, China sends many official delegations for study tours. For example, to learn the technology related to the high-speed trains from Siemens, 97 delegations or groups with 580 technicians were sent to Germany in 2006 and 2007. On April 11th, 2008, China produced its first CHR3 high-speed rail locomotives; CHR300–700s are now used widely with a top speed of 350 kilometers per hour.

China has the world’s longest high-speed railway (HSR) system with over 19,000 km of track in service as of December 2016.¹⁰ China built this HSR network, remarkably, in less than 10 years at unit costs lower than for similar projects in other countries. The HSR network operates with high-traffic volumes on its core routes and with good reliability. **This has been accomplished at a cost which is at most two-thirds of that in the rest of the world, showing its comparative advantage.**

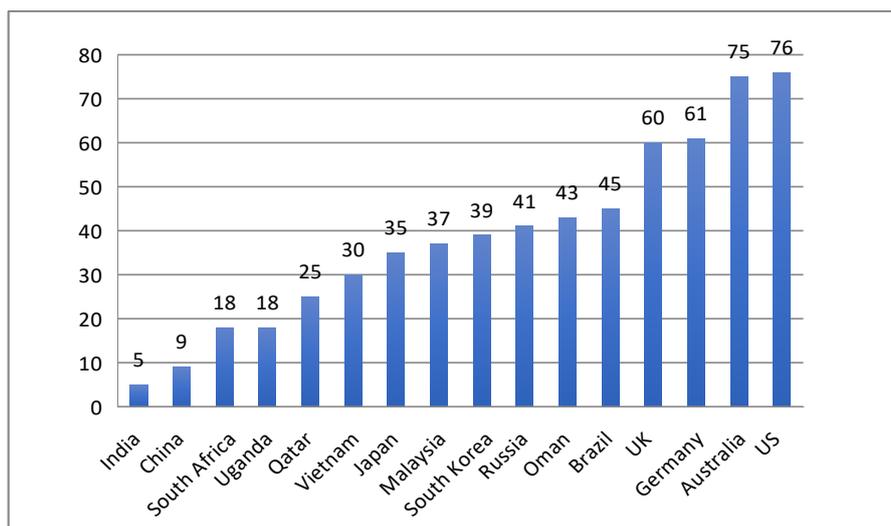


Figure 1. Average hourly labor cost in construction, site foremen (PPP \$ 2013)

Source: Based on labor cost data from International Construction Cost Survey 2013

Several factors influence the cost of HSR construction. The major factors are the line design speed, type of tracks, topography,¹¹ weather conditions (such as very low temperature requiring special design features for the road bed), land-acquisition costs (high in dense urban areas), use of viaducts instead of embankments, construction of major bridges across wide rivers, and construction of mega stations. According to Gerald Ollivier, a World Bank Senior Transport Specialist and coauthor of the technical note:

*“Besides the lower cost of labor in China, one possible reason for this is the **large scale** of the high-speed railway network planned in China. This has allowed the standardization of the design of various construction elements, the development of innovative and competitive capacity for manufacture of equipment and construction and the amortization of the capital cost of construction equipment over a number of projects.”¹²*

Based on the experience with World Bank–supported projects, the Chinese cost of railway construction is about 82% of the total project costs mentioned earlier. China’s HSR with a maximum speed of 350 kilometer per hour has a typical infrastructure unit cost of about US\$17 million–21 million (RMB100 million–125 million) per km, with a high ratio of viaducts and tunnels. The cost of HSR construction in Europe, having design speeds of 300 km/h or more is estimated

10. China defines HSR as any railway in China with commercial train service at the speed of 200 km/h (124 mph) or higher. By this definition, China has the world’s longest HSR network, with more than 19,000 km of track in service by December 2016.

11. In particular, mountainous areas require extensive tunneling and bridge construction, which can reach as high as 80% of the alignment length.

12. Ollivier G, Sondhi J and Zhou N, 2014. “High-Speed Railways in China: A Look at Construction Costs”. *China Transport Topics* No. 9. Beijing, China: World Bank Office. p. 8.

at US\$25–39 million per km. HSR construction costs in California (excluding land, rolling stock, and interest during construction) is put as high as US\$52 million per km. Based on Yves Crozet, the unit cost for four HSR lines under construction in France in 2013 was in a range of US\$24.8–35.2 million per km.

Table 1. Range of average unit costs (RMB million per km of double track)

Element	350 km/h	250 km/h	200 km/h
Land acquisition and resettlement	4	5–9	5–8
Civil works	57	56–62	42–43
<i>Embankment</i>	24	31–42	23–28
<i>Bridges/viaducts</i>	71	57–73	59–62
<i>Tunnels</i>	--	60–95	51–68
Track			
<i>Track (ballast-less)^a</i>	10	10–13	
<i>Track (ballasted)^a</i>			5–7
Signaling and communications	5	3	3–4
Electrification	6	4–5	4

Source: FSR/PAD for projects

Notes: ^a Ballast-less slab track is used for 350 and 250 km/h PDLs, ballasted track for 200 km/h railways

Source: Ollivier et al. (2014)

5.2 Infrastructure financing in China

According to China’s development experience, infrastructure has played a major role in accelerating growth and poverty reduction. A popular saying is, “*If you want to become rich, construct roads first.*” There is an economic logic behind this: In our analysis using World Bank data, we found that “**Without the land cost, the unit cost of 1 kilometer of highway in 2012 was twice the unit cost in 2000** [emphasis added]. If the price of land is rising, especially near urban corridors, the justification for planning highways ahead of time is even stronger”. (Lin and Wang, 2017a, p. 119).

China’s infrastructure development was initially led by rapid trade expansion in the coastal regions, and financed by all levels of government as well as the private sector, with cost-recovery principles and practices widely applied. The government played a leading role in strategic planning, financing infrastructure development, and resolving the bottlenecks for growth, while maintaining fiscal discipline. Commercial loans, infrastructure bonds, and urban development funds enforced market discipline. Additionally, international partners played a catalytic role in China’s process of learning, reforming, and innovating, and initially provided substantial funding and management experience.

China has used three major channels for infrastructure financing: direct budget investment from fiscal resources; market-based financing including borrowing with land-based financing; and public–private partnerships for infrastructure (PPPI).

As national policy, the government has encouraged the banking sector to finance infrastructure investment, especially in highway construction and urban infrastructure. The “user pays” principle is well applied in China, and cost recovery can reach as much as 30%–40% of the total cost in some subsectors. Cost recovery has imposed market discipline on owners and contractors, allowed private

participation, and enhanced efficiency. In 2008, for example, roughly 40% of urban infrastructure came from fiscal sources (including land revenue), 30% from bank loans, and 29% from enterprises (based on income streams such as fees and charges). Only 1% was from foreign investment and bonds.¹³

Private participation in infrastructure (PPI) in China has taken various forms. In the 1990s, the government was eager to grant favorable concessions to attract foreign investment and piloted build–operate–transfer (BOT) projects from 1996. Many varieties of BOT were invented and applied. One of such examples was the Laibin B power project. But over 1998–2004, the number of BOT and PPI projects declined, in part due to large issues of infrastructure bonds, rising land-lease revenues, and a greater number of urban development and investment companies (UDICs) (see the Box on China Development Bank in Lin and Wang, 2017b). In the last decade, as the government has tightened control of local investment platforms because of mounting local government debt, the public–private partnership in infrastructure (PPPI) approach has become more common. One such example is the Beijing Subway Line 4 which was started in 2004 and completed in 2009.

5.3 How China’s development cooperation helped address Africa’s bottlenecks

Non-traditional bilateral development financiers such as China, India, Arab countries, and Brazil have emerged as major financiers of infrastructure projects in Africa. China works particularly in bottleneck-easing sectors, such as power generation and transmission. According to Foster and Briceño-Garmendia (2010, p. 25), “Donors have neglected power since the 1990s.” In contrast, China allocated half its commitment to infrastructure to electricity during 2001–2010. Chen (2013) also found that China has contributed (and is contributing) 9.0 GW of electricity-generating capacity, including completed, ongoing, and committed power projects.¹⁴ The impact of this investment is likely to be transformative when one considers that the entire installed capacity of the 47 Sub-Saharan countries (excluding South Africa) is 28 GW.

China’s development cooperation is concentrated in hydropower generation and transmission, in part because of its demonstrated comparative advantage (see Boxes 1 and 2). Again, China is using the approach of “Do what they know best.”

According to China’s Foreign Aid White Paper, 61% of all concessional lending was in economic infrastructure (State Council Information Office, 2011; 2014). From 2010 to May, 2012, China approved concessional loans worth US\$11.3 billion for 92 African projects. For example, the Addis Ababa-Adama Expressway of Ethiopia and the Kribi Deep-water Port of Cameroon were both funded by concessional loans from China. Some of China’s main commercial banks have also started export buyer’s credit businesses in Africa, supporting the power grid in Ghana, hydropower stations in Ethiopia, a west–east expressway in Algeria, and other projects (MOFCOM, 2013).

All these are examples of China-financed infrastructure projects to ease bottlenecks. However, to get back to the question, “Have these projects helped addressing bottlenecks?”, the short answer is, yes, in two-thirds of the time. In our analysis of 168 China-sponsored infrastructure projects, the majority of these projects in 2001–2010 targeted and helped address African bottlenecks in five

13. 2010 interview with Qin Hong, Director of the Policy Research Center of the Ministry of Housing and Rural-Urban Development.

14. The Hoover Dam in Colorado, by comparison, is a 2 GW facility, producing electricity for about 390,000 homes (Chen, 2013).

sectors: water, electricity, road and rail, air transport, and telecoms (based on World Bank-PPIAF Chinese projects database). The probability of these projects helped easing the bottleneck was 62.5%. There is, however, much room for better targeting and improvement, especially in water (see Lin and Wang, 2017a, Annex 5).

Infrastructure projects are lumpy, long-term, capital intensive and with high-sunk costs—as it takes a long time to complete and generate revenue streams. Since 2008 financial crisis, there has been an increasingly short supply of long-term capital, which has profound implication for infrastructure financing, growth and financial stability. Therefore, the key question is how will these infrastructure projects be financed in the future?

6. Prospects for development finance and “patient capital”

The world economy is facing huge uncertainty and volatility. As some established donors are constrained by their heavy debt burden and slow growth in the post-2015 era, development finance will come less from official development assistance (ODA) but more from the other official flows (OOF), OOF-like loans, and OOF-like investments from development banks and sovereign wealth funds in emerging economies. In Figure 2, the share of developing countries in global investment (including China) is projected to overtake that of the high-income countries in 2015 and beyond.

6.1 Redefining development finance

We propose to broaden the definitions of development finance. The OECD–DAC definitions of ODA and OOFs are a good starting point, but they need to be reformed to clarify and to take into account all forms of finance aimed to support development.¹⁵ For monetary policy instruments, there are M0, M1, M2, and M3. In development finance, we can define DF1, DF2, DF3, and DF4 similarly (see below), according to, (1) the extent of “concessionality” with a consistent benchmark market interest rate, (2) the source (the extent of “official” or state involvement), (3) the destination countries (low- or middle-income developing countries), and (4) the objectives of the financing (for economic development and welfare). These ideas were also seen in previous studies (Brautigam, 2011; OECD, 2014b; Boussichas and Guillaumont, 2014; Xu and Carey, 2015). A new set of clearer definitions would facilitate transparency, accountability, selectivity by development partners, and encourage sovereign wealth fund (SWFs) to invest in developing countries, and facilitate public–private partnerships in developing-country infrastructure.

In particular, SWFs are managing huge amount of assets, in excess of US\$21 trillion, and many of them are seeking higher risk-adjusted returns.¹⁶ Some of them have traditionally underinvested in the emerging and developing countries with less than 10% of assets allocated to these countries. Norway, for example, is having a national debate on how best to reallocate some of its huge assets to developing countries. The Norwegian Government Pension Fund is the world’s largest SWF,

15. Debate is sharp on calculating concessional loans, whether face value (OECD-DAC approach) or budget subsidies (China approach) should be used, or what interest rate should be used as the discount rate. Li Ruogu claims that “*all China’s loans for development [from Eximbank of China] are concessional in character*” if a “proper” benchmark interest rate can be used for the discount rate (Li, R. 2007).

16. SWF Institute, <http://www.swfinstitute.org/fund-rankings/> accessed October, 2015.

with US\$888 billion in assets and expected to grow to more than US\$1,100 billion by 2020. But it allocates 90% of assets to “liquid” developed country equities with a real rate of return of mere 3.17% since 1998, much lower than other SWFs with more significant investment in emerging markets in the range of 10% or more (Kapoor, 2013). NorFund, a much smaller Norwegian fund investing in developing countries, in contrast, has a higher rate of return than the Norwegian Government Pension Fund (GPF). Redefining “development finance”, as we propose, would help sway public opinion toward SWFs investing in developing countries and expand the sources of development finance.

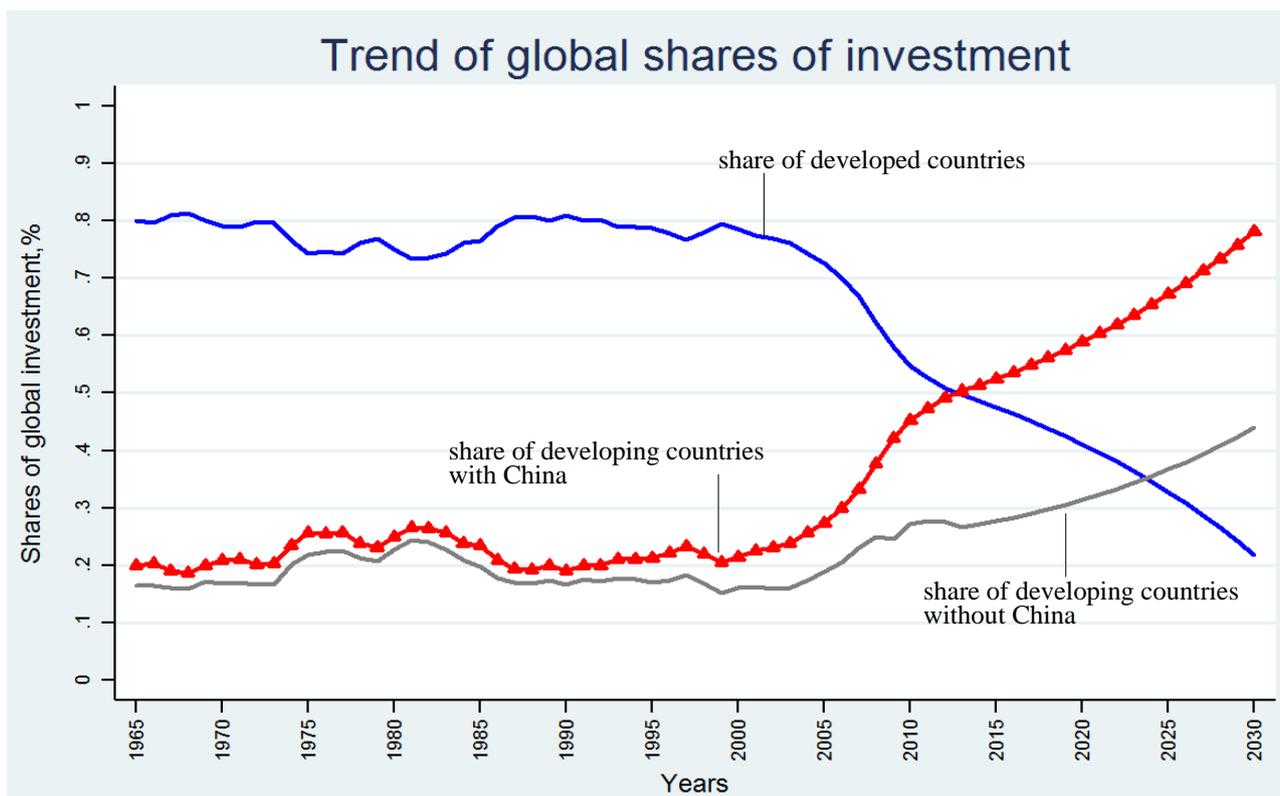


Figure 2. Global shares of investment with developing countries including China, overtaking the high-income countries (1965–2030)

Source: Authors' projections based on World Bank (2013)

We propose to redefine development finance in the following ways (Figure 3):

- DF1 = Official Development Assistance (ODA, as defined by OECD–DAC with reforms as proposed in the December 16, 2014, decision).
- DF2 = DF1 + OOF, including preferential export credit.
- DF3 = DF2 + OOF-like loans (non-concessional loans from state entities for development, but at market interest rates).
- DF4 = DF3 + OOF-like investment (equity investments by SWFs or development projects supported by state guarantees, or PPP projects for public infrastructure, which provide global

public goods for sustainable development). This latter concept would be consistent with, but different from Total Official Sustainable Development proposed by OECD–DAC.

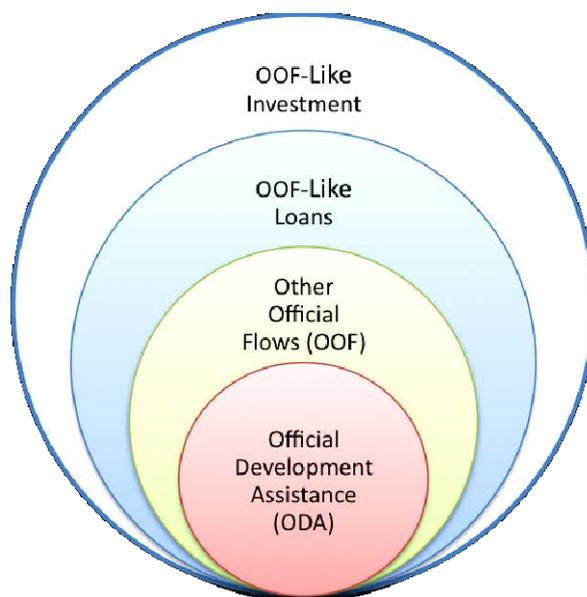


Figure 3. Expanding the definition of development finance

Source: Authors

Notes: The circles correspond to $DF1 = ODA$; $DF2 = ODA + OOF$; $DF3 = DF2 + OOF$ -like loans; and $DF4 = DF3 + OOF$ -like investment. Another category could be added separately for SSDC that cannot be monetized.

What do the investment data tell us in reality? How much is ODA among different types of development financing? The recent World Investment Report 2017 provides a broad picture of external financing to developing countries, which differs from development financing: “Global external financial flows to developing economies were estimated at US\$1.4 trillion in 2016, down from more than US\$2 trillion in 2010. These external resources include private capital flows—FDI, foreign portfolio and other investments (chiefly bank lending)—as well as other financial flows, such as official development assistance (ODA) and international remittances” (UNCTAD, 2017, p. 12). By looking at the UNCTAD data, we come to the conclusion that:

- FDI flows have remained the largest and one of the most stable sources of external financial flows to the developing economies.
- Foreign portfolio flows are the most volatile flows, with short-term cyclical natural and sensitivity to short-term issues such as the global financial crises.
- ODA has remained smaller in volume than FDI, but fairly stable. The protracted weakness of global economic growth has made the mobilization of external resources, which are critical complement to domestic revenue, increasingly difficult.

All these observations have strengthened our argument in favor of “patient capital” or “ultra-long-term, visionary capital” which can serve as the best resources for development financing. See below for our definition.

6.2 Patient capital and its potential volumes

In our earlier paper, we proposed a concept of “patient capital”, in contrast to “impatient capital”, which is dependent on the long-term orientation (LTO) of a country or region, as well as the development of banking and financial institutional investors. We broadly define “patient capital” as those capitals to be invested in **a relationship** in which the investor is willing to take a stake in a country or a real sector or a firm, aiming for the long-term returns. Examples could include parents investing in the education of their children, promising ideas/innovations for venture capitalists, entrepreneurial investment for real sectors, or unlisted equity of a company/project for financiers. Owners of patient capital are equity-like investors, but willing to “sink” money in the real sector or unlisted companies or unlisted infrastructure projects for a long time.¹⁷ What is the “long term” in this definition? In our view, the maturity for patient capital (suitable for infrastructural investment projects) may be in the order of 10 years or more, depending on the nature of the “relationship”. For venture capital, it may be 7 years, as conventionally defined.

Several important features can be derived from this definition:

- First, patient capital is highly dependent on domestic banking sector, and institutional investors that can turn the long-term savings of citizens into loanable funds and can serve as the buyers of equity-like financial instruments with a long-term horizon. Therefore, the development of commercial and investment banks, institutional investors such as Sovereign Wealth Funds and Pension Funds should be encouraged because of their importance in infrastructure financing.
- Second, international multilateral financial organizations such as the World Bank, regional development banks as well as bilateral donor funded development banks/funds play critical roles in turning domestic public savings into international long-term development funds (a part of patient capital). Therefore, the establishment of new institutions such as the Asian Infrastructure Investment Bank and the New Development Bank, the Silk Road Funds and other infrastructure funds (such as our proposed Global Structural Transformation Fund) should be welcomed and supported. These are among the providers of patient capital.
- Third, unlisted equity-like instruments or unlisted infrastructure funds (that are not easily traded) are well suited for patient capital. More of such instruments/funds should be created. These are better suited for infrastructure than the short-term debt instruments for impatient capital (such as hedge funds) that can be traded frequently.
- Fourth, patient capital is highly correlated to entrepreneurial capital (direct investment), and thus new ideas, innovations, internationally known brands, risk-taking and hard work are all important elements in turning this capital to investment projects in the real sectors for development purpose. Governments everywhere should improve investment climate to attract FDI, and for the private sector to participate in the direct investment of infrastructure (*via* PPPI and others), Special Economic Zones, Eco-industrial parks, Eco-cities, as well as in the “real” sector or manufacturing sectors.

17. This concept is consistent with the “buy and hold” capital in Justin Lin and Kevin Lu’s blogs (Lu and Lin, 2013; Lin and Lu, 2014; Lin, Lu and Mandri-Perrott, 2015).

Now, the question is: how to estimate the amount of patient capital amongst different capital flows? Based on data from the UNCTAD (2017), we can provide a rough share of “patient capital” in the total external financing flows to developing economies. UNCTAD reports that the total external financing flows to these economies were US\$1.4 trillion in 2016; we can then calculate, roughly, the shares of FDI (45%), Remittances (28%), ODA (12%), Foreign Portfolio flows (9%), and other investments (mainly, Bank Lending 6%).

Assuming that half of the bank lending was long term (at 10 years or longer), then the shares of patient capital flows in 2016 would be around 60% of the total external financing flows to developing economies (Figure 4). Here, we make an assumption that majority of foreign portfolio investment is impatient (<10 years). Remittances may finance consumption or investment, for which we need more information. Therefore, we included only the shares of FDI (including M&A), ODA, and half of the Bank Lending in the estimate of the share of patient capital flows for 2016. Indeed these assumptions are strong and these estimates are rough. Future studies are needed for developing exact measure of patient capital flows based on micro data.

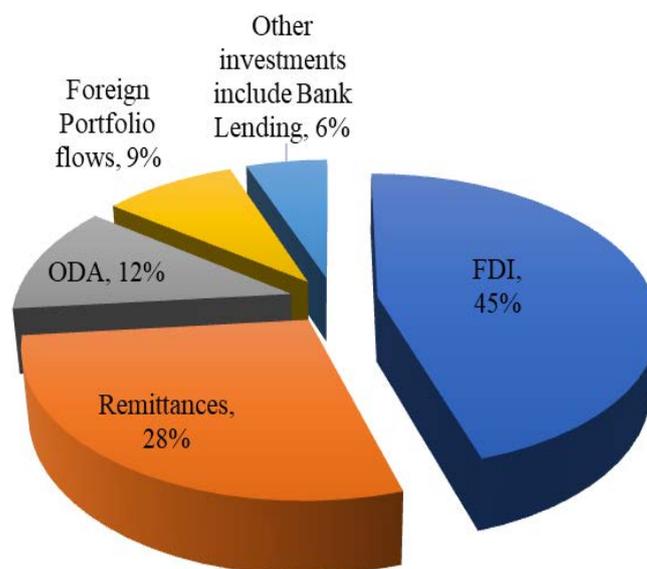


Figure 4. How much is patient capital? Roughly 60 percent of total external financing flows to developing economies in 2016

Source: Calculated based on UNCTAD (2017) report, p.13.

China is a latecomer among the suppliers of patient capital, as it has just started to use its comparative advantage in patient capital to help releasing infrastructural bottlenecks to achieve win-win solutions. In terms of cross-border M&A, China started to be a net supplier in 2008. In terms of Net FDI (outflows minus inflows), China’s Outward Foreign Direct Investment (OFDI) in 2016, which stood at US\$183 billion dollars and second only to the United States, had exceeded the inflows for two consecutive years (UNCTAD, 2017). In addition, China also provides significant overseas lending through China EXIM Bank and China Development Bank. In recent years, each bank has been lending about US\$100 billion overseas (Dollar, 2016, p. 3). A question, however, is what policies/regulations could be put into place to prevent patient capital from becoming “impatient”?

7. Conclusions

Through the lens of the New Structural Economics (Lin, 2010; 2011), in this paper we discuss China's demonstrated comparative advantages in infrastructure, *e.g.* in hydropower, and high-speed railways (HSR). In addition, long-term orientation (LTO) and patient capital are latent comparative advantages that China, Singapore, South Korea, and many Asian economies possess.

Patient capital plays an important role in infrastructure financing. Successful countries with future orientation (as in Spence, 2008) have seen their infrastructure better financed. Other evidence of rising patient capital can be seen by the rising number of Sovereign Wealth Funds and government-sponsored Strategic Investment Funds (SIFs) established by countries such as Kazakhstan, Malaysia, Mexico, Morocco, Nigeria, Philippines, Senegal, South Africa and Vietnam (Halland *et al.*, 2016). The number of Multilateral Strategic Investment Funds (MSIFs), including those for infrastructure, are rising as well. This trend is in tune with our proposal for establishing a "Global Structural Transformation Fund" in our 2013 paper for the UN Post-2015 Agenda (Lin and Wang, 2013). Using recent PrEQin data, it shows that "the median net internal rates of returns (IRR) for private infrastructure funds across all vintages remains consistent at around 10%." (PrEQin, Quarterly Infrastructure Report 3Q-2015). The best performance can be seen in Temasek, Singapore's SWF: by investing in Asian emerging market economies, its annual shareholder return reached a stellar 15% since inception (Temasek Annual Review, 2016). The point is that, if the patient capital can be invested in the bottleneck releasing infrastructure, the economic and financial returns could be higher than the "risk-free bond yield".

Currently, China's large amount of patient capital has been used at home. Along with the gradual opening of China's capital account, more patient capital is going to be exported as more enterprises and banks "going global". Patient capital often comes with technology, management skills and implementation capacity in infrastructure and manufacturing. If the right governance mechanism is put into place, the export of patient capital could have strong impact on global connectivity and development. "China is likely to emerge in the next few years as the world's largest net creditor" (Dollar, 2016, p. 1), which provides both risks and opportunities for China and for the rest of the world.

These features of comparative advantages, long-term orientation, and patient capital are critical for the Belt and Road Initiative. In addition to the three principles of "wide consultation, joint construction, and shared benefit", if these features of economies involved—comparative advantage, long-term orientation, and patient capital—are given significant analysis and consideration by all sides, be they investing or hosting countries, or multilateral or plurilateral or bilateral organizations, then we can hope to see a more fruitful development cooperation in the world. If all countries work together investing in bottleneck-releasing infrastructure and providing global public goods, including the Belt and Road Initiative and 10 proposals for Africa, the prospects for achieving global peace and development will be enhanced.

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