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INVITED OPENING PIECE

The new structural economics: Patient capital as a comparative advantage

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ABSTRACT

The world economy needs a growth-lifting strategy, and infrastructure financing seems to hold the key. Based on the New Structural Economics (Lin, 2010; 2012) we discuss the heterogeneity of capital focusing on the long-term versus short-term orientation (STO). Traditional neoliberalism assumes that capital is homogenous, complete capital account liberalization is "beneficial". However, previous studies have found evidence of long-term orientation (LTO) in the culture of many Asian economies (Hofstede, 1991). In this exploratory paper, we suggest that the LTO can be considered a special endowment which, under certain circumstances, can be developed into a comparative advantage (CA) in patient capital. If these countries can turn their latent CA into a revealed CA in patient capital, and develop the ability to "package" profitable and non-profitable projects in meaningful ways, they would have a "revealed" competitive advantage in infrastructure financing. The ability to "package" public infrastructure and private services is one of the key institutional factors for success in overseas cooperation.

Keywords*: patient capital; long-term orientation; infrastructure financing; development*

"Patience is bitter, but its fruit is sweet."
(In French: "La patience est amère, mais son fruit est doux.")
- Jean-Jacques Rousseau

1. Introduction

Global economic uncertainty is looming large in early 2017, after eight years of anemic growth with Brexit, the election of Trump and other populist rhetoric of anti-globalization. Some world-renowned economists expressed concerns on the low productivity growth, and called for "a clear vision of the goals of development policy and learning from the successes and mistakes of the past" (Stockholm Statement).[1] The US real GDP grew 1.6% in 2016, compared with an increase of 2.6% in 2015 (BEA, 2017), and the labor force participation rate remained low at 62.7% in November 2016, much lower than the

1. "It is now evident that some of the recommendations of more traditional economics were not valid. Policymakers cannot rely on simple policy guides such as holding the fiscal balance in check, using monetary policy to control inflation, providing macroeconomic stability, and then leaving it to the market to do the rest. Assuming that such an approach will promote growth that trickles down to the poor is not a tenable premise. Indeed, we owe some of our current predicament to too close an adherence to that dated advice." See "Towards a Consensus on the Principles of Policymaking for the Contemporary World", November 15, 2016, p. 2. http://www.sida.se/globalassets/sida/eng/press/stockholm-statement.pdf

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pre-crisis level of 66.5% in 2007 (US BLS, 2016). The global economy still needs a growth-lifting strategy in the wake of the rising interest rates in the US.

Eight years ago, in February 2009, principal author Justin Lin suggested to "go beyond Keynesianism" and to have a "globally concerted fiscal policy to invest in infrastructure of developing countries—a Global Infrastructure Initiative" in a speech at Peterson Institute. Lin reiterated this view in a lunch speech at American Foreign Relations in May 2009, which was later published in Harvard International Review. Lin promoted this idea in several review articles or books, including in his joint book with Yan Wang. Having seen sub-par recovery, more and more economists agree on the need to invest in infrastructure and global public goods. The International Monetary Fund (IMF) has also belatedly recognized, "Now it is the time to promote infrastructure development" (IMF 2014, Chapter 3). U.S. president Donald Trump proposes a strategy of massive infrastructure investment and bringing manufacturing jobs back to the United States, which seems to have gained support.

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.

This paper summarizes our previous papers and discusses a new idea about the heterogeneity of capital which is critical for infrastructure financing. Based on the New Structural Economics (Lin, 2010; 2012) we criticize the traditional neoliberalism assumption on capital being homogenous. According to these models, infrastructure is nothing special and infrastructure financing is no different from other type of investment. In those models, there is no issue of currency- and term-mismatches, thus complete capital account liberalization is "beneficial" to all, which is being widely criticized now.[2]

In this exploratory paper, we attempt to focus on the long-term versus short-term orientation (STO) and propose that "patient capital" or "long vision capital" can be considered a comparative advantage, important to infrastructure financing. Previous studies have presented evidence of long-term orientation (LTO) in many Asian economies influenced by Confucianism (Hofstede, 1991; Hofstede, Gert and Michael, 2010). These countries have high domestic savings rates, and accumulated large amount of "patient capital", which is most suitable for infrastructure investment. Consumers in these countries have lower discount rates and can tolerate lower yield. The macro implications on debt sustainability issues has drawn attention in the recent literature; see, for example, Galor and Özak (2016), Kukharskyy (2016), Broner and Ventura (2016), and more recently, Kapur (2016). Rather than the macro angle, we attempt here to discuss the micro aspect of LTO: the concepts of patient capital from the angle of endowment and comparative advantages, as well as its role in infrastructure financing.

We first review the literature and present the New Structural Economics' framework on infrastructure development and its financing. In Section 4 we move on to the literature on "long-term orientation" (LTO) and its implications to savings and infrastructure financing. In Section 5, we

2. Currency-term-and-risk-mismatches are well analyzed in the finance literature, especially in relation to financial crises. We thank Yiping Huang for this suggestion.

discuss the comparative advantage concept and why "long-term orientation" cannot be, but patient capital can be, considered a comparative advantage. In Section 6, we link patient capital with infrastructure financing instruments, and give some examples. Section 7 concludes.

2. Investing in bottleneck-releasing infrastructure as a growth lifting strategy

The importance of critical infrastructure for growth and development is well known. But the global infrastructure investment initiative that Lin proposed since 2009 has several unique characteristics. First, any growth-lifting solution should focus on implementing "bottleneck-releasing" investments in developed and developing countries which will not only increase demand in the short term but also raise longer term growth prospects. The traditional Keynesian stimulus directs spending toward the domestic economy, while Lin's proposal recommends a globally coordinated investment initiative, directing global savings toward where the developmental impact of employment generation and social rates of return are higher. Such projects will increase demand and jobs in advanced countries and offset the contractionary effect when the advanced countries exit the quantitative easing (QE), raising interest rates and attempt to implement some sort of structural reforms, as the US is currently doing in early 2017.

Secondly, investing in bottleneck releasing infrastructure could lead to high rates of growth as well as social and financial returns, as well as employment generation and poverty reduction in the long term. Empirical literature has found supporting evidence for the spill-over effect of infrastructure on long-run growth and development.[3] "To the extent that such high rates of return are not detected by a microeconomic cost-benefit analysis, they point to macroeconomic externalities associated with infrastructure" (Canning and Bennathan, 2000, p. 31). Comparatively, investing in the infrastructure of developing countries could have higher rates of returns than those from industrial countries where infrastructure is already in place (Bai *et al*., 2006; Canning and Bennathan, 2000; World Bank estimates, 2012).

We have compared some estimated rates of return from infrastructure with the benchmark U.S. 10-year bond yields (at around 2.41% but rising) (Lin and Wang, 2013). Using recent PrEQin data, it shows that "the median net internal rates of return (IRR) for infrastructure funds across all vintages remains consistent at around 10%. The PrEQin Infrastructure Index currently stands at 164.6 points and has consistently outperformed the PrEQin all Private Equity Index since its inception in 2007" (PrEQin, Quarterly Infrastructure Report 3Q-2015).

Another strand of the literature has examined the effect of infrastructure on income inequality. The rationale is that infrastructure provision may have a disproportionate effect on the income and welfare of the poor by raising the value of the assets they hold (such as land or human capital), or by lowering the transaction costs (such as transport and logistic costs). These effects may occur through a variety of mechanisms documented in the literature; see, for example, Estache, Foster and Wodon (2002); Estashe (2003); and Calderón and Serven (2010).

Both arguments, macroeconomic externality and income inequality, point to the need for

3. For instance, Aschauer (1989) found that the stock of public infrastructure capital is a significant determinant of aggregate TFP in the U.S. and his estimate of the marginal product of infrastructure capital was as high as 100% per year. Canning and Bennathan (2000) found that, "In a limited number of countries we find evidence of very acute shortage of electricity generating capacity and paved roads, and large excess returns to infrastructure investment."

public investment in providing certain types of infrastructure, because they represent either non-rival public goods as in the case of rural roads, or a natural monopoly as in the case of electricity generation and distribution systems. Without government intervention or public investment, the critical infrastructure for development would be undersupplied.

Thirdly, in a joint paper for the UN's Post-2015 panel, we proposed to establish a Global Structural Transformation Fund (GSTF) (Lin and Wang, 2013). Our idea then was to use this fund to help "crowd-in" funding from Sovereign Wealth Funds, Pension Funds and the private sector, and increase utilization of green technology by transforming existing cities into green cities and building new clusters of eco-friendly industries. Today, these ideas are largely supported as shown by the Chinese leadership's proposal on the "One Belt One Road" vision (Xinhua, 2013), the establishment of the Silk Road Fund in January 2015, and two new banks, The New Development Bank in July 2015 and The Asian Infrastructural Investment Bank (AIIB) in December 2015.

Fourthly, in our new joint book we propose that, based on the New Structural Economics, 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. Our idea there is to "package" or combine infrastructural building with Eco-industrial parks, Special Economic Zones (SEZs), green urban development and structural transformation to generate employment, revenue, growth and poverty reduction. (Lin and Wang, 2017). This idea of "packaging" is important for infrastructure financing (see Section 7 below).

3. New Structural Economics and Infrastructure

The New Structural Economics (NES) postulates that each country at any specific time possesses given factor endowments consisting of land (natural resources), labor, and capital (both human and physical), which represent the total available budget that the country can allocate to primary, secondary and tertiary industries to produce goods and services. The relative abundance of endowments in a country are given at any given specific time, but changeable over time. In addition, infrastructure is a fourth endowment, which is fixed at any given specific time and changeable over time (Lin, 2012b).

This framework implies that at any given point in time, the structure of a country's factor endowments, that is the relative abundance of factors that the country possesses, determines the relative factor prices and thus the optimal industrial structure (Ju *et al*., 2015). Therefore, the optimal industrial structure in a country, which will make the country most competitive, is endogenously determined by its endowment structure.

Further, economic development as a dynamic process entails structural changes, involving industrial upgrading and corresponding improvements in "hard" (tangible) and "soft" (intangible) infrastructure, at each level. Such upgrading and improvements require an inherent coordination, with large externalities to firms' transaction costs and returns to capital investment. Thus, in addition to an effective market mechanism, the government should play an active role in facilitating structural transformation, diversification and industrial upgrading (Lin, 2012b). The Growth Identification and Facilitation Framework (Lin and Monga, 2011) is a pragmatic guide for governments to play the facilitating role in structural transformation.

Land-based financing offers powerful tools that can help pay for urban infrastructure investment.[4] These options have been utilized during China's experimentation on Special Economic Zones and the infrastructure around these zones (Wang, 2011). Therefore, our first proposition is that, other things being equal, a piece of land with proper level of infrastructure is always more valuable than a piece of land without. Thus, it can be well used as collateral for infrastructure development loans. Since infrastructure is often sector-specific, the "proper" infrastructure must be consistent with the needs of industries that are the country's existing or latent comparative advantage. In a country with overall poor infrastructure, Special Economic Zones (SEZs) can be used to develop industries of the country's latent comparative advantages to be the nation's competitive advantages pragmatically and quickly.

The role of Special Economic Zones has been well accepted and proven by the successful experiences in emerging market economies. In particular, SEZs can: 1) provide a bundling of public services in a geographically concentrated area, 2) improve the efficiency of limited government funding/budget for infrastructure, 3) facilitate cluster development or agglomeration of certain industries, 4) propel urban development and conglomeration of services, and thus, 5) they are conducive to green growth, job creation and income generation (Lin and Wang, 2013; Zeng, 2010; Yusuf, 2013). Therefore, our second proposition is that 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.

In the long term, if a country develops industries (and the specific infrastructure needed for that particular industry) according to the comparative advantage determined by the endowment structure, the country will become most competitive, generate the most profits (surplus), have the largest savings and have the fastest upgrading of endowment structure, which will in turn build the foundation for the upgrading and diversification of industries to the more capital-intensive industries. This will become a virtuous cycle and infrastructure can be financially viable.

But how could the infrastructure funding gap be closed without putting an additional fiscal burden on the already cash-strapped governments? In general, infrastructure consists a spectrum of public goods, semi-public goods and private goods. It will require a combination of financing from both traditional and new sources:

First, domestic public financing has been the dominant source of infrastructure financing in developing countries, providing about two-thirds of total infrastructure financing. Maintenance of existing roads, for example, should be financed by domestic public funding from vehicle taxes or gasoline surcharges, as is the common practice in middle-income countries.

Second, Official Development Assistance (ODA) from traditional donor countries can be used to leverage other funding sources. However, going forward, it is expected that traditional ODA is going to decline significantly, stabilizing at its pre-crisis trend level.

The third and the most important source of financing is Other Official Finance (OOF) which are raised from emerging market economies, Sovereign Wealth Funds, Pension Funds and multilateral

4. For legal and typical land-asset based infrastructure financing, see policy note by George E. Peterson (2008), "Unlocking Land Values to Finance Urban Infrastructure: Land-based financing options for cities", PPIAF Trends and Policy Options Series, Washington DC.

development banks and funds.

The fourth is Public-Private Partnership in Infrastructure (PPPI). Depending on the characteristics of specific infrastructure, whether it is public, or semi-public or private goods, various funding sources can be combined and used.

We now turn to a relatively new idea in this exploratory paper, a special kind of capital, *i.e.*, "patient capital" or "long vision capital", and its role in infrastructure financing.

4. Literature related to Long-Term Orientation (LTO)

The important role of discount rates in economic models is well known, but which groups of consumers have high discount rate, and which have low discount rate? What determines the discount rate? These issues have long been researched by Dutch sociologist Geert Hofstede and his co-authors.

Based on Hofstede's cultural dimension theory, long-term orientation (LTO) represents one of the five key cultural dimensions measuring fundamental cultural differences.[5] Initially called 'Confucian dynamism', this dimension associates the connection of the past with the current and future actions.[6] Societies with a high degree in long-term orientation value persistence, perseverance, thrift, and being able to adapt and learn. Long-term orientation has been widely considered as an important element for human and physical capital formation, technological advancement and economic growth. A poor country that is short-term oriented usually has little to no economic development, while long-term oriented countries continue to develop to a point (Hofstede, 1991).

The Growth Commission report, led by Michael Spence, found that future orientation as one of the five key ingredients for 13 successful countries in the post-World War II period which experienced sustained high growth—defined as 7% per year or more for 25 years or longer. "Future orientation is related to high levels and effectiveness of savings and public and private investment" (Spence, 2008, p. 9). Meanwhile, they found public sector saving and investment well below the optimum in much of the developing world, with the crowding out of private sector and systematic pattern of underinvestment (Spence, 2008).

The average level of long-term orientation of individuals living in a country is generally recognized in the economic discipline as a valid proxy for the country's time preference rate. For instance, Galor and Özak (2016) pointed out, "In light of the importance of long-term orientation for human and physical capital formation, technological advancement, and economic growth, time preference has been widely considered as a fundamental element in the formation of the wealth of nations" (Galor and Özak, 2016, p. 1). Their research found pre-industrial agro-climatic characteristics that were conducive to higher returns to agricultural investment had a persistent positive effect on the long-term orientation in the contemporary era. In Galor and Özak (2016), individuals characterized by higher long-term orientation select agricultural practices that permit higher but delayed return, while the engagement of individuals with long-term orientation in

5. Five cultural dimensions are: individualism, masculinity, uncertainty avoidance, long-term orientation and power distance (Hofstede, 1991).

6. The Chinese Value Survey (CVS) was started in 1971 by Michael Bond and his Chinese colleagues. The fourth dimension in CVS strongly related to the Confucian teaching of persistence, perseverance, thrift, ordering relationship by status and observing this order, having a sense of shame, and personal steadiness and stability (Hofstede *et al*., 2010, p. 236).

profitable investment ventures mitigates their tendency to discount the future and reinforces their ability to delay gratification, whose superior economic outcome increases their reproductive success, transmitting their time preference inter-generationally and gradually increasing the representation of high long-term orientation individuals in the population.

The long-term orientation index across countries is also consistent with a large number of studies showing significantly higher savings rates in developing countries than in industrial countries. Mendoza *et al*. (2009) observed a secular decline in the U.S. net foreign asset position started in the early 1980s, with the portfolio composition of U.S. net foreign assets featuring increased holdings of risky assets and a large increase in debt. In Mendoza *et al*. (2009), such a global financial imbalance results from financial integration among countries differing in financial markets development, that countries with more advanced financial markets accumulate foreign liabilities in a gradual, long-lasting process. In their studies of financial globalization under financial frictions, Broner and Ventura (2016) further emphasize the role of imperfect enforcement of domestic debts and the interactions between domestic and foreign debts. Their model shows that the observed patterns of financial globalization depend on the level of development, productivity, domestic savings and the quality of institutions. However, as argued by Hofstede *et al*. (2010), individuals in countries with a high level of long-term orientation value persistence and perseverance, and are willing to delay short-term material gratification in favor of long-term benefits. In contrast, individuals in short-term oriented countries care more about immediate gratification than long-term fulfillment. Since long-term orientation represents the willingness of economic agents to forfeit instant gratification for the sake of long-term monetary benefits, it logically follows that cross-country differences in long-term orientation may have an impact on the individual behavior in those countries. For example, a recent research by Kukharskyy (2016) explores the impact of the cross-country long-term orientation organizational dimension on the behavior of firms. He finds the level of long-term orientation of cooperation parties has a positive effect on the likelihood of vertical integration. As such, it is of interest to focus on this "pure" or fundamentals-based source of global financial integration, and integrate this with endogenous product and process innovation.

As such, long-term orientation may be considered an endowment, a virtuous attribute inherited from the cultural background that values persistence, perseverance, thrift, saving and being able to adapt and learn, etc.

5. Patient capital as a comparative advantage

Can LTO be considered a comparative advantage? Our short answer is no. Long-term orientation may be considered a cultural endowment because it is inherited from a historical and cultural background. However, it is not an input to the production, such as capital or labor. Here we argue that, first, comparative advantage is related to those productive factors (capital, labor, or natural resources) for various sectors that can be relied upon intensively or non-intensively. Just like a product or service can be skilled-labor intensive, a product can be called "patient capital intensive", as capital is not homogeneous. There are patient capital and impatient capital, among other classifications.[7] Secondly, a country may have LTO but an "orientation" cannot be exported. It may have abundant long-term savings but cannot turn them into patient capital and export it. This means

7. "Hedge funds are not noted for their long-term thinking for them, a quarter is an eternity. Their goal will be to turn a quick buck on the government's magnanimous offer before Washington wakes up", Joseph E. Stiglitz (Vanity Fair, December 27, 2016).

that this country may have latent comparative advantage but is not yet able to turn this kind of capital into "real" or revealed comparative advantage.

Just like labor is not homogeneous, capital is not and has never been homogenous. There are many ways to classify different kinds of capital. But in terms of infrastructure financing, it is critical to distinguish patient versus impatient capital. When studying economic growth and development, we often observe that patient capital (ultra-long-term debt and FDI) contributes to economic growth more significantly than impatient short-term capital. When studying the effect of capital account liberalization, many economists have rightly distinguished Foreign Director Investment (FDI) and portfolio investment (Kose *et al*., 2009; Gou *et al*., 2010). They pointed out that early opening to FDI inflows is important for economic growth in developing countries but the complete liberalization of the rest (portfolio investment), as pushed by Washington Consensus, has mixed results—in some cases it leads to financial crises (Ostry *et al*., 2016; Lin 2013; 2015). Their distinction is an important one, but not sufficient for our analysis.

Here, we propose a concept of "patient capital" versus "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 institution investors. We broadly define "patient capital" as those capitals to be invested in a relationship in which the lender is willing to see the borrower growing up in the future to be able to provide decent returns, as in the cases of, for example, 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. Those investors are not eyeing the short-term returns but for the long-term future returns when the borrowers or investment projects grow up or scale up. 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,[8] and they are willing and better able to take risks.

What is the "ultra-long-term" in this definition? In capital market, long-term capital is any debt instruments above 12 months. Whereas in our view, the maturity for patient capital (suitable for infrastructural investment projects), may be in the order of 10 years or above, depending on the nature of the "relationship". For venture capital, it may be 7 years, as conventionally defined. For FDI and unlisted equity, it may be longer than 10 years. So we can call them ultra-long-term capital or patient capital.[9]

One should distinguish long-term savings from patient capital. Parents willing to invest in the education of their children, or citizens investing in real estate or saving for retirement, are providers of long-term savings. But only entrepreneurs and institutions are able to turn long-term savings into patient capital. Who, then, are the providers of patient capital? We think they include (foreign and domestic) direct investors, entrepreneurs, venture capitalists, National Pension Funds, Sovereign Wealth Funds (SWFs), all multilateral development banks, as well as some National Development Banks or development funds that are financed by taxpayers with a long-term horizon. This also includes our proposed Global Structural Transformation Fund (a multilateral development fund for

8. 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)).

9. Long-Term Orientation and patient capital can help understand why some developing countries (mostly from Asia) are exporting capital to developed countries (the Locus Paradox). We thank Yiping Huang for this point.

infrastructure/special economic zones and structural transformation, suggested by Lin and Wang (2013).

Drawing on the OECD's "Institutional Investors and Long Term Investment" project, the following table provides a taxonomy of infrastructural financing instruments. The coverage of instruments is comprehensive, spanning all forms of debt and equity and risk mitigation tools deployed by governments and agents. We then added a column to illustrate the Patient Capital and their roles, as they are the buyers/financiers of infrastructure financing instruments (Table 1). The first part of the table is based on an OECD study (2015) and the last column was added by us.

Table 1. Taxonomy of Instruments for Infrastructure Financing and the role of Patient Capital

	Infrastructure Finance Instruments			**Market Vehicles**		**Financiers /buyers**
Asset Category	Instruments	Infrastructure projects	Corporate balance sheets	Capital pool		**Patient or impatient capital?**
Fixed Income	Bonds	Project bonds	Corporate Bonds, Green Bonds	Bond indices, Bond Funds ETFs		All participants with patient or impatient capital
		Municipal, Sub-sovereign bonds				
		Green Bonds, Sukuk	Subordinated bonds			
	Loans	Direct investment lending, Syndicated project loans, and Resource-financed infrastructural loans (RFI)	Direct investment lending to infra corporate; syndicated loans, Securitized loans (ABS), CLOs	Debt Funds (GPS), Loan Indices, Loan Funds		Patient capital: Multilateral Development Banks, bilateral donor-funded banks or funds, semi-public funded investment banks or corps, some National Development Banks
Mixed	Hybrid	Mezzanine Finance	Convertible Bonds	Mezzanine Debt Funds, Hybrid Debt Funds		Mixed participants
Equity	Listed	YieldCos	Listed infrastructure and utility stocks, closed-end Funds, REITs, IITs, MLPs	Listed Infra Equity Funds, Indices, trusts, ETFs		Patient Capital: Sovereign Wealth Funds, Pension Funds, and others
	Unlisted	Direct Investment in infrastructure project equity, PPP	Direct investment in infra corporate equity	Unlisted Infrastructure Funds		Patient Capital: SWFs, Pension funds, Entrepreneurial capital, Proposed Global Structural Transformation Funds (Lin and Wang, 2013)

Source: Drawing on OECD (2015), and the last column and the Resource-financed infrastructure (RFI) are added by authors (underlined). RFI loans are defined as "patient", because they have a feature of "nonrecourse" or "limited recourse".

Several important features can be seen from this table:

- 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 or 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, establishment of new institutions such as the Asian Infrastructure Investment Bank, 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-working 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.

We think "Net Foreign Asset" may be used as a good indicator of revealed comparative advantage in exporting capital, including, but not limited to, patient capital.[10] Based on the Growth Commission work (Spence, 2008), many of the East Asian countries and regions including Japan,South Korea, Taiwan, Hong Kong, China and Singapore possess these similar characteristics. Our hypothesis is that the NFA of these countries and regions may be higher than those without abundant patient capital. In Figure 1, we find that Net Foreign Asset is positively and significantly associated with Long-Term Orientation index. If this hypothesis can be further studied and corroborated by other evidence such as Net FDI (outflows minus inflows) and cross border M&A, we consider these countries and regions have the comparative advantage in patient capital as defined above. 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 (as shown by Mendoza *et al*. (2009)).

6. China is utilizing its comparative advantage in patient capital

The previous section discusses patient capital in general and now we turn to specific examples and cases. In all Chinese Value Surveys, China ranked among the top five countries consistently with long-term orientation index. Many of the East Asian countries/regions such as Japan, South Korea, Hong Kong (China), Taiwan (China), Indonesia and Singapore are also ranked high on LTO index. Infrastructure in these countries and regions are better financed and well developed, as compared to countries at similar income level, indicating at least a latent "comparative advantage in patient capital.

However, a question is whether this is a latent comparative advantage (CA) or a "revealed one"? Under what conditions can the latent CA become revealed CA? In Figure 2, we find that that NFA

10. The Net Foreign Asset (NFA) position of a country is the value of the assets that country owns abroad, minus the value of the domestic asset owned by foreigners. It reflects the indebtedness of that country. In the World Bank WDI database, NFA is the sum of foreign assets held by monetary authorities and deposit money banks, less their foreign liabilities. We use the World Bank definition here.

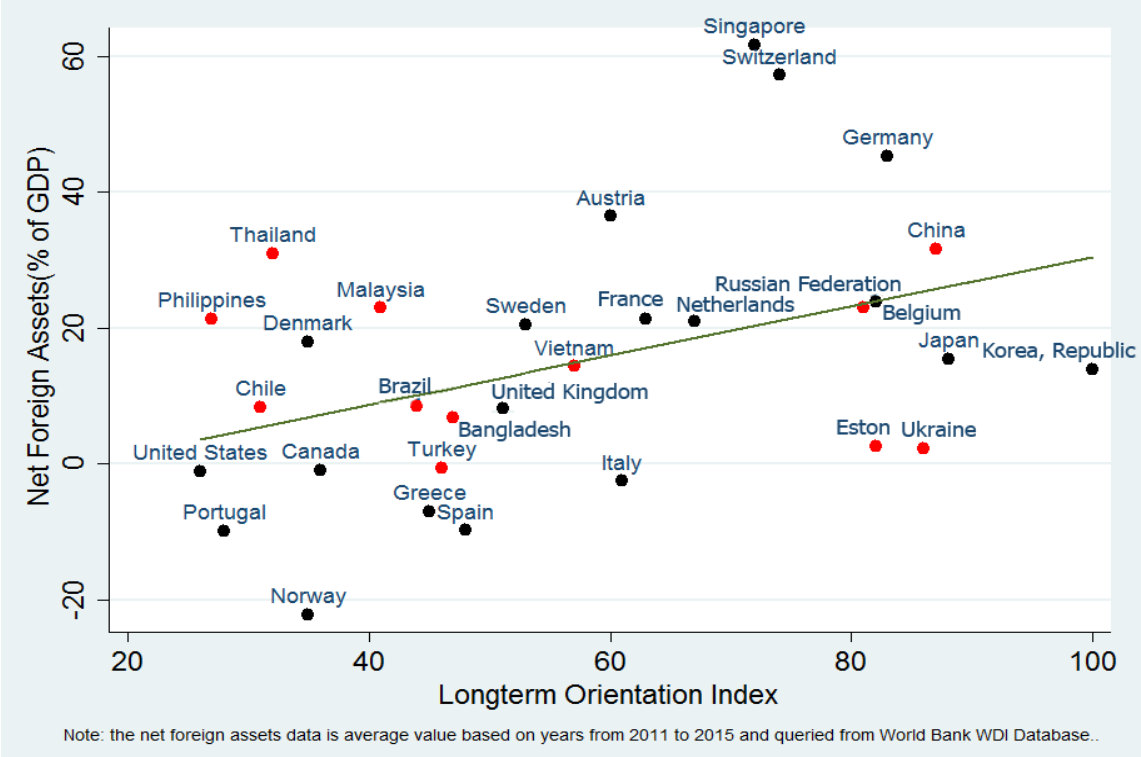


Figure 1. Net Foreign Asset (% of GDP) and Long-Term Orientation
Source: The NFA (% of GDP) data is the average of 2011–2015, calculated based on World Bank WDI database. Long-term orientation index from Hofstede et al., 2010, page 255–258.

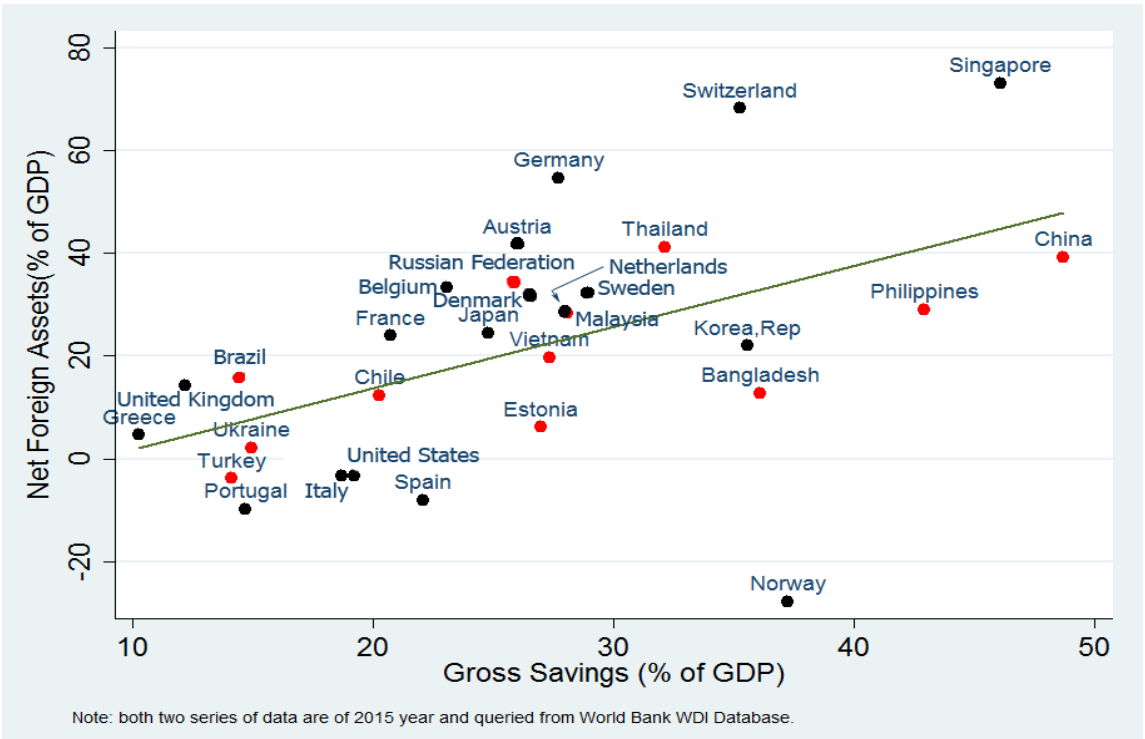


Figure 2. Net Foreign Assets (% of GDP) and Savings Rates, 2015
Source: Both obtained from the World Bank WDI database.

is positively and significantly associated with savings rates. Further, "Currently in second place, China had an estimated $2.4 trillion in net foreign assets by the end of 2015, compared to Japan's

$3.6 trillion. Increases in net foreign asset come through current account surpluses. In the four years ending in 2015, China's cumulative current account surpluses amounted to about $1 trillion, far larger than Japan's $200 billion. If those trends continue, it is simple arithmetic that China will become the largest net creditor in 2020." (Dollar, 2016, p. 1).

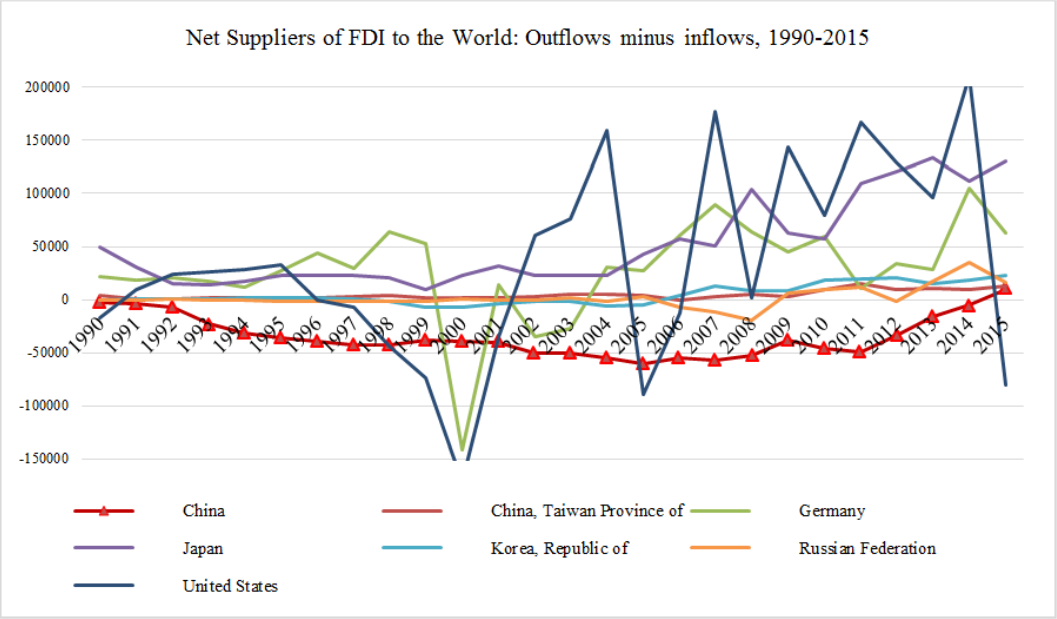


Figure 3. Net suppliers of FDI to the World: Outflows minus inflows, 1990-2015
Source: Calculated from UNCTAD Statistics, FDI/MNC database. Accessed January 9, 2017. Official data used for China 2015

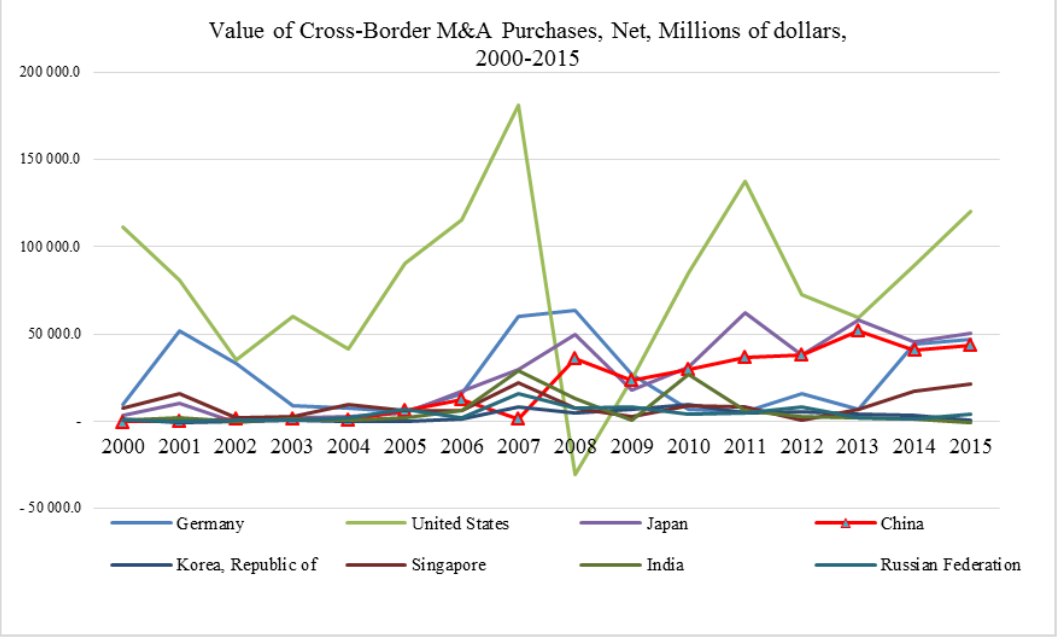


Figure 4. Value of Cross-Border M&A, net, millions of dollars, 2000-2015
Source: UNCTAD cross-border M&A database (www.unctad.org/fdistatistics). Note: Cross-border M&A purchases are calculated on a net basis as follows: Purchases of companies abroad by home-based TNCs (-) Sales of foreign affiliates of home-based TNCs. See Annex table 10 of the World Investment Report.

In the last two decades, Germany, Japan, South Korea and Singapore are good examples of building long-term relationship with developing countries in Asia as well as in Africa by investing in their infrastructure. China has been learning and trying to catch up. Here we argue that China also

has just started to use its comparative advantage in patient capital to help releasing infrastructural bottlenecks to achieve win-win solutions. China is a latecomer—it is able to turn its latent CA to a revealed CA in patient capital only recently, and this timing can be seen in the following two figures, Figure 3 on Net FDI supply to the world, and Figure 4 on cross-border M&A (net). One can see that China is a late comer in both aspects: in terms of cross border M&A, China started to be a net suppliers in 2008. In terms of Net FDI (outflows minus inflows), China is only starting to catch up: In 2015, China's overseas direct investment, at $145.6 billion dollars, had just exceeded the inflows, but the potential is large, as more enterprises going global.

6.1. Example 1: China and Ecuador

In addition to direct investment, China also provides significant overseas lending through China EXIM Bank and China Development Bank. In recent years, each bank has been lending about $100 billion overseas (Dollar, 2016). Rather than focusing on quantities, here we explain the rationales.

The Chinese approach in Ecuador offers a good example of focusing on the long-term dynamics of a country's net worth, rather than the short-term liquidity (as in debt sustainability framework

China and Ecuador's access to international financial markets

China has recently become Ecuador's most important creditor, and has seen Ecuador through a prolonged period of limited access to financial markets. In 2008, Ecuador defaulted on two outstanding bonds totaling USD3.2 billion. These two bonds amounted to less than half of all public foreign debt, and only about 6% of GDP (IMF 2014). Nonetheless, the default was unusual, because the government did not cite financial hardship but irregularities in the debt itself. Many international analysts opposed the default, Moody's downgraded Ecuador's debt to Caa3, and Ecuador lost access to its traditional western creditors. This signaled an opportunity for Chinese leaders and investors to diversify their economy's sources of primary commodities through oil loans, especially as Ecuador was unable to seek funding elsewhere. China's innovative arrangements involving pre-sales of crude oil provided much needed funds upfront.

China accounted for over one-third of Ecuador's total external public debt in 2013. It has also signed oil deals with Ecuador in which it prepays for oil shipments, giving both parties predictability in their trade.

Most loans from China are in the hydroelectric and extraction sectors, helping the government move to its goal of producing some 93.5% of its energy by 2021 via hydropower, but they also carry conditions to use Chinese equipment and contractors.

Moody's specifically cited Ecuador's ability to secure financing from China as a reason for upgrading its debt to Caa1 in 2012. In 2014, Ecuador reentered international financial markets, issuing its first traditional public bond since the partial default. China's share of Ecuador's external public debt fell in 2014. It appears that as of 2014, Ecuador was no longer relying solely on China for new external financing.

Source: Ray and Chimienti, 2015; Gallagher and Myers, 2014.

(DSF) of the IMF and the World Bank). This can be shown in large amount of concessional and non-concessional loans for investment using these developing countries' undervalued assets as collateral—for example, to build hydropower plants and alleviate power bottlenecks. In the long term, these projects can propel growth and job creation.

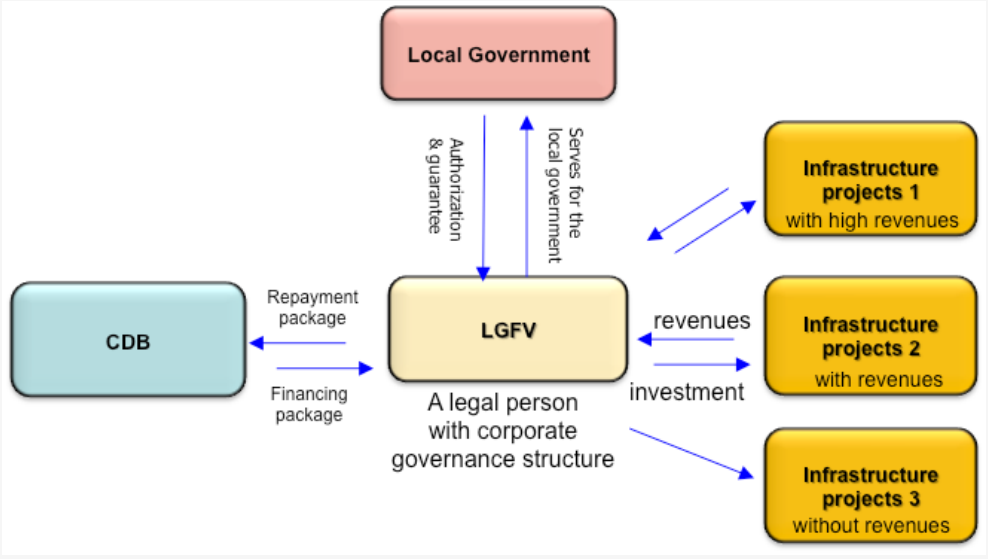
6.2. The capacity to "package" infrastructure projects is also critical for infrastructure financing

China develops its capacity in packaging infrastructure project in a smart way since the late

China Development Bank: Innovative approach of packaging infrastructure projects

In late 1990s, most local governments met significant infrastructure bottlenecks. In early 1998, the municipal government of Wuhu, a port city alongside Yangtze River, set aside its prime assets to establish the Wuhu Urban Construction Investment Co. Ltd. (WUCI). WUCI was mandated to raise fund for the city's infrastructure with the authorization and implicit guarantee from the local government. It is the beginning of Local Government Funding Vehicle (LGFV), which leverages the government's credit.

The first feature of Wuhu model is packaged or bundled loans. The urban infrastructure projects are highly diversified and heterogeneous. In late 1998, China Development Bank (CDB) signed an agreement with Wuhu municipal government, and the latter was promoted to designate a finance vehicle (WUCI) to raise fund and repay for various projects altogether. By this way, WUCI get financing from CDB for six infrastructure projects focusing on highway, water utility, waste disposal and landfill. Consequently, the socially inclusive infrastructure projects are financially supported by the economically bankable ones (projects with high revenues). And conversely, the economically bankable projects also benefit from the socially inclusive ones.

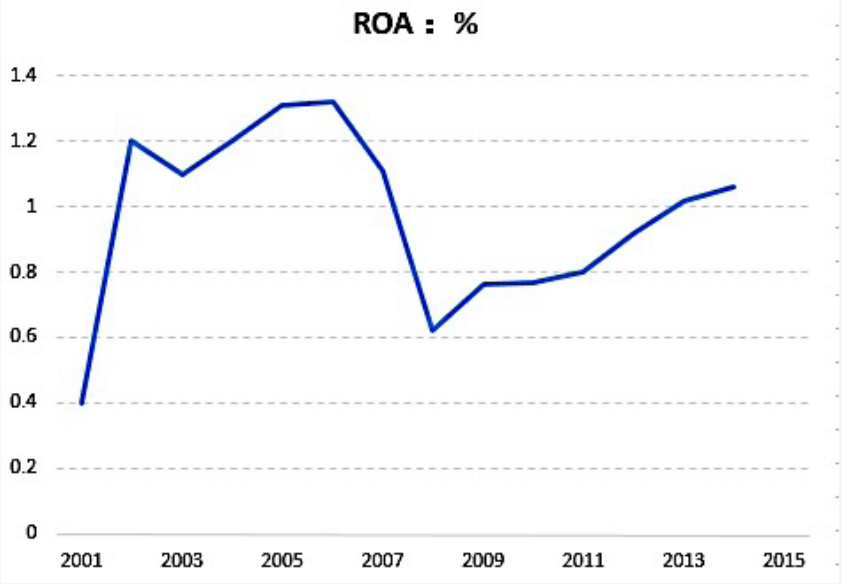


Since then, infrastructures in Wuhu have been improved remarkably, meanwhile the overall business and investment climate has become more attractive. After the infrastructure

bottlenecks are released, the related sectors such as construction, building materials, real estate, tourism, automobiles have rapidly developed to become pillar industries. In next two decades, per capita GDP of Wuhu rose from USD1,000 in 1998 to USD10,000 in 2015. The city certainly had no problem repaying the CDB's loans.

In 2003, the Wuhu model was applied to Tianjin City. In this case, Tianjin city got financing from CDB to support a package of urban infrastructure projects: highway and subway construction, watershed management of a river, urban landscaping, and land acquisition and reclamation. Since 2009, in facing the external shocks of global financial crisis, Wuhu model has been widely replicated and applied to other provinces and cities.

Through this and other innovative approaches, CDB has been able to finance large number of infrastructure projects and reach decent rates of returns. By 2015, the outstanding of RMB loan provided by CDB amounted to USD1.48 trillion, two-third of which directly goes to infrastructure financing. For the last decade (2006–2015), CDB's ROA (return on assets) averaged to 0.93%, despite the shocks of financial turmoil in 2008–2009. From 1998 to 2015, CDB's NPL ratio declined from 42.7% to 0.8%.



With a rapidly rising local government debt burden, LGFV became a controversial issue in 2010s and was suspended. A new budget law is being implemented since early 2015, local government bonds are issued, and debt-equity swaps are carried out. Nonetheless, China's economy has significantly benefited from the construction of bottleneck-releasing infrastructure networks, which was financed in smart ways under specific circumstance at a specific time period.

Source: Qiyuan Xu, "CDB: Born Bankrupt, Born Shaper", Working paper, Chinese Academy of Social Sciences. December 2016. http://policydialogue.org/events/meetings/the_future_of_national_development_banks/materials/

1990s, starting with the China Development Bank's Wuhu project. Here we use this example to illustrate how to package different infrastructure projects, some with high revenues, others without, to make them economically bankable and financially viable. This is possible only if the investment banks have a long-term orientation and have patient capital, aiming for the long-term relationship with, and the development of, the client.

With the similar desire to help long-term development and achieve win-win solutions, China has developed series of Resource Financed Infrastructure (RFI) projects with African countries (such as the Bui Dam in Ghana, with coca beans as collateral). A recent World Bank-led study however considers it as "a new form of infrastructure financing" (Halland *et al*., 2014). What is the definition of RFI model? In simple words, "The RFI model is a financing model whereby government pledges its future revenues from a resource development project to repay a loan used to fund construction of infrastructure. The key advantage of the model is that a government can obtain infrastructure earlier than it would have been able to if it had to wait for a resource project to produce revenues. This new financing model resembles aspects of other financing models, and use of the model will raise issues in the same way that every other model does, whether used for a resource development project or an infrastructure project." (Halland *et al*., 2014, p. 13).

Halland *et al*. (2014) highlighted the most important advantage of the RFI approach, and that is this approach "can bring substantial benefits to a [host] country and its citizens,... years ahead of what would have been possible under any other model." (Halland *et al*., 2014, p. 14). Based on the intellectual foundation of New Structural Economics (Lin, 2012), we had discussed the pros and cons of this RFI approach by stressing the structural aspects of the RFI concept, especially focusing on its feature of "nonrecourse" or "limited recourse" loans which are favorable to the borrower; its ability of reducing transaction cost, reducing the currency mismatch and the maturity mismatch, and encouraging the spatial concentration/agglomeration; as well as the risks associated with political economy and transparency issues. We pointed explicitly that, "There are legitimate concerns over the transparency issues around past RFI packages. We are strongly supportive of the Extractive Industries Transparency Initiative (EITI) principles for moral, political as well as risk management reasons…. In our view, any "deals" negotiated in the dark—without the support of the general public—are likely to be revoked or renegotiated later if there is a change in the government. This lesson from history should be kept in mind." (Lin and Wang, 2014, p.77)

With the hindsight, here we stress that these RFI packages actually are smart ways to package public or semi-public infrastructures to make them attractive to long-term private investors with patient capital who are eyeing for a decent rate of return in the long (10 years or more) term. The special feature of RFI packages of being "nonrecourse" or "limited recourse", favoring the borrower, indicates the lender have assumed higher risks than in the case of full-recourse secured loans. This unique "insurance" service provided by the lender in RFI loans, that would otherwise be unavailable, has yet to be fully appreciated and priced-in by the development community. Should a high rate be charged due to this insurance service? This question is worthy of future research.

The ability to "package" public infrastructure and private services is one of the key institutional factors for success in overseas cooperation as shown by several successful cases in Africa including, but not limited, to Huajian Shoemaker in Ethiopia's Eastern Industrial Park and associated infrastructure investment (World Bank, 2012; Lin and Wang, 2017).

7. Concluding remarks

In this paper, we explore the role of patient capital in infrastructure financing, a new topic worthy of future research, especially on its specific measures. We attempt to show that successful countries with long-term orientation (LTO) can potentially turn its latent comparative advantage in patient capital into a revealed one, as China is doing. The country's rising overseas investment in infrastructure and manufacturing sectors, overtaking inflows, is an indication. Currently large amount of patient capital has been used to finance the country's domestic projects. Along with the gradual opening of China's capital account, more patient capital is going to be exported as more enterprises and banks are "going global". Patient capital often comes with technology, management skills and implementation capacity, the export of which will have strong impact on global connectivity and development. Using NFA as an imperfect measure, "China is likely to emerge in the next few years as the world's largest net creditor", and a proportion of these net foreign assets would be in fact patient capital (see Table 1 for a taxonomy), suitable for infrastructure, manufacturing and employment generation (Dollar, 2016, p. 1).

China needs to continue to learn, as it did in the last 38 years, to become a better development partner by listening to the demand from partners, South or North, East or West, and interacting with the governments, NGOs and civil societies. China needs to be more open and transparent in providing accurate data on international development financing and activities. It is our view that any deals made in the dark are more likely to be revoked or renegotiated by the next government of the client country in the future. The political economy dynamics must be taken into consideration.

In the post-2015 era, the emergence of new multilateral or regional development banks and funds such as the AIIB, the New Development Bank, and the Silk Road Fund, and other unlisted infrastructure or sovereign funds, is encouraging as they are suppliers of patient capital and they bring positive energy and momentum to the world economic development arena. In a multipolar world, it seems inevitable to have multipolar development organizations and different plural-lateral and multilateral development banks and funds. China's recent focus on New Multilateralism is good for the global economy. We are cautiously optimistic that a common ground can be found for partners from the North and the South to work together on "win-win" solutions for sustainable development and world peace.

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