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On the design of financial products along OBOR

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Abstract

We propose a design of fundamental indexes of equity and bond for the One Belt One Road (OBOR) to increase the market effect, instead of only using the OBOR construction investment funds to initiate the OBOR. Background and data are briefed, the methodology and the value-indifferent weighting are explained. We also illustrate an explicit computation of the fundamental index of the equity for the OBOR by using the available data from 12 countries.

JEL Classification: G11; G12; G15

Keywords: Fundamental index; Equity and bond; Composite index; OBOR infrastructure fund

1. Introduction

One Belt One Road is a Chinese initiative to connect more than 60 countries (66 at present) with physical, commercial, cultural, and other links. These countries have a combined population about 4.4 billion and near one-third of global GDP. The One Belt refers to the Silk Road Economic Belt, a recreation of the old land-based Silk Road trade routes from China through Central Asia and on to the Middle East and Europe. It is also called the Modern Silk Road.

Investment for the OBOR is tremendously huge for supporting all those infrastructures and sustaining development. China's state-owned enterprises and largest financial institutions lead the charges of the OBOR development. All provinces in China have indicated their participation in the implementation of the OBOR with a wide range of specific projects. Sichuan province encourages its industrial enterprises to shift surplus production capacity abroad and facilitates the export of equipment, raw material and products from Sichuan. The provincial government has committed to raising the "supporting level of credit" to help participating enterprises, including the offer to train local enterprises to apply for national funds. The OBOR holds rich promise for Chinese companies looking to expand overseas, but risks of continuing financial support funds and long term return of the infrastructure investment should be accessed more carefully.

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In order to support the OBOR with sustaining development, we propose to a design of financial products to transfer the investment return and risk to real financial markets across the 66 countries, and financial institutions and investors all over the world. We may create some financial products which can be traded in the financial markets over the world to effectively support the OBOR through marketization. Due to the various differences among 66 countries along the OBOR and their financial markets difference, it is better to formulate an index with great diversification, low turnover, broad market participation and modest expense for most emerging markets along the OBOR. We adapt the principle of the fundamental indexes developed by Arnott et al,[1] Arnott and West[2] and Arnott et al[3] to the new index construction among 66 countries with representatives of stocks, stock indexes and sovereign debts. Using the cash flow, sales, dividends and book factors with five-year smoothing averages, we design a fundamental index of equity for the OBOR, a fundamental index of sovereign debt for the OBOR and a composite index.

An indexed portfolio based on market capitalization and market value favors the companies that are expected to be future successes and pays for those anticipating future successes today. Fundamental indexes are valuation indifferent, they do not care of the market price, valuation multiples or market capitalization of a company. Fundamental indexes favor stocks in the broad economy, weighted in accordance to a company's economic measures. That is the reason we choose to build a fundamental index of equity for the OBOR through this principle. Instead of picking top 1000 stocks in a single market, we choose representatives of equity among 66 countries to weight in average of four factors from cash flow, dividends, sales and book. For the design of a fundamental index of bond, we choose the common sovereign debts for each country with special four factors from population, land, GDP and energy consumption.

The remainder this paper is organized as follows. In Section 2 we present a brief background of the OBOR and various basics. Section 3 devotes to the data from various sources in tables. We propose to a design of financial products to shift the investment return and risk to real financial markets across the 66 countries in Section 4, and fundamental indexes of equity and bond for the OBOR for different factors are presented. Using the data from EastMoney.com, we present an way to compute the fundamental index of equity for the OBOR with modifications from the available data. Conclusion is given in Section 5 and Appendix on the OBOR Infrastructure Fund in the last section.

2. Background

It is possible through the materialization of the New Silk Road Economic Belt (SREB). Once materialized, the SREB will connect China's central and western regions to the huge markets of Eurasia and East Africa and help close the prosperity gap between the eastern and western regions of China, while the 21st Century Maritime Silk Road will further boost the economic prosperity in the eastern and coastal regions of the country by further enhancement of understanding and cooperation between nations and countries along the new Maritime Silk Road, quoted from Haque.[4] The President of China, Xi Jinping[c] in late 2013 initiated the Chinese integration and cooperation in diverse areas not only with the countries in China's neighborhoods, but also with all the countries along the SREB as many as 65 countries from Asia, Europe and Africa into account. China-led $100 billion Asian Infrastructure and Investment Bank, formally set up in Beijing on December 25, 2015, is about to start its operation. In November 2014, President Xi Jinping announced plans to create a 40 billion USD development fund, which will be distinguished from the banks created for the initiative. The role of the Silk Road Fund is to invest in businesses for the OBOR rather than lend money for projects.

The One Belt and One Road initiative is geographically structured along 6 corridors to connect China to Europe, the Middle East, Central Asia, and South Asia, and the maritime silk road (see Fig. 1).[d] Hope the effective goods exchange and well-communicated information networks to bring the accelerating growth, to increase business opportunities and to narrow inequalities.

[c] The Silk Road Economic Belt (One Belt) concept was introduced by China's President Xi Jinping in an address at Nazarbayev University in Astana, Kazakhstan in September 2013. President Xi introduced the concept of the 21st Century Maritime Silk Road (One Road) in an address in Indonesia in which he also proposed the establishment of the Asian Infrastructure Investment Bank (AIIB) to fund some of the infrastructure required.

[d] For more than history about the Silk Roads, we refer to Frankopan,[12] the book consists of 25 chapters and stories chronologically from the earliest civilisations in Central Asia to the Second Gulf War and touches on the current challenges facing what the West terms the Middle East. Complex national, complicate international and commercial histories with inevitable maelstroms of religious and racial issues, intertwines through the perplex history. The Silk Roads does not only cover the East, but also touches west to the Americas. Since the Renaissance, mainly by Iberian conquistadors, the trading routes among the global for luxury goods are in existence.

Fig. 1. Countries covered by the OBOR initiative.

New Eurasian Land Bridge: running from Western China to Western Russia
China−Mongolia−Russia Corridor: running from Northern China to Eastern Russia
China−Central Asia−West Asia Corridor: running from Western China to Turkey
China−Indochina Peninsula Corridor: running from Southern China to Singapore
Bangladesh−China−Myanmar Corridor: running from Southern China to Myanmar
China−Pakistan Corridor: running from South-Western China to Pakistan
Maritime Silk Road: running from the Chinese Coast through Singapore to the Mediterranean

The main routes of the One Belt One Road (OBOR) initiative (see Fig. 2) are designed to link up with other corridors already planned or under construction. There are seven industry sectors which stand to benefit: (1) Infrastructure, (2) Financial & Professional Services, (3) Advanced Manufacturing & Transport, (4) Agriculture, (5) Energy & Resources, (6) E-Commerce & Logistics, (7) Healthcare & Life Sciences.

The two concepts were adopted at the Third Plenum of the 18th Chinese Communist Party Congress in November 2013 and in the Government Work Report of the Chinese Government adopted in March 2014. Plans for OBOR were further developed in 2014 and 2015 and international cooperation was sought for several initiatives. Several implementing and cooperation arrangements are already being put into place.

Table 1 presents several implementations and cooperation arrangements from 2013 to 2015. In addition, several Chinese state agencies (such as the General Customs Administration; the Administration of Quality Supervision, Inspection and Quarantine; the Ministry of Commerce; and the Ministry of Transport) have already released implementation plans, as have several Chinese provinces. A related initiative that has not received nearly the attention as the One Belt and One Road is the Digital Silk Road (DSR) proposed by China in 2015. Introduced by China's Cyberspace Administration's director Lu Wei, (See Liu and Gao[5]) the DSR seeks cooperation in 5G, cloud computing, the Internet of Things, big data, e-commerce, digital investment, smart cities, and smart energy. The DSR was the subject of a high-level meeting in Brussels in July 2015 at which Chinese and European officials and representatives of leading digital hardware, software, and platform companies from both Europe and China held discussions about cooperation in cyberspace. Research is currently underway mapping out the digital capabilities, companies, and regulations in several of the OBOR countries in support of the DSR.

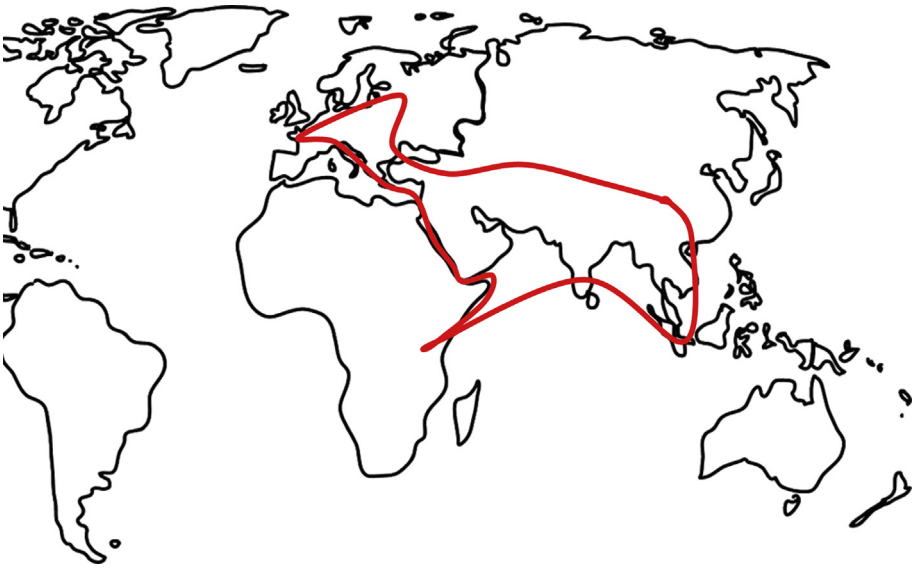

Fig. 2. The main One Belt One Road routes.

Table 1
Several implementing and cooperation arrangements.

1. Joint Communique on the 14th Meeting of the Council of Heads of Governments of the Shanghai Cooperation Organisation Member States (15 Dec 2015)
2. Henan's Implementation Plan for Participating in the Building of the Silk Road Economic Belt and 21st Century Maritime Silk Road (1 Dec 2015)
3. Co-operation between China and the CEE Countries: The Medium-Term Agenda and The Suzhou Guidelines (24 Nov 2015)
4. Action Plan for Harmonisation of Standards Along the Belt and Road (2015−2017) (22 Oct 2015)
5. NDRC Approves Infrastructure Projects Serving Belt and Road (15 Sept 2015)
6. Sino-Kazakhstan Joint Declaration on a New Stage of Comprehensive Strategic Partnership (31 Aug 2015)
7. Hunan's Belt and Road Action Plan (2015−2017) (14 Aug 2015)
8. Mid-term Roadmap for Development of Trilateral Co-operation between China, Russia and Mongolia (9 July 2015)
9. Joint Ministerial Statement: Fostering Pragmatic Cooperation towards the Future of GMS Economic Corridors (11 June 2015)
10. Guangdong's Implementation Plan for Participating in the Building of the Belt and Road Initiative (3 June 2015)
11. Joint Statement on Cooperation on the Construction of Joint Eurasian Economic Union and the Silk Road Projects (8 May, 2015)
12. Joint Statement on Establishing All-weather Strategic Co-operative Partnership between the People's Republic of China and the Islamic Republic of Pakistan (20 April 2015)
13. Announcement on the Reform of the Integrated Regional Customs Clearance Along the Silk Road Economic Belt (30 March 2015)
14. Vision and Actions on Jointly Building the Silk Road Economic Belt and 21st Century Maritime Silk Road (28 March 2015)
15. The Belgrade Guidelines for Co-operation between China and the CEE Countries (16 Dec 2014)
16. The Bucharest Guidelines for Co-operation between China and the CEE Countries (26 Nov 2013)

The major goals of the OBOR initiative are to achieve policy co-ordination across OBOR nations, to build the infrastructure to enhance connectivity among OBOR nations, increase trade and investment flows, promote financial integration, and foster better relations among the peoples of the OBOR nations. Policy co-ordination will be required in order to develop and then operate the infrastructure planned as part of the OBOR initiative (see Enright, Scott & Associates[6] January Report). The OBOR is more than 12 times the size of the Marshall Plan which is the USA's initiative to reconstruct Western European devastated economies after World War II, and it definitely has no comparison in modern history in terms of both scale and scope. One should not separate OBOR with another creation of the Asian Infrastructure Bank (Shanghai-based New Development Bank and the $ 100 billion Contingent Reserve Arrangement) to associate with BRICS emerging markets.

Under the OBOR, Chinese enterprises are encouraged to collaborate with local businesses in sectors like logistics, electricity and information systems. It is crucial to have enough funding availability, credits and insurance to investors.

This will totally change the traditional Chinese investment, the mergers and acquisitions are no longer appropriated, since almost a one-fourth of all enterprises are downgraded after the mergers and acquisitions based on historical data. The OBOR and International Production Cooperation strategies have a commitment to long-term partnerships at their core and investment that presuppose many years of engagement will complement. The new oversea investment strategy for the Chinese government would have a solid financial base and sustainable growth prospects as well as trusted multi-years collaborations to build this global industrial chain.

The Asian Infrastructure Investment Bank (AIIB), first proposed by China in October 2013, is a development bank dedicated to lending for projects regarding infrastructure. China in 2015 announced that over one trillion yuan ($160 billion US) of infrastructure projects were in planning or construction. On 29 June 2015, the Articles of Agreement of the AIIB, the legal framework was signed in Beijing. The proposed multilateral bank has an authorized capital of $100 billion, 75% of which will come from Asian and Oceania countries. China will be the single largest stakeholder, holding 26% of voting rights. The bank plans to start operation by the end of 2015.

Jin[7] points out that infrastructure investment can be impeded by significant political, sovereign, and financial risks. The bigger challenge lies in creating a designated institution to coordinate the many OBOR initiatives. Chellaney[8] mentions the risk of non-performing loans at state-owned banks and high execution risks the OBOR could face. The China's foreign exchange reserves have fallen by about a quarter of its peak $ 4 trillion in 2014. The Credit Rating Agency Fitch has questioned that many OBOR projects could not prove profitable. Sustaining rapid growth along OBOR needs to leverage the global value chain and to implement further economic policies and reforms with considerable cost and applications of new technologies. Instead of viewing OBOR as the China's own advancing interests, designs of its financial products on the OBOR to connect not only physical channels but also financial channels. This may bring a global financial market for the OBOR to have more equity investors and debt and loan investors from all over the world to contribute the OBOR to make the infrastructural constructions sustainable and profitable in short, middle and long terms.

3. Data and methodology

In this section, we provide an overview of data and methodology that we use to construct the fundamental indexes of the equities and bonds for the OBOR.

After President Xi Jinping's initiative of jointly building the Silk Road Economic Belt and the 21st Century Maritime Silk Road (hereinafter referred to as the Belt and Road Initiative) in 2013, China issued The Vision and Actions on Jointly Building the Silk Road Economic Belt and the 21st Century Maritime Silk Road in 2015.[e] Promoting policy coordination, connectivity of infrastructure and facilities, unimpeded trade, financial integration and people-to-people bonds, adhering to the principle of achieving shared growth through discussion and collaboration in propelling the Belt and Road construction are necessarily ingredient for the OBOR.

Chinese government released another official action[f] to build a peaceful and prosperous 21st-Century Maritime Silk Road. With new developments emerging for the up-to-date wrap-up on how the Initiative has progressed, we collect data from 65 countries from 2005 to 2016 to cover various information.

We collected data from China Belt and Road Initiative official website[g] and the report[h] for more information. We use the data and methods from Ministry of Commerce of People's Republic of China,[9] Chin and He,[10] and Industrial Cooperation between Countries along the Belt and Road identified 65 countries in Table 2.

Table 2 shows the regions with including countries in the region. Table 3 illustrates the land area, population, GDP and household consumption in 2014, from Chin and He.[10] Table 1-28 in MCPRC[9] shows that various sectors invested in emerging and acquisition in 2015 with total $ 54.44 billions. Chapter 7 of MCPRC[9] reports that the direct investment of China into the OBOR is $ 115.68 billions, which is 10.5% of the total foreign investment of China. Up to June 2016, the Chinese banking institutions and insurances set 56 branches among 24 countries in the OBOR.

We further collect the data set of 60 fields of the 65 countries along the OBOR from 2015 to 2016 from the World Bank source. There are four aspects of the data: (1) Surface Area, (2) Population, (3) GDP and (4) Household consumption data. The data of the

[e] Vision and Actions on Jointly Building Silk Road Economic Belt and 21st Century Maritime Silk Road, the National Development and Reform Commission, Ministry of Foreign Affairs, and Ministry of Commerce of the People's Republic of China, March 2015.

[f] Vision for Maritime Cooperation under the Belt and Road Initiative, the National Development and Reform Commission(NDRC) and the State Oceanic Administration(SOA), June 2017.

[g] https://www.yidaiyilu.gov.cn/.

[h] Industrial Cooperation between Countries along the Belt and Road, China International Trade Institute, August 2015.

Table 2
Countries along the Belt and Road.

Region	Country
East Asia	China, Mongolia
Southeast Asia	Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Vietnam
Central Asia	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
Middle East and North Africa	Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi, Arabia, Palestine, Syria, United Arab Emirates, Yemen
Southeast Asia	Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka
Europe	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Turkey, Ukraine

Source: Industrial Cooperation between Countries along the Belt and Road, China International Trade Institute. The countries are grouped based on World Bank's classification by region.

first three aspects is of 2016, the data of the fourth aspect is of 2015. Missing data is labeled by N/A, the Palestinian data due to political uncertainty is missing. In the dataset we find that The Belt and Road initial countries accounted for 30% of total GDP, accounting for 62% of the world's population, accounted for 38% of the world total territory, and the total world consumption of 26% households.

The Belt and Road countries in terms of territory, population, GDP and household consumption capacity in the world occupies a pivotal position.

4. Designs of financial products

Other than the Chinese government investment to build the OBOR infrastructures, there are various reasons not too easy to attract financial institutions and investors to involve with the construction and the continuations for the OBOR. One of special features on investing infrastructures is the large investment with slow and long term return with many different risks from political, operational and cultural risks. In order to support the OBOR with sustaining development, we propose to a design of financial products to shift the investment return and risk to real financial markets across the 66 countries, and financial institutions and investors all over the world.

4.1. Fundamental index of equity for the OBOR

The designs we propose in this paper are the fundamental indexes for equity and bond based on 66 countries representative equity indexes and bond indexes or other significant financial indexes. Based on each country's market capitalization, our primary method is to build a weighted combination of each country's representative equity/bond index to enhance the diversification, and such a fundamental index has low turnover, broad market participation and modest expenses. Even in relative efficient market, the overprice and underprice of most stocks or indexes of their actual fair values create erroneously high and low capitalization respectively. Capitalization-weighted indexes systematically overweight overpriced and underweight underpriced securities among 66 countries along the OBOR respectively.

The fundamental index developed by Arnott et al[1] and Arnott and West[2] is an weighted summation determined by the relative scale of an enterprise based on certain fundamental measure to address this structural return drag. These size metrics are intended to accurately reflect the economic footprint of a country (or company): (i) trailing five-year cash flow (Cash Flow), (ii) trailing five-year sale (Sale), (iii) trailing five-year gross dividends (Dividends), (iv) book value (Book). For each country along the OBOR, we may choose an stock index or several stocks to represent this country's equity, A composite fundamental index for the OBOR equity is defined by equally weights the four size metrics. For instance, if a country equity index would receive 4% weight in the Sales index it its sales represented 4% of the combined trailing five-year total sales of the 66 countries along the OBOR. Similarly, if the same country represents 6% of the economy by the cash flow, 3% by book value and 5% by dividends, we average the four measures $((4\% + 6\% + 3\% + 5\%)/4 = 4.5\%)$ and infer that it represents 4.5% of the economy along the OBOR. This weight is assigned for this country for the Fundamental Indexation, regardless of the share price, valuation multiples and market capitalization.

Table 3
Countries along the Belt and Road.

Region	Country	GDP current US$ billion 2016	Population million 2016	Surface Area sq.km thousand 2016	Household consumption current US$ billion 2015
East Asia	China	11199.15	1378.67	9562.91	4271.06
	Mongolia	11.16	3.03	1564.12	6.88
Southeast Asia	Brunei Darussalam	11.40	0.42	5.77	2.56
	Cambodia	20.02	15.76	181.04	13.86
	Indonesia	932.26	261.12	1910.93	493.56
	Lao PDR	15.90	6.76	236.8	10.45
	Malaysia	296.36	31.19	330.8	160.35
	Myanmar	67.43	52.89	676.59	N/A
	Philippines	304.91	103.32	300	215.94
	Singapore	296.97	5.61	0.72	109.30
	Timor-Leste	N/A	1.26	14.87	N/A
	Thailand	406.84	68.86	513.12	205.12
	Vietnam	202.62	92.70	330.97	131.33
South Asia	Afghanistan	19.47	34.66	652.86	16.61
	Bangladesh	221.42	162.95	147.63	141.31
	Bhutan	2.24	0.80	38.39	1.14
	India	2263.52	1324.17	3287.26	1224.31
	Maldives	3.59	0.42	0.3	N/A
	Nepal	21.14	28.98	147.18	17.10
	Pakistan	283.66	193.20	796.1	216.85
	Sri Lanka	81.32	21.20	65.61	56.51
Central Asia	Kazakhstan	133.66	17.80	2724.9	99.05
	Kyrgyz Republic	6.55	6.08	199.95	5.80
	Tajikistan	6.95	8.73	141.38	6.38
	Turkmenistan	36.18	5.66	488.1	N/A
	Uzbekistan	67.22	31.85	447.4	35.59
Middle East and North Africa	Bahrain	31.86	1.43	0.77	14.02
	Egypt, Arab Rep.	336.30	95.69	1001.45	274.24
	Iran, Islamic Rep.	N/A	80.28	1745.15	197.89
	Iraq	171.49	37.20	435.05	106.53
	Israel	318.74	8.55	22.07	163.76
	Jordan	38.65	9.46	89.32	30.05
	Kuwait	N/A	4.05	17.82	47.12
	Lebanon	47.54	6.01	10.45	31.36
	Oman	66.29	4.42	309.5	23.03
	Palestine	N/A	N/A	N/A	N/A
	Qatar	152.47	2.57	11.61	36.18
	Saudi Arabia	646.44	32.28	2149.69	263.68
	Syrian Arab Republic	N/A	18.43	185.18	N/A
	United Arab Emirates	348.74	9.27	83.6	204.45
	Yemen, Rep.	27.32	27.58	527.97	36.72
Europe	Albania	11.93	2.88	28.75	9.22
	Armenia	10.55	2.92	29.74	8.22
	Azerbaijan	37.85	9.76	86.6	30.09
	Belarus	47.43	9.51	207.6	29.85
	Bosnia and Herzegovina	16.56	3.52	51.21	13.31
	Bulgaria	52.40	7.13	111	31.39
	Czech Republic	192.92	10.56	78.87	86.98
	Croatia	50.43	4.17	56.59	28.60
	Estonia	23.14	1.32	45.23	11.76
	Georgia	14.33	3.72	69.7	9.54
	Hungary	124.34	9.82	93.03	60.05
	Latvia	27.68	1.96	64.49	16.49
	Lithuania	42.74	2.87	65.29	26.16
	Macedonia, FYR	10.90	2.08	25.71	6.88
	Moldova	6.75	3.55	33.85	5.72

(*continued on next page*)

Table 3 (*continued*)

Region	Country	GDP current US$ billion 2016	Population million 2016	Surface Area sq.km thousand 2016	Household consumption current US$ billion 2015
	Montenegro	4.17	0.62	13.81	3.18
	Poland	469.51	37.95	312.68	278.95
	Romania	186.69	19.71	238.39	109.96
	Russian Federation	1283.16	144.34	17098.25	714.68
	Serbia	37.75	7.06	88.36	27.75
	Slovak Republic	89.55	5.43	49.04	47.93
	Slovenia	43.99	2.06	20.27	22.30
	Turkey	857.75	79.51	785.35	519.08
	Ukraine	93.27	45.00	603.55	60.29
B&R countries total		22833.57	4612.76	51612.69	11028.50
world countries total		75543.54	7442.14	134325.13	42772.77
Share of B&R countries in world total		0.30	0.62	0.38	0.26

Source: World Bank database, accessed on 31 July 2017, The countries are grouped based on World Bank's classification by region

$$FIE_{OBOR} = \sum_i w_i EI_i,$$

where FIE_{OBOR} is the Fundamental Index of equity for the OBOR, and the summation is among all those representatives of stocks and stock indexes EI_i, and w_i is the composite weight from the four fundamental measures.

Using a single metric would lead to a skewed sample of countries, a blend of multiple measures along with the five-year smoothing, mitigates the exposure to any of these risks and sharply reduces turnover. Arnott and West[2] indicate that each metric has its own special vulnerabilities. The fundamental index of equity for the OBOR ignores all of the information that is reflected in the shared prices for the representative country's stocks and stock indexes. This is why we adapt this methodology to formulate weighted sum among all 66 different equity markets. The information even with corrected price means that the stock will be priced to offer average long-term risk-adjusted performance. Hence no harm is done by holding more or less than the cap-weighted index. If the information with incorrect price, then the error is harmfully correlated with the weight in the cap-weighted portfolio. With available data for the related metrics, we can keep tracking the fundamental index of equity for the OBOR. The advantage of the fundamental index for the US has been shown robust and significant over long period of time, and the Exhibit 8 and 9 of Arnott and West[2] illustrates the results of studies done by Nomura Securities for the fundamental index of equity for 23 developed equity markets, using price-only data.

We can apply the same methodology to sector index funds, ETFs and bond index. We further explain the fundamental index of bond for the OBOR in the next subsection.

4.2. An example of the fundamental index of equity for the OBOR

In this subsection, we compute the fundamental index of equity for the OBOR defined in previous subsection with modifications due to the data availability. First of all, most of countries participated the Belt and Road Initiative are developing countries. There are not well-developed stock markets in the 66 countries. We selected the main index data of 12 countries to represent the fundamental index of equity for the OBOR as a modified version of FIE_{OBOR}.

Due to the data availability, we have collected stock indexes from the following 12 countries.

(1) the JKSE of Indonesia is an index of 546 stocks in the Indonesia stock market,
(2) the STI of Singapore is an index consisting of 45 stocks in the Singapore stock market,
(3) the SENSEX of India is an index consisting of 30 stocks in the India stock market,
(4) the VNI30 of Vietnam is of 30 stocks,
(5) the KLSE of Malaysia is of 30 stocks,
(6) the SET of Thailand is of 565 stocks,
(7) the KSE 100 of Pakistan is of 100 stocks,

(8) the CSE of Sri Lanka is of 279 stocks,
(9) the IRT of Russia is of 50 stocks,
(10) the WIG of Poland is of 20 stocks,
(11) the ATG of Greece is of 60 stocks,
(12) the SSEC of China is of 1244 stocks in the Chinese stock market.

These index data is obtained from the EastMoney.com, a professionally financial database in China. We use daily information of those 12 indexes from September 1, 2013 to September 1, 2017 to calculate our fundamental index of equity along the OBOR.

Let us first normalize $\left(x^* = \frac{x-min(x)}{max(x)-min(x)}\right)$ each country's index due to their various differences. Then, we download basic country profile data from the world bank database, according to the measure in previous section, we use the Foreign direct investment, net inflows (BoP, currency US$) of the country to replace the Dividends of the country, the GDP (currency US$) of the country to replace the book value of the company, the Revenue, excluding grants (% of GDP) of the country to replace the sale of company, the Tax revenue (% of GDP) of the country to replace the cash flow of the company. We collect the five year data from 2012 to 2016, and use GDP item for example to calculate the arithmetic average of the five years GDP data for each country to represent the size of the country. We denote it by GDP_i, then we sum the GDP data from each country to have $GDP_{sum} = \sum_{i=1}^{12} GDP_i$. Now we get the ratio of the each country by GDP_i/GDP_{sum}. Then we apply this method to every item in the data we collected to evaluate all those fundamental weights in Table 8.

By using the formula $FIE_{OBOR} = \sum_i w_i EI_i$ to calculate the fundamental index of equity of the OBOR, with the regularization process for each index, we multiply 10,000 to the weighted index. The Fundamental index of equity of the OBOR for the period between September 1, 2013 and September 1, 2017 is illustrated in Fig. 3.

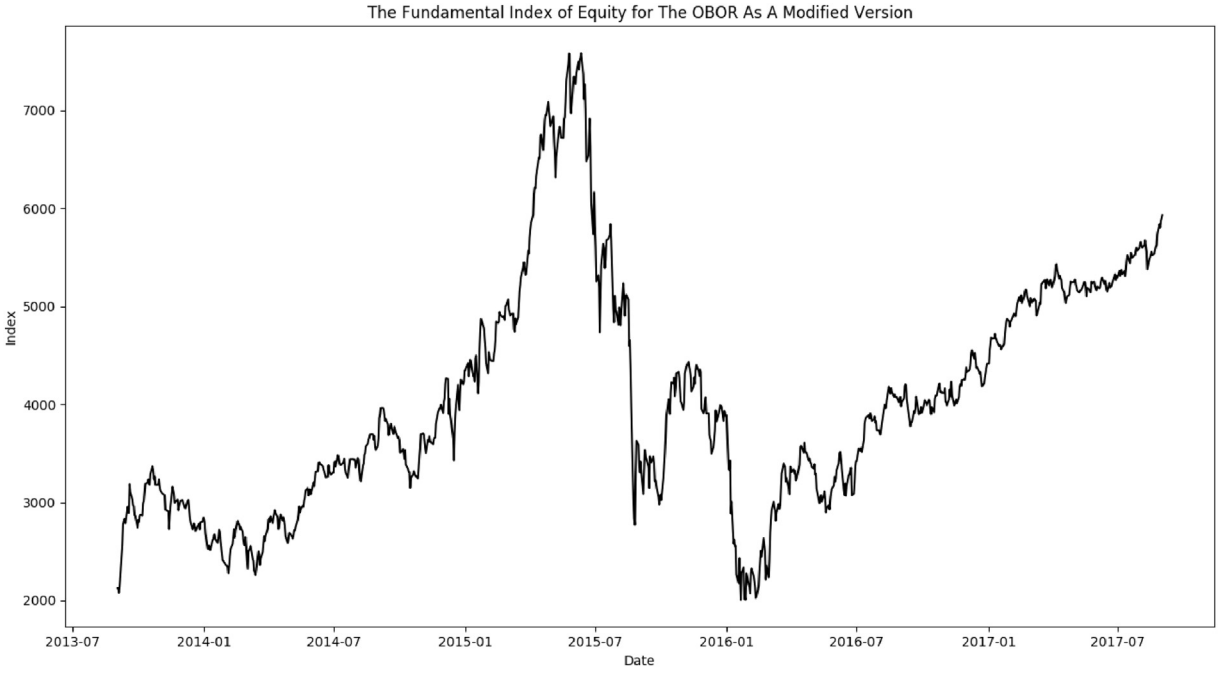

Fig. 3. The Fundamental Index of Equity for The OBOR As A Modified Version. The figure shows the Fundamental Index of Equity for The OBOR as a modified version, using data from EastMoney.com and World Bank for 12 countries from September 1, 2013 to September 1, 2017. The modified fundamental index is computed as in chapter 4.2, and the maximum value 7584, minimum 2005 with mean 4033, standard deviation 1169 from all those 1043 computed indexes.

Table 4
Other profiles about the 65 countries.

Country	Factor 1[1]	Factor 2[2]	Factor 3[3]	Factor 4[4]	Factor 5[5]	Factor 6[6]	Factor 7[7]	Factor 8[8]	Factor 9[9]	Factor 10[10]	Factor 11[11]	Factor 12[12]	Factor 13[13]	Factor 14[14]	Factor 15[15]
China	19.64	8.26	15.50	17.42	1.21	35.23	25.75	95.50	50.30	N/A	3.93	N/A	N/A	N/A	7.55
Mongolia	50.78	3.55	11.29	46.80	2.25	0.26	4.03	64.40	21.44	N/A	2.02	8.08	0.22	21.60	14.50
Brunei Darussalam	46.04	N/A	N/A	37.38	−9.18	N/A	17.93	N/A	71.20	N/A	10.24	N/A	N/A	N/A	19.19
Cambodia	61.28	1.14	3.51	65.67	3.52	0.32	0.76	75.50	19.00	15.94	0.27	N/A	N/A	N/A	0.37
Indonesia	19.08	3.40	11.22	18.31	2.45	9.08	6.63	87.40	21.98	12.96	0.81	N/A	8.25	11.30	1.90
Lao PDR	29.34	2.15	5.92	39.11	3.02	0.10	N/A	75.70	18.20	15.82	N/A	N/A	N/A	N/A	0.33
Malaysia	67.24	9.85	26.90	60.84	1.92	1.59	42.80	98.20	71.06	18.93	4.60	N/A	N/A	0.60	7.96
Myanmar	16.41	N/A	N/A	26.37	9.33	3.31	N/A	80.60	21.80	N/A	0.22	N/A	N/A	N/A	0.24
Philippines	27.97	3.58	9.40	36.93	1.66	31.14	53.06	91.80	40.70	15.36	0.70	N/A	N/A	N/A	1.00
Singapore	172.15	51.88	85.05	146.27	−1.43	N/A	49.28	100.00	82.10	18.67	8.84	N/A	N/A	N/A	9.36
Timor-Leste	N/A	N/A	N/A	N/A	N/A	0.08	N/A	71.90	13.40	102.61	N/A	N/A	N/A	41.80	0.37
Thailand	68.93	5.64	16.07	54.20	1.74	6.03	21.44	97.80	39.32	20.68	2.54	N/A	N/A	10.50	4.45
Vietnam	93.62	2.05	6.05	91.06	1.11	13.38	N/A	97.60	52.72	N/A	1.44	6.59	3.06	13.50	1.70
Afghanistan	6.90	0.58	1.90	49.02	5.26	0.31	N/A	55.30	8.26	N/A	N/A	N/A	N/A	N/A	0.67
Bangladesh	16.65	1.33	3.79	21.30	6.73	13.68	N/A	86.90	14.40	9.84	0.31	N/A	N/A	N/A	0.44
Bhutan	29.41	2.51	8.07	52.13	7.24	0.03	N/A	100.00	39.80	N/A	N/A	N/A	N/A	N/A	1.16
India	19.18	1.68	6.49	20.63	3.61	62.75	7.52	94.10	26.00	N/A	0.81	N/A	N/A	N/A	1.59
Maldives	93.76	7.43	11.97	89.03	0.44	0.00	N/A	98.60	54.46	N/A	N/A	N/A	N/A	N/A	2.67
Nepal	10.66	0.73	2.52	39.36	5.46	6.28	0.62	91.60	17.58	19.42	0.14	N/A	N/A	N/A	0.23
Pakistan	8.69	1.51	5.58	15.82	1.81	19.85	1.56	91.40	18.00	N/A	0.47	N/A	N/A	N/A	0.84
Sri Lanka	21.44	3.78	11.97	29.08	3.57	7.25	0.84	95.60	29.99	13.28	0.53	N/A	N/A	N/A	0.78
Kazakhstan	32.64	8.71	22.91	29.16	10.75	0.31	41.19	92.90	70.83	13.67	5.60	N/A	N/A	2.80	15.43
Kyrgyz Republic	N/A	1.10	3.41	N/A	2.48	2.00	11.86	90.00	30.25	24.16	1.94	10.02	1.29	30.60	1.72
Tajikistan	N/A	1.11	3.50	N/A	5.28	1.87	N/A	73.80	18.98	N/A	1.48	8.79	19.51	32.00	0.44
Turkmenistan	N/A	6.67	16.06	N/A	−4.84	0.01	N/A	N/A	15.00	N/A	2.68	N/A	N/A	N/A	12.47
Uzbekistan	20.62	2.22	6.64	21.49	7.62	2.26	N/A	N/A	42.80	N/A	1.65	N/A	N/A	N/A	3.41
Bahrain	N/A	N/A	N/A	N/A	N/A	N/A	0.96	100.00	93.48	N/A	19.59	N/A	N/A	N/A	24.29
Egypt, Arab Rep.	10.35	3.46	11.11	19.60	6.25	16.58	0.78	99.40	37.82	20.99	1.66	N/A	N/A	N/A	2.37
Iran, Islamic Rep.	N/A	N/A	N/A	N/A	N/A	1.36	N/A	96.20	45.33	N/A	2.99	N/A	N/A	N/A	7.97
Iraq	32.56	5.43	17.24	39.26	−12.92	0.84	N/A	86.60	17.22	N/A	1.31	N/A	N/A	N/A	4.95
Israel	29.81	36.19	37.40	27.53	1.10	0.96	19.66	100.00	77.35	32.42	6.60	N/A	N/A	N/A	8.82
Jordan	35.12	3.92	8.98	55.94	1.01	5.13	1.82	96.90	53.40	22.19	1.89	N/A	N/A	N/A	2.95
Kuwait	N/A	N/A	N/A	N/A	N/A	0.00	2.72	99.00	82.08	38.80	15.21	N/A	N/A	N/A	27.22
Lebanon	54.49	7.68	13.86	66.47	−0.79	7.31	N/A	99.00	74.00	18.74	2.89	N/A	N/A	N/A	4.28
Oman	N/A	N/A	N/A	N/A	N/A	0.04	4.13	93.40	74.17	N/A	6.55	N/A	N/A	N/A	16.49
Palestine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qatar	47.48	N/A	N/A	41.63	−9.41	0.38	3.41	100.00	92.88	N/A	15.31	N/A	N/A	N/A	37.78
Saudi Arabia	30.67	21.75	55.76	30.18	−2.89	0.31	0.77	97.00	69.62	N/A	9.44	N/A	N/A	N/A	18.08
Syrian Arab Republic	N/A	N/A	N/A	N/A	N/A	1.62	N/A	90.10	29.98	N/A	0.95	N/A	N/A	N/A	1.82
United Arab Emirates	103.82	40.48	72.85	101.44	−5.44	N/A	N/A	99.60	91.24	3.53	11.26	N/A	N/A	N/A	18.78
Yemen, Rep.	3.29	1.04	2.49	25.09	4.56	3.35	4.70	N/A	25.10	N/A	0.22	N/A	N/A	N/A	0.99
Albania	28.74	4.25	11.88	45.58	−0.25	1.05	1.49	95.10	63.25	24.73	2.31	N/A	N/A	N/A	1.66
Armenia	33.14	3.76	9.00	43.31	0.51	1.38	5.27	100.00	58.25	23.15	1.97	8.45	2.31	30.00	1.90
Azerbaijan	46.45	4.76	16.13	43.67	14.61	0.64	2.53	87.00	77.00	34.18	2.20	N/A	N/A	N/A	3.79
Belarus	62.66	5.60	17.21	62.76	7.76	0.92	4.31	99.70	62.23	29.68	3.68	9.33	N/A	4.80	6.74
Bosnia and Herzegovina	N/A	4.88	12.14	N/A	0.65	1.83	2.82	99.90	65.07	38.68	3.37	N/A	N/A	N/A	6.08
Bulgaria	63.57	7.47	19.02	60.51	1.11	1.67	7.65	99.40	56.66	27.21	4.71	N/A	N/A	22.00	5.45
Czech Republic	80.34	17.57	32.71	72.97	1.07	3.13	14.90	100.00	81.30	27.95	6.26	N/A	N/A	N/A	9.38
Croatia	51.40	12.11	22.88	48.22	−0.12	2.25	8.98	99.60	69.80	N/A	3.71	N/A	N/A	N/A	4.16
Estonia	79.59	17.75	28.92	75.63	1.69	0.48	11.40	99.60	88.41	2.32	6.73	N/A	N/A	N/A	15.11
Georgia	43.48	3.81	9.45	59.13	3.97	1.49	5.57	100.00	47.57	24.74	2.69	5.59	9.77	N/A	1.99
Hungary	92.51	12.57	25.64	82.19	0.99	4.61	N/A	100.00	72.83	40.66	3.97	N/A	N/A	14.90	4.19
Latvia	57.99	14.63	26.09	57.44	0.72	1.27	N/A	99.30	79.20	41.64	3.51	N/A	N/A	22.50	3.52
Lithuania	74.35	14.77	28.84	73.50	1.18	1.28	11.85	96.60	71.38	9.20	3.82	N/A	N/A	22.20	4.27

Table 4 (*continued*)

Country	Factor 1^1	Factor 2^2	Factor 3^3	Factor 4^4	Factor 5^5	Factor 6^6	Factor 7^7	Factor 8^8	Factor 9^9	Factor 10^{10}	Factor 11^{11}	Factor 12^{12}	Factor 13^{13}	Factor 14^{14}	Factor 15^{15}
Macedonia, FYR	49.24	4.98	14.48	63.80	6.26	0.29	2.99	99.40	70.38	N/A	3.50	N/A	N/A	22.10	4.00
Moldova	43.63	2.12	5.67	71.76	5.40	1.46	3.99	88.40	49.84	31.36	1.39	9.72	N/A	11.40	1.40
Montenegro	42.23	6.97	17.09	65.67	1.54	0.40	N/A	99.70	68.12	N/A	4.61	8.46	N/A	N/A	3.62
Poland	52.28	12.68	26.77	48.40	0.20	6.71	8.78	98.30	68.00	32.58	3.97	7.99	0.01	N/A	7.95
Romania	41.39	9.47	22.95	42.32	2.16	3.48	7.50	100.00	55.76	32.60	2.58	N/A	N/A	N/A	3.54
Russian Federation	25.71	9.72	22.54	20.55	3.61	6.43	13.76	96.90	70.10	25.04	6.60	N/A	N/A	11.20	12.47
Serbia	50.91	5.28	13.68	58.25	1.07	3.20	N/A	99.20	65.32	N/A	4.27	N/A	N/A	25.40	6.26
Slovak Republic	93.81	16.81	29.91	90.08	−0.38	2.12	10.29	100.00	77.63	40.56	5.14	N/A	N/A	N/A	6.22
Slovenia	79.06	21.66	32.36	69.42	0.60	0.69	6.42	99.50	73.10	39.95	6.73	N/A	N/A	14.30	7.01
Turkey	22.06	11.18	23.99	25.02	7.72	1.19	2.16	100.00	53.74	32.43	2.85	N/A	N/A	1.60	4.27
Ukraine	49.29	2.31	8.19	55.52	17.14	6.16	7.27	96.20	48.88	35.76	3.42	10.45	0.01	8.60	5.96

Source: World Bank database, accessed on 31 July 2017.

In this table: Factor 1 represents exports of goods and services (% of GDP) in 2016; Factor 2 represents GNI per capita, Atlas method (current thousand US$) in 2016; Factor 3 represents GNI per capita, PPP (current international thousand $) in 2016; Factor 4 represents imports of goods and services (% of GDP) in 2016; Factor 5 represents inflation, GDP deflator (annual %) in 2016; Factor 6 represents Personal remittances, received (current US billion$) in 2016; Factor 7 represents high-technology exports (% of manufactured exports) in 2015; Factor 8 represents improved water source (% of population with access) in 2015; Factor 9 represents individuals using the Internet (% of population) in 2015; Factor 10 represents revenue, excluding grants (% of GDP) in 2015; Factor 11 represents electric power consumption (kWh thousand per capita) in 2014; Factor 12 represents income share held by lowest 20% in 2014; Factor 13 represents poverty headcount ratio at $1.90 a day (2011 PPP) (% of population) in 2014; Factor 14 represents poverty headcount ratio at national poverty lines (% of population) in 2014; Factor 15 represents CO_2 emissions (metric tons per capita) in 2013; N/A represents the missing value.

Table 5
Summary statistic of Table 4.

Item	N	Mean	Min	Max	STD	Kurt	Skew
Exports of goods and services (% of GDP) 2016	54	47.11	3.29	172.15	30.8	3.76	1.45
GNI per capita, Atlas method (current US$) 2016	55	8.69	0.58	51.88	10.01	7.56	2.56
GNI per capita, PPP (current international $) 2016	55	18.05	1.9	85.05	15.99	6.97	2.34
Imports of goods and services (% of GDP) 2016	54	50.93	15.82	146.27	25.32	2.43	1.11
Inflation, GDP deflator (annual %) 2016	58	2.31	−12.92	17.14	5	2.48	−0.11
Personal remittances, received (current US$) 2016	60	5.15	0	62.75	10.2	18.32	3.95
High-technology exports (% of manufactured exports) 2015	44	10.55	0.62	53.06	13.04	3.87	2.1
Improved water source (% of population with access) 2015	60	93.63	55.3	100	9.55	4.86	−2.18
Individuals using the Internet (% of population) 2015	64	52.61	8.26	93.48	24.17	−1.18	−0.23
Revenue, excluding grants (% of GDP) 2015	39	26.47	2.32	102.61	16.32	11.84	2.62
Electric power consumption (kWh per capita) 2014	59	4.09	0.14	19.59	3.93	4.61	2
Income share held by lowest 20% 2014	11	8.5	5.59	10.45	1.45	0.33	−0.74
Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population) 2014	9	4.94	0.01	19.51	6.53	2.45	1.63
Poverty headcount ratio at national poverty lines (% of population) 2014	22	17.08	0.6	41.8	10.88	−0.32	0.4
CO_2 emissions (metric tons per capita) 2013	64	6.54	0.23	37.78	7.32	5.08	2.07

Summary statistic of the Country's indicators in Table 4, N represents the number of data for each country.

Fig. 3 illustrates the basic information about the 12 countries stock markets represented by those fundamental weights we evaluated in a modified version. During the period of computation, our fundamental index has maximum value 7584, minimum 2005 with mean 4033, standard deviation 1169 from all those 1043 computed indexes.

4.3. Fundamental index of bond for the OBOR

Bolla (2017)[11] studies the fundamental indexing methodology to show that the fundamental index approach outperforms a market-value-weighted index, and carries statistically significant increasing risk factor term and duration risk, default risk, convexity risk, liquidity risk and carry trade risk. We follow the valuation-indifferent weighting approach by Arnott et al[3] for the fundamental index of bond for the OBOR.

Table 6
Another profiles about the 65 countries.

Country	Factor 1[1]	Factor 2[2]	Factor 3[3]	Factor 4[4]	Factor 5[5]	Factor 6[6]	Factor 7[7]	Factor 8[8]	Factor 9[9]
China	215.03	32.91	28.90	1418.29	242.49	93.74	N/A	N/A	4.66
Mongolia	76.36	74.15	6.00	21.54	0.09	159.18	N/A	N/A	33.75
Brunei Darussalam	35.48	70.61	14.50	N/A	0.17	140.12	N/A	N/A	N/A
Cambodia	58.83	113.11	99.00	9.32	1.70	75.54	−0.77	14.17	6.18
Indonesia	47.94	30.05	24.90	308.54	19.78	121.79	−2.59	10.75	32.13
Lao PDR	N/A	48.67	67.00	11.65	1.08	99.97	−3.73	13.51	10.85
Malaysia	145.32	120.73	18.50	190.95	10.96	96.58	−3.15	14.30	6.05
Myanmar	36.97	40.93	13.00	6.40	4.08	111.92	N/A	N/A	0.54
Philippines	63.49	46.77	28.00	77.73	5.64	68.60	−1.33	13.63	9.88
Singapore	135.13	206.32	2.50	N/A	70.58	82.59	4.36	13.63	N/A
Timor-Leste	N/A	N/A	9.00	N/A	0.04	N/A	8.93	39.89	N/A
Thailand	169.43	100.78	25.50	129.65	9.00	104.36	−0.09	16.29	6.87
Vietnam	N/A	173.24	24.00	77.80	11.80	136.26	N/A	N/A	3.81
Afghanistan	−1.22	49.67	7.50	2.49	0.16	145.50	N/A	N/A	2.89
Bangladesh	60.62	34.53	19.50	38.64	3.38	66.52	−1.34	8.50	4.12
Bhutan	52.91	67.06	15.00	1.96	0.01	120.71	N/A	N/A	17.75
India	N/A	27.53	26.00	479.56	44.01	104.39	N/A	N/A	10.92
Maldives	83.86	64.33	12.00	0.94	0.30	101.67	N/A	N/A	3.50
Nepal	86.14	49.14	17.00	4.16	0.05	85.94	1.06	16.79	8.27
Pakistan	51.41	23.83	18.00	65.48	0.98	60.24	N/A	N/A	12.86
Sri Lanka	72.27	36.31	9.00	43.92	0.68	109.70	−7.57	12.38	18.68
Kazakhstan	44.78	46.35	9.00	154.29	6.58	145.77	−2.42	9.84	63.65
Kyrgyz Republic	19.28	83.40	10.00	7.50	1.14	108.69	−1.52	16.80	15.69
Tajikistan	25.18	57.54	22.00	5.10	0.43	86.62	N/A	N/A	16.77
Turkmenistan	N/A	49.75	N/A	0.40	4.26	169.82	N/A	N/A	N/A
Uzbekistan	N/A	31.98	5.50	14.84	1.07	164.77	N/A	N/A	N/A
Bahrain	N/A	64.85	9.30	N/A	−1.46	87.55	N/A	N/A	N/A
Egypt, Arab Rep.	119.65	24.16	6.50	46.58	6.88	122.45	N/A	12.52	13.26
Iran, Islamic Rep.	N/A	N/A	15.50	6.32	2.05	135.23	N/A	N/A	0.83
Iraq	N/A	53.43	34.50	N/A	3.32	107.23	N/A	N/A	N/A
Israel	N/A	40.47	12.00	N/A	11.51	111.75	−2.23	23.35	N/A
Jordan	108.31	69.11	12.50	25.75	1.27	79.32	−3.48	15.38	14.34
Kuwait	N/A	N/A	61.40	N/A	0.28	122.03	−21.05	1.39	N/A
Lebanon	218.68	48.14	15.00	30.90	2.34	103.54	−7.37	14.28	17.98
Oman	70.10	72.41	6.30	N/A	−2.69	174.98	N/A	N/A	N/A
Palestine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Qatar	147.03	58.64	8.70	N/A	1.07	153.38	N/A	N/A	N/A
Saudi Arabia	33.98	48.62	16.20	N/A	8.14	121.12	N/A	N/A	N/A
Syrian Arab Republic	N/A	N/A	15.50	4.42	N/A	102.38	N/A	N/A	N/A
United Arab Emirates	110.09	140.76	8.20	N/A	8.80	192.64	−0.01	0.06	N/A
Yemen, Rep.	N/A	28.44	40.50	7.29	−0.02	N/A	N/A	N/A	18.81
Albania	61.16	55.60	5.00	8.27	0.99	87.98	−3.03	18.51	27.85
Armenia	54.36	48.12	4.00	8.93	0.18	116.03	−4.71	20.98	38.68
Azerbaijan	40.02	53.11	3.00	13.22	4.05	113.80	−2.72	15.60	5.20
Belarus	47.35	107.33	5.00	37.88	1.65	98.72	2.25	14.17	15.92
Bosnia and Herzegovina	57.93	87.30	65.00	12.89	0.29	101.87	0.37	19.98	29.66
Bulgaria	55.62	104.64	23.00	37.49	2.78	112.27	−0.70	20.16	31.64
Czech Republic	66.70	158.10	9.00	N/A	1.70	104.34	−1.18	13.34	N/A
Croatia	86.68	70.25	7.00	N/A	0.16	99.86	N/A	N/A	N/A
Estonia	81.78	121.53	3.50	N/A	−0.65	94.27	−0.01	1.41	N/A
Georgia	65.65	65.23	3.00	14.85	1.57	133.57	−1.20	23.77	29.66
Hungary	58.27	157.36	7.00	N/A	−5.31	100.67	−1.74	23.57	N/A
Latvia	81.51	95.28	5.50	N/A	0.76	105.27	−2.27	21.36	N/A
Lithuania	15.13	122.00	5.50	N/A	0.97	98.26	−0.15	4.85	N/A
Macedonia, FYR	54.96	N/A	2.00	6.94	0.30	96.17	N/A	N/A	20.77
Moldova	38.72	89.87	6.00	6.34	0.23	72.20	−1.94	19.50	12.94
Montenegro	63.35	63.34	10.00	2.67	0.70	N/A	N/A	N/A	25.22

Table 6 (*continued*)

Country	Factor 1[1]	Factor 2[2]	Factor 3[3]	Factor 4[4]	Factor 5[5]	Factor 6[6]	Factor 7[7]	Factor 8[8]	Factor 9[9]
Poland	76.56	85.16	37.00	N/A	14.07	100.40	−2.56	15.61	N/A
Romania	34.10	73.95	12.00	95.96	4.32	109.26	−1.49	18.95	31.36
Russian Federation	N/A	36.88	9.80	467.72	6.85	138.48	−1.99	10.62	23.33
Serbia	56.40	90.29	7.00	30.81	2.35	106.90	N/A	N/A	23.58
Slovak Republic	78.03	170.97	11.50	N/A	1.15	93.18	−2.86	17.68	N/A
Slovenia	72.02	143.89	7.00	N/A	1.68	96.58	−2.98	18.65	N/A
Turkey	81.16	39.77	6.50	397.92	17.55	98.26	1.12	18.24	10.72
Ukraine	70.33	80.96	5.00	122.83	3.05	83.70	−1.49	20.45	58.27

Source: World Bank database, accessed on 31 July 2017.
In this table: Factor 1 represents domestic credit provided by financial sector (% of GDP) 2016; Factor 2 represents merchandise trade (% of GDP) 2016; Factor 3 represents time required to start a business (days) 2016; Factor 4 represents external debt stocks, total (DOD, current billion US$) 2015; Factor 5 represents foreign direct investment, net inflows (BoP, current billion US$) 2015; Factor 6 represents net barter terms of trade index (2000 = 100) 2015; Factor 7 represents net lending (+)/net borrowing (−) (% of GDP) 2015; Factor 8 represents tax revenue (% of GDP) 2015; Factor 9 represents total debt service (% of exports of goods, services and primary income) 2015; N/A represents the missing value.

The valuation-indifferent weighting is best interpreted as a simple way of incorporating size and value premiums into a portfolio in lieu of a strategy and used non-price-based accounting variables to create portfolio weights in Arnott et al.[3] The principle of the fundamental index of bond is the same as we discussed in previous subsection as to the equity portfolios, with modifications of several challenges unique to the fixed-income securities. For a company with one stock, there are multiple bond offerings issued by the same company. For corporate investment-grade and high-yield bonds, the valuation-indifferent weights are different. For the fundamental index of bond for the OBOR, we adapt the emerging market bonds among 66 countries.

There are many choices of factors to form a fundamental index in emerging market. The emerging market bonds do not have metrics such as sales, profits, book value or dividends. Analogues for the country size do exist. We use (i) total population, (ii) square root of land area as a crude proxy of resources, (iii) total gross domestic product (GDP) and (iv) energy consumption. All factors are computed as smoothed five-years averages.

The four factors are much less volatile than factors used for equity and corporate bonds. For example, the second factor (square root of land area) does not change from year to year, hence the target weight moves gradually. We use 66 countries' emerging market sovereign plus index with RMB-denominated foreign sovereign debt as the constituents. In order to avoid the overrepresent problem by one country with multiple debt issues, we follow Arnott et al (2010) to split the country weight among each of its issues according to the face value of the debt, as we did in the equity case with multiple representatives. Therefore, the fundamental index of bond for the OBOR is given by

$$FIB_{OBOR} = \sum_i w_i SD_i,$$

where FIB_{OBOR} is the fundamental index of bond for the OBOR, the weight w_i for each sovereign debt SD_i is computed by the five-year smoothing average of four factors in the above.

Up to the available data for computing the fundamental index of bond for the OBOR, one would compare the performance against the benchmark, and compare with CAMP, three-factor and five factor regressions for the alpha

Table 7
Summary statistics of Table 6.

Item	N	Mean	Min	Max	STD	Kurt	Skew
Domestic credit provided by financial sector (% of GDP) 2016	50	73.7	−1.22	218.68	44.78	2.97	1.56
Merchandise trade (% of GDP) 2016	59	75.42	23.83	206.32	42.13	0.91	1.18
Time required to start a business (days) 2016	63	16.71	2	99	17.6	8.49	2.69
External debt stocks, total (DOD, current billion US$) 2015	44	101.3	0.4	1418.29	235.91	23.18	4.46
Foreign direct investment, net inflows (BoP, current billion US$) 2015	63	8.62	−5.31	242.49	31.85	48.77	6.73
Net barter terms of trade index (2000 = 100) 2015	61	110.44	60.24	192.64	27.23	0.84	0.88
Net lending (+)/net borrowing (−) (% of GDP) 2015	38	−1.94	−21.05	8.93	4.24	11.67	−2.12
Tax revenue (% of GDP) 2015	39	15.51	0.06	39.89	7.07	3.2	0.44
Total debt service (% of exports of goods, services and primary income) 2015	41	18.04	0.54	63.65	14.17	2.41	1.39

Summary statistic of the Country's indicators in Table 5, N represents the number of data for each country.

Table 8
The summary of 12 countries' basic profile.

Country	Item	Value (10 billion $)	$Ratio_a$	$Ratio_b$
China	Foreign direct investment, net inflows (BoP, current US$)	243	54.89%	50.73%
	GDP (current US$)	10,200	59.27%	
	Revenue, excluding grants (current US$)	731	41.36%	
	Tax revenue (current US$)	567	47.42%	
Greece	Foreign direct investment, net inflows (BoP, current US$)	2.3	0.52%	2.57%
	GDP (current US$)	222	1.29%	
	Revenue, excluding grants (current US$)	84.7	4.79%	
	Tax revenue (current US$)	44.2	3.69%	
India	Foreign direct investment, net inflows (BoP, current US$)	32.7	7.39%	7.78%
	GDP (current US$)	2020	11.75%	
	Revenue, excluding grants (current US$)	92.9	5.25%	
	Tax revenue (current US$)	80.5	6.72%	
Indonesia	Foreign direct investment, net inflows (BoP, current US$)	18.6	4.21%	5.50%
	GDP (current US$)	903	5.26%	
	Revenue, excluding grants (current US$)	104	5.89%	
	Tax revenue (current US$)	79.3	6.63%	
Malaysia	Foreign direct investment, net inflows (BoP, current US$)	10.4	2.36%	2.58%
	GDP (current US$)	314	1.83%	
	Revenue, excluding grants (current US$)	51.7	2.92%	
	Tax revenue (current US$)	38.2	3.19%	
Pakistan	Foreign direct investment, net inflows (BoP, current US$)	1.26	0.28%	1.01%
	GDP (current US$)	251	1.46%	
	Revenue, excluding grants (current US$)	19.3	1.09%	
	Tax revenue (current US$)	14.6	1.22%	
Poland	Foreign direct investment, net inflows (BoP, current US$)	11.2	2.54%	4.58%
	GDP (current US$)	503	2.93%	
	Revenue, excluding grants (current US$)	132	7.48%	
	Tax revenue (current US$)	64.1	5.36%	
Russian	Foreign direct investment, net inflows (BoP, current US$)	36.3	8.22%	14.93%
	GDP (current US$)	1820	10.61%	
	Revenue, excluding grants (current US$)	422	23.88%	
	Tax revenue (current US$)	204	17.02%	
Singapore	Foreign direct investment, net inflows (BoP, current US$)	65.4	14.80%	5.43%
	GDP (current US$)	299	1.74%	
	Revenue, excluding grants (current US$)	43.4	2.45%	
	Tax revenue (current US$)	32.8	2.74%	
Sri Lanka	Foreign direct investment, net inflows (BoP, current US$)	0.862	0.20%	0.40%
	GDP (current US$)	76.8	0.45%	
	Revenue, excluding grants (current US$)	7.35	0.42%	
	Tax revenue (current US$)	6.59	0.55%	
Thailand	Foreign direct investment, net inflows (BoP, current US$)	10.7	2.42%	3.22%
	GDP (current US$)	406	2.36%	
	Revenue, excluding grants (current US$)	64.9	3.67%	
	Tax revenue (current US$)	52.8	4.41%	
Vietnam	Foreign direct investment, net inflows (BoP, current US$)	9.57	2.16%	1.26%
	GDP (current US$)	182	1.06%	
	Revenue, excluding grants (current US$)	13.9	0.78%	
	Tax revenue (current US$)	12.4	1.04%	

The data in this table describe the result of the country profile data process. The data come from world bank database, $Ratio_a$ represents the ratio of every item dividend the summation of the same item in the table. $Ratio_b$ is the w_i in the formula $FIE_{OBOR} = \sum_i w_i EI_i$, represents the weight of individual country in the composite index.

and beta, sensitivity to market and economic conditions, and the risk factors analysis (sovereign risk, duration risk, convexity risk, liquidity risk and carry trade risk).

Among 66 countries along the OBOR, scores for sovereign risk are the highest in the middle east countries of Syria and Iraq where wars left government finance in shambles, Greece where credit defaults occurred. Among 66

countries along the OBOR, various risks are required to assess, and are evaluated to reflect the sovereign risk. Overall evaluation is based on the security risk, political stability risk, government effectiveness risk, legal and regulatory risk, macroeconomic risk, foreign trade and payment risk, financial risk, tax policy risk, labor market risk, and infrastructure risk.

4.4. OBOR composite index

In order to promote the One Belt One Road financing system and the initiative, the Ministry of Finance of China, Argentina, Belarus, Kampuchea, Chile, Czech, Ethiopia, Fiji, Georgia, Greece, Hungary, Indonesia, Iran, Kenya, Laos, Malaysia, Mongolia, Burma, Pakistan, Qatar, Russia, Serbia, Sultan, Switzerland, Thailand, Turkey, Britain and other 26 in the Ministry of Finance, approved the "One Belt One Road financing" guiding principle (hereinafter referred to as the "guiding principle"). On May 14, 2017, "One Belt One Road" International Cooperation Forum promotes a meeting on finance so that Minister Xiao Jie and Chancellor Hammond, Georgia's first deputy prime minister and finance minister Si J Willy, Russian finance minister Xi Lu Aranoff of Qom, Pakistan's Ishak Dahl, Iran's finance minister Taib Nia, the Hungarian national economy minister Wahl Mihai, high Ethiopia's minister of Finance and Economic Cooperation Department, Kampuchea finance minister Nabibi ampon monira, Argentina finance minister Maputo card or the Ministry of Finance and other 17 financial ministers signed the guiding principle. On the basis of actively promoting the "national Belt and Road Initiative" financing strategy, we put forward The Belt and Road financial index by collecting financial and economic development of the OBOR countries, and put forward the index system construction:

5. Conclusion

The One Belt and One Road initiative is geographically structured along 6 corridors to connect China to Europe, the Middle East, Central Asia, and South Asia, and the maritime silk road among 66 countries. We present several implementations and cooperation arrangements from 2013 to 2015. Several Chinese state agencies (such as the General Customs Administration; the Administration of Quality Supervision, Inspection and Quarantine; the Ministry of Commerce; and the Ministry of Transport) have already released implementation plans, as have several Chinese provinces.

We collected data from the Chinese Belt and Road Initiative official website and the report for more information, and illustrates the land area, population, GDP and household consumption in 2014, the Belt and Road countries in terms of territory, population, GDP and household consumption capacity in the world occupies a pivotal position and are presented in our Tables 4−7.

In order to have a sustainable development for the OBOR, we propose a design of financial products to shift the investment return and risk to real financial markets across the 66 countries, and financial institutions and investors all over the world. The fundamental index developed by Arnott et al[1] and Arnott and West[2] is an weighted summation determined by the relative scale of an enterprise based on certain fundamental measure to address this structural return drag. The Fundamental Index of equity for the OBOR is a value-indifferent weighted sum of the representatives equities among 66 countries, where the weight is the average of the smoothing factors cash flow, sale, dividend and book value for the representative equity. Using data from EastMoney.com and World Bank database, we present a way to compute the fundamental index of equity for the OBOR with modifications of smoothing weights among only 12 countries.

Similarly, we define the fundamental index of bond for the OBOR, the weight w_i for each sovereign debt SD_i is computed by the five-year smoothing average of four factors total population, square root of land area as a crude proxy of resources, total gross domestic product (GDP) and energy consumption. It is a future research project to understand the indexes we defined here and to hedge risks arising from various reasons.

Appendix. On the OBOR infrastructure fund

China Investment Association Federation of overseas investment (hereinafter referred to as the "sea") is to guide enterprises to set up a "construction investment fund management platform The Belt and Road, various types of funds will be included, municipal infrastructure, housing industry, Roads and bridges, Hong Kong, machine rail, energy, electric power, communications, intelligence and the people's livelihood the construction fund 10.

Joint or required by the domestic and foreign professional investment strength to establish “The Belt and Road” investment fund management platform for enterprise reporting, by Chinese Overseas Investment Association experts, enterprises have the ability to clearly determine the feasibility of investment projects and welfare projects development. “Belt and Road Initiative” is the key to exchange and make use of the information as interoperability, and a breakthrough on the interoperability and infrastructure is bound to stimulate a large number of major infrastructure projects. Great Wisdom Agency showed statistically that the countries with “The Belt and Road” proposed, in the construction of infrastructure have reached the scale of 1 trillion and 40 billion yuan, and the construction of infrastructure in Asia is expected to total $8−10 trillion in the next ten years. The Chinese government initiated the Asian infrastructure investment bank (hereinafter referred to as Asia Investment Bank), which has received the participation of 57 founding members.

Table: The Belt and Road construction investment fund management platform includes the infrastructure fund types

- Municipal Construction Fund
- Initiative Live Construction Fund
- Roads and Bridges Construction Fund
- Railway Construction Fund
- Machine Port Construction Fund
- Energy Construction Fund
- Power Construction Fund
- Communications Construction Fund
- Intelligent Construction Fund
- People's Livelihood Construction Fund

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