



Belt and Road Economic Health Index

Technical Paper

July 2017



www.icbcstandard.com

Contents

| 1. | Introduction | 3 |
|----|---|----|
| 2. | Concept development | 4 |
| 3. | Index design | 5 |
| 4. | Data transformation and index computation | 11 |
| 5. | Data scoping | 16 |

ICBC Standard Bank

ICBC Standard Bank is a leading financial markets and commodities bank operating across both developed and emerging economies. ICBC Standard Bank Plc was formed in February 2015 when Industrial and Commercial Bank of China Limited (ICBC) acquired a 60% stake of Standard Bank Plc from Standard Bank Group. As a result, a compelling strategic platform was formed, one that benefits from a unique Chinese and African parentage and an univalled global network and level of expertise.

ICBC Standard Bank Plc is a strategic platform for serving the growing demands of our clients in Global Markets products, as well as distributing African risk. We specialise in global commodities, fixed income, currencies and equities.

Headquartered in London, ICBC Standard Bank Plc also has operations in Dubai, Hong Kong, Shanghai, Singapore, New York, and Tokyo.

For more information please visit www.icbcstandard.com.

Oxford Economics

Oxford Economics was founded in 1981 as a commercial venture with Oxford University's business college to provide economic forecasting and modelling to UK companies and financial institutions expanding abroad. Since then, we have become one of the world's foremost independent global advisory firms, providing reports, forecasts and analytical tools on 200 countries, 100 industrial sectors and over 3,000 cities. Our best-of-class global economic and industry models and analytical tools give us an unparalleled ability to forecast external market trends and assess their economic, social and business impact.

Headquartered in Oxford, England, with regional centres in London, New York, and Singapore, Oxford Economics has offices across the globe in Belfast, Chicago, Dubai, Miami, Milan, Paris, Philadelphia, San Francisco, and Washington DC. We employ over 230 full-time people, including more than 150 professional economists, industry experts and business editors —one of the largest teams of macroeconomists and thought leadership specialists. Our global team is highly skilled in a full range of research techniques and thought leadership capabilities, from econometric modelling, scenario framing, and economic impact analysis to market surveys, case studies, expert panels, and web analytics. Underpinning our in -house expertise is a contributor network of over 500 economists, analysts and journalists around the world.

Oxford Economics is a key adviser to corporate, financial and government decision-makers and thought leaders. Our worldwide client base now comprises over 1000 international organisations, including leading multinational companies and financial institutions; key government bodies and trade associations; and top universities, consultancies, and think tanks.

June 2017

All data shown in tables and charts are Oxford Economics' own data, except where otherwise stated and cited in footnotes, and are copyright © Oxford Economics Ltd.

This report is confidential and may not be published or distributed without ICBC Standard Bank's permission.

The modelling and results presented here are based on information provided by third parties, upon which Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

To discuss the report further please contact:

Gary Licht: gary.licht@icbcstandard.com ICBC Standard Bank Plc 20 Gresham street, London, EC2V 7JE, UK Tel: +44 203 145 6704 Helena Huang: <u>helena.huang@icbcstandard.com</u> ICBC Standard Bank Plc 20 Gresham street, London, EC2V 7JE, UK Tel: +44 203 145 6511

1. Introduction

This document provides a methodological overview of the approach used to develop the Belt and Road (B&R) Economic Health Index. It acts as an accompaniment to the white paper which summarises the key findings of our analysis. This document is structured around the sequential process that was used to develop the index as follows:

- 1 **Concept development:** at the outset of the project, it was necessary to conceptualise the index—essentially to define and agree on the overarching purpose of this tool and what it should measure.
- 2 **Index design:** we were then moved on to formally design the index tool. This involved developing the overall framework and structure of the Index and selecting which data indicators would be used to measure identified themes within this framework.
- **3 Data collection and index computation:** post-design we proceed to compute the Index. This involved collecting and formatting the relevant raw data sources, standardising them into a consistent unit of measurement and then aggregating them together using an agreed weighting system.
- 4 Data scoping: as part of this project, we also undertook a very thorough data scoping exercise to understand the extent to which data availability would constrain our ability to evaluate the 65 economies in the B&R region within a consistent framework. The findings from our data scoping work are summarised in an Appendix to this document.

2. Concept development

This chapter outlines the process that was undertaken to develop the concept of the Economic Health Index measure. This involved iterative discussion with the ICBC Standard's working group to establish the underlying motivation for the index, what it was seeking to measure and how it could be applied and used. This chapter provides a high-level overview of this process.

Indices are essentially tools for synthesising disparate data sources to summarise information in a clear and systematic manner around a headline topic(s). As such, a fundamental first step in the design of any index is to clearly identify the headline topic and the type of information that is intended to be reported and summarised. Tangential to this, if it is the intention that the index results be used for specific analytical purposes, it is also important that these are clearly defined and understood beforehand, as this can also influence index design.

It was agreed that the principle objective of the Index was to inform investors about current and future economic conditions and the level of economic and political risk in each of the 65 markets. Within this context, it was agreed that the measure should transmit comparable information with regard to each market e.g. who is growing faster than whom, where is political risk higher/lower. The implication of this is that the method of data normalisation should be one which generates comparative insights across countries at a point in time rather than about within-country change over time. In this light, the index measure is likely to be of greater interest and use for investors who are primarily focused on making decisions about where to allocate money (e.g. with the optimal risk-return trade off).

Finally, a key feature of the index is that it will be updated and published on a monthly basis post-launch. As such, there is a practical requirement that the majority of the information that is collated and reflected in the index should be published or updated on a high-frequency basis, ideally monthly but at least quarterly.

3. Index design

Based on the principles outlined in chapter 2 and the findings from our data scoping exercise, we moved on to develop an index structure and identify indicators and data sources that could be used to populate the index. The Index is intended to be a tool that will enable users to compare countries across two main dimensions:

- **Macroeconomic performance:** covering a set of key macroeconomic parameters that are relevant to an investor including market size, growth prospects, how external conditions are affecting the domestic economy and fundamentals related to the business climate; and
- **Risk:** covering both economic and political risk, this sub-category will help to inform users about the sustainability of this growth and wider factors which can help investors to differentiate between markets.

3.1 Index structure

The Index model framework is visualised in Fig. 1. The two core categories (macro performance and risk) are further decomposed into two separate sub-components and then further divided into a further 3-4 themes. This bullet points below describe each of the sub-components in more detail with reference to the themes.

- **Current outlook:** this sub-category provides information on the current state of economic conditions in each of the 65 markets. This is separated into three separate themes covering the strength of domestic demand growth, the strength of external demand based on developments in trading partner economies and short-term growth prospects based on our baseline forecast in each economy for the next two years. The objective of this section of the index will be to provide users with regular and timely insights into current economic developments in each country.
- **Market fundamentals:** in contrast, the market fundamentals sub-category will stand alongside the current outlook sub-component and provide information relevant to investors with a longer-term horizon. The three themes cover factors that are likely to be particularly relevant to a greenfield investor in terms of the investment climate and long-term growth prospects for each economy.
- **Economic risk:** is tracked with reference to four channels: sovereign risk reflecting the probability of a fiscal crisis; external risk covering reflecting the likelihood of a 'sudden stop' crisis; price and cost stability which will cover metrics related to the future risk of an increase in inflation or exchange rate depreciation; and the current state of monetary policy (with loose policy in this context interpreted to generate a higher level of risk).
- **Political risk:** this sub-category of the index will aim to track, monitor and compare different elements of political risk across the 65 B&R markets. This will be de-composed into three themes covering risks related to the business environment, to conflict and security and to the political outlook and policy of the ruling (or prospective) government.

Fig. 1. Overview of index structure



Source: Oxford Economics

3.2 Indicator selection

3.2.1 Leveraging our in-house forecasting capabilities

Having established the model framework, our next task was to identify data sources that could be used to populate the index. In parts, the Index is designed to provide forward-looking information to users. In these cases, we use our own inhouse projections from our <u>Global Economic Model</u> (GEM). The GEM provides a rigorous and consistent platform for economic forecasting with an unprecedented degree of country coverage. Forecasts are updated and maintained by our team of expert country economists. The GEM itself covers 80 country models in depth whilst through our <u>Country Economic Forecasting</u> service, we provide forecasts, commentary and coverage for over 180 countries including all 65 countries in the B&R region. The majority of these forecasts are updated on a high-frequency basis—either monthly or quarterly. The remainder are updated on a biannual basis, often a reflection of the relative lack of available high-frequency data on the strength of economic activity.

Fig. 2. Overview of Oxford Economics' macroeconomic forecasting coverage across the B&R region

| Covered by the GEM | | Cover | | |
|--------------------|-----------|------------|------------|--------------|
| Monthly | Ouarterly | Monthly | Ouarterly | Biannual |
| Bulgaria | Bahrain | Kazakhstan | Azerbaijan | Afghanistan |
| China | Estonia | Ukraine | Bangladesh | Albania |
| Croatia | Iran | | Belarus | Armenia |
| Czech Republic | Iraq | | Bosnia | Bhutan |
| Egypt | Latvia | | Cambodia | Brunei |
| Hungary | Lithuania | | Georgia | East Timor |
| India | Oman | | Jordan | Kyrgyzstan |
| Indonesia | Slovenia | | Lebanon | Laos |
| Israel | Vietnam | | Macedonia | Maldives |
| Kuwait | | | Serbia | Moldova |
| Malaysia | | | Syria | Mongolia |
| Pakistan | | | Uzbekistan | Montenegro |
| Philippines | | | | Myanmar |
| Poland | | | | Nepal |
| Qatar | | | | Palestine |
| Romania | | | | Sri Lanka |
| Russia | | | | Tajikistan |
| Saudi | | | | Turkmenistan |
| Singapore | | | | Yemen |
| Slovakia | | | | |
| Thailand | | | | |
| Turkey | | | | |
| UAE | | | | |

Source: Oxford Economics

These forecasts were mainly leveraged in the macroeconomic performance category. They include estimates of the current quarter growth rate forecasts for each component of domestic demand (consumer spending, investment and government consumption) to ensure that we are providing a comprehensive overview of this topic. Alongside side this, we also include information on our projections for growth going forward over both short-term (2-year) and long-term (10-year) horizons. The short-term forecasts will focus on demand-side metrics (GDP and consumption) growth while the long-terms forecasts will focus on supply-side metrics (working-age population and labour productivity).

In addition, we have also used our uniquely comprehensive forecasting platform to develop a bespoke measure of the strength of external demand for each of the 65 B&R countries. This measure was segmented into two parts covering external demand for goods and external demand for inbound tourism services¹. In both cases, this process involved estimating the relative importance of trading partners using historic data on bi-lateral trade patterns². These shares were then used to produce a weighted measure of external demand based on the trajectory of merchandise import volumes (for goods) and consumer spending (for tourism) in these partner countries. These trackers can be used to provide a real-time measure of current external demand that is tailored to each B&R market.

In addition, we used OE forecasts to complement secondary data sources in the economic risk sub-component of the Index. These included our near-term outlook for both inflation and the exchange rate (price and cost stability) and for government revenue growth (sovereign risk).

3.2.2 Secondary source data

In addition to the forward-looking information included in the Index, we have also used a wide range of secondary source data. At the outset of the source identification process, we developed a number of criteria which were used to differentiate between available indicators as follows:

- Relevance: the indicator needs to be relevant to the topic that we are seeking to assess and measure;
- **Periodicity:** although it was not accepted that not all topics that were being considered and measured within our framework were amenable to high-frequency publication, our intention to publish the Index on a monthly basis implied that a sizeable proportion of the data needed to be published at that interval and that the volume of annual data should be minimised;
- **Timeliness:** the index needs to reflect current trends and changes. As such, the indicator needs to relate to a recent period. For monthly data sources, this was set at a time lag of three months, for quarterly data at a two-quarter lag and any annual data used had to relate to the latest completed calendar year (2016 at the time of collection);
- Coverage: datasets need to be applicable to our geographic area of interest. In the case of a multilateral provider, we excluded datasets which did not cover at least 85 percent of the B&R region. For indicators that would be gathered via national sources a similar threshold was applied based on our data scoping exercise; and
- **Reliability:** to ensure credibility, it is important that the indicator is published by a reliable and trusted provider. These include major multilateral data

¹For virtually all the countries in the B&R where service exports form a significant proportion of total overseas revenues, travel and passenger transport receipts account for a high proportion of service export earnings.

² For goods weightings, we used the IMF's Direction of Trade (DOTs) facility which provides a comprehensive overview of bilateral merchandise goods flows for all 65 B&R economies. For tourism, we used weights estimated based on in-house research compiled on behalf of the World Travel and Tourism Council (WTTC).

collectors such as the IMF, the World Bank or the UN or organisations with the authority to publish National Statistics within the host economy.

Fig. 3 provides a full overview of indicators used across the Index and documents the major source used. The bullet points below summarise the key sources that were leveraged and the rationale by sub-component.

- **Market fundamentals:** given that this sub-component of the index focused on a set of more slowly evolving indicators, it was felt that this was an area where it would be acceptable (though not preferable) to use annual data. The tax and regulatory environment and financial and physical infrastructure themes drew heavily on information contained within the World Bank's Ease of Doing Business Survey (EDBS) which assesses a variety of factors associated with a country's investment climate for a very wide cross-section of countries including 64 of the countries within the B&R region. Variables related to market size and growth included our own forecasts (described previously) or were sourced from our in-house database which draws upon a very wide set of national and international statistical providers;
- Economic risk: for both the sovereign risk and external risk themes our data selection drew upon the literature of characteristics that have been identified as relevant signals of an emerging market's vulnerability to either a fiscal crisis or a 'sudden stop' crisis. Specifically, we have selected indicators that are used by the IMF in their Early Warning crisis models for emerging markets³. For price and cost stability, we identified a basket of indicators that aim to capture risks related to sudden and unexpected changes in prices and costs which could stand alongside our own forecasts for inflation and exchange rate movements. Finally, for monetary policy we selected a basket of indicators which provided insight on the current status (tight or loose) of financial and lending conditions. These were tailored to provide as comprehensive as possible an information set based on our findings from the data scoping exercise.
- **Political risk:** measurements of political risk tend to be collected and published by more specialist providers. Our political risk will be covered by a mixture of indicators from the EDBS monitor (covering risks related to the business environment) and the EPRE service (covering conflict and security and the political outlook and policy).

³ International Monetary Fund, The IMF-FSB Early Warning Exercise: Design and Methodological Toolkit, September 2010

Fig. 3. Overview of indicator coverage

| Sub-component | Theme | Indicator | Major source |
|---------------------|---|-----------------------------------|----------------------------------|
| | | Consumer spending | OE GEM estimate |
| | Domestic demand ⁴ | Investment | OE GEM estimate |
| | | Government consumption | OE GEM estimate |
| Current outlook | E to welde wood | World trade - goods | OE estimate, UN |
| | External demand | World trade - tourism | OE estimate, WTTC |
| | | Economic growth | OE GEM forecast |
| | Short-term prospects | Consumer spending growth | OE GEM forecast |
| | | Growth stability | OE GEM, national sources |
| | Market size and growth | Market size | OE calculation, UN |
| | Market size and growth | Demographic health | OE GEM forecast |
| | | Productivity performance | OE GEM forecast |
| | | Trading across borders | World Bank |
| | | Paying taxes | World Bank |
| | Tax and regulatory environment | Starting a business | World Bank |
| Market fundamentals | | Dealing with construction permits | World Bank |
| | | Registering a property | World Bank |
| | | Getting electricity | World Bank |
| | | Fixed broadband subscriptions | ITU |
| | Figure sight and also signal inferenteers to be | Transport infrastructure | WEF Global Competitiveness Index |
| | Financial and physical infrastructure | Monetary base | IMF, national sources |
| | | Private sector loans | IMF, national sources |
| | | Interest rate spread | IMF, national sources |
| | | M2 growth | IMF, national sources |
| | Manatany paliny | Consumer credit | IMF, national sources |
| | Monetary policy | Business lending | IMF, national sources |
| | | Real interest rate | IMF, national sources |
| | | Government debt | IMF, national sources |
| | Sovereign rick | Fiscal balance | IMF, national sources |
| | Sovereight lisk | Government revenue growth | OE GEM forecast |
| | | GDP per capita | UN |
| Economic risk | | Reserve coverage | IMF, national sources |
| | | Current account balance | IMF, national sources |
| | External risk | External debt | IMF, national sources |
| | | External debt | IMF, national sources |
| | | Term structure | IMF, national sources |
| | | Inflationary outlook | OE GEM forecast |
| | Price and cost stability | Inflation volatility | OE calculation, national data |
| | | Energy import dependence | OE estimate, UN COMTRADE |
| | | Exchange rate valuation | OE GEM forecast, national data |
| | | Investor protection | World Bank |
| | Business environment | Contract enforcement | World Bank |
| | | Insolvency law | World Bank |
| Political risk | | Security environment | Control Risks |
| i ontiour risk | Conflict and security | Social cohesion | Control Risks |
| | | International relations | Control Risks |
| | Political outlook and policy | Political stability | Control Risks |
| | Tolitical outlook and policy | Ideology and policy | Control Risks |

Source: Oxford Economics

⁴ In a handful of cases, the OE baseline forecast is only available for real GDP in aggregate and not broken down by expenditure component. Here, real GDP growth is used as a proxy for domestic demand. These economies include: Bhutan; East Timor; Mongolia; Montenegro; and Nepal.

3.3 Data coverage and missing data

Although every effort has been made to create a fully comprehensive framework, it was not always possible to source secondary data for every one of the 65 markets. In some cases, this was the case because the available source was insufficiently timely (and therefore failed to pass the criteria identified in the previous subsection). In other cases, this simply reflects the fact that this data is not currently published for that country. Our expectation is that the issue of missing data will ease over time as data availability improves particularly in some of the currently less mature B&R economies. As such, we plan to carry out an annual review of data sources to potentially increase data coverage.

In general, our approach was to leave out the indicator where missing and readjust that country's weights so that they still summed to one. This has the drawback that that the 65 countries are not measured on a strictly comparable basis. However, without a reasonably accurate means to impute missing data, our view is that using a technique such as mean imputation would simply introduce a false sense of comparability. Rather than providing an exhaustive overview, below we outline the typical characteristics of a missing indicator:

- No time series data was available i.e. it was the case that the value was not published rather than simply being published on an insufficiently timely basis;
- The indicator did not share a close correlation with another available indicator such as GDP per capita. This was particularly the case in variables linked to measuring economic risk; and
- The quality of data coverage in that country was low implying that it was challenging to source a timely and conceptually closely related variable as a benchmark.

Dealing with missing data is a common challenge in index construction. Given the intention to produce regular updates, we took the view in some cases that it was better not to estimate a missing data point where we judged that on reliable method of imputation was available. Overall, missing data accounted for 5.7 percent of cases across the index although these were concentrated in particular countries and indicators as described below.

- **Monetary policy:** obtaining timely and high-frequency data on credit growth (both consumer and business) was particularly problematic. For these two indicators, our coverage only amounts to approximately two thirds of the countries—by a distance the lowest proportion of any variables in the index. We expect that data coverage for this type of indicator should improve gradually over time.
- The **conflict and security** and **political outlook and policy** themes are covered by data from Control Risks' political risks service. This does not cover six of the B&R economies (Afghanistan, Bhutan, East Timor, Palestine and Yemen). Given the nature of political risk measures is that they are subject to sharp and sudden country-specific changes, we felt that it was not prudent to use a proxy measure. Going forward, we are currently investigating alternative sources that could be used in place for these markets.

Furthermore, the volume of missing data was concentrated in a handful of B&R markets: Afghanistan; Bhutan; East Timor; Iraq; Laos; the Maldives; Palestine; Syria; Uzbekistan; and Yemen. For the other 55 markets, the average level of data coverage was over 97 percent or 42 of our 43 indicators.

4. Data transformation and index computation

Having discussed index structure and the appropriate data sources to use in the previous chapter, this chapter discusses the techniques that were used to transform this raw data into a standardised format that were then weighted together to generate the final index score.

4.1 Data collection and formatting

The data sources as set out in the previous section were systematically collected and formatted prior to normalisation. This sometimes involved the transformation of the raw data into a metric that was of more value to explaining the relevant theme e.g. from a level to a growth rate. The actual units used in each case are documented in the table below. The bullet points below document the general principles that were used as part of this process and highlight any

- In general, where we are using a secondary data point we have used moving averages to either smooth the recent growth rate or level. Although, one of the key motivations of the Index is to provide timely and real-time information it was determined that this smoothing process would help to filter out the 'noise' from individual monthly or quarterly data points—this is particularly relevant to relatively volatile measures such as the current account.
- To account for seasonality, we have typically used annual or rolling annual average measures of economic performance. This choice was again taken to ensure that the Index values are transmitting information about real trends rather than statistical artefacts.
- Market size was measured based on the level of GDP in each country at a constant set of prices and exchange rates to ensure comparability. Given the enormous difference between China (and to a lesser extent India) and the rest of the B&R on this metric, it was decided to transform this variable using a logarithmic scale.

Fig. 4. Overview of units of measurement by indicator

| Sub-component | Theme | Indicator | Units |
|---------------------|---------------------------------------|-----------------------------------|--|
| | Domestic demand | Consumer spending | Annualised Q-Q growth current quarter or % yr current yr |
| | | Investment | Annualised Q-Q growth current quarter or % yr current yr |
| | | Government consumption | Annualised Q-Q growth current quarter or % yr current yr |
| Current outlook | External domand | World trade - goods | Index measure |
| | | World trade - tourism | Index measure |
| | Short term prospects | Economic growth | Real GDP growth forecast (2-yrs) |
| | Short-term prospects | Consumer spending growth | Real consumption growth forecast (2-yrs) |
| | | Growth stability | Standard deviation GDP growth, past five years |
| | Markat size and growth | Market size | Log (GDP, US\$, constant prices and exchange rates) |
| | Market size and growth | Demographic health | Working-age pop growth (10-yrs) |
| | | Productivity performance | Labour productivity growth (10-yrs) |
| | | Trading across borders | Index score, 0-100 |
| | | Paying taxes | Index score, 0-100 |
| | Tax and regulatory environment | Starting a business | Index score, 0-100 |
| Market fundamentals | | Dealing with construction permits | Index score, 0-100 |
| | | Registering a property | Index score, 0-100 |
| | | Getting electricity | Index score, 0-100 |
| | | Fixed broadband subscriptions | Subscriptions per 100 people |
| | Financial and physical infrastructure | Transport infrastructure | WEF |
| | Financial and physical intrastructure | Monetary base | % GDP |
| | | Private sector loans | % GDP |
| | | Interest rate spread | % points |
| | Monetary policy | M2 | 3 MMAV annual growth as % GDP |
| | | Consumer credit | 3 MMAV annual growth as % GDP |
| | | Business lending | 3 MMAV annual growth as % GDP |
| | | Real interest rate | 3 MMAV level |
| | | Government debt | % of GDP |
| | Sovereign risk | Fiscal balance | % of GDP |
| | oovereigh here | Government revenue growth | % yr next 3-yrs |
| | | GDP per capita | US\$, PPP exchange rate |
| Economic risk | | Reserve coverage | FX reserves, months of imports |
| | | Current account balance | % GDP |
| | External risk | External debt | % GDP |
| | | External debt | % exports |
| | | Term structure | % of external debt that is short-term |
| | | Inflationary outlook | CPI % yr, year ahead |
| | B | Inflation volatility | Standard deviation CPI growth last three years |
| | Price and cost stability | Energy import dependence | Energy imports % GDP |
| | | Exchange rate valuation | Projected future movement in the exchange rate vs current level |
| | | Investor protection | Index score, 0-100 |
| | Business environment | Contract enforcement | Index score, 0-100 |
| | | Insolvency law | Index score, 0-100 |
| Political risk | | Security environment | Risk measure, 0-10 scale |
| | Conflict and security | Social cohesion | Risk measure, 0-10 scale |
| | | International relations | Risk measure, 0-10 scale |
| | Political outlook and policy | Political stability | Risk measure, 0-10 scale |
| | | Ideology and policy | Risk measure, 0-10 scale |

Source: Oxford Economics

4.2 Normalisation

Once the data are transformed from their raw format to a metric that shows the relative importance to the economy, these series then need to be normalised, so that they can be assessed over time and across economies in a consistent manner. Our approach in this respect follows a standard "z-score" normalisation process. This takes the cross-country average for each pillar in the starting year and assesses the extent to which a country is above or below this average. The formula for the z-score is set out in Equation 1 below.

Equation 1 - Z score formula

Standard score , $z = \frac{X-\mu}{\sigma}$

To avoid outliers having an excessive effect on the overall scoring system, values were capped to within two standard deviations of the mean (either side). Many of the variables in the index are measured on unbounded scales and were characterised by a negatively skewed distribution, particularly within the economic risk theme. The final step in index calculation was to apply a min-max formula to generate a 0-100 scale. Therefore, for variables with a handful of tail values, the application of z-score capping had the desirable impact of introducing greater differentiation across countries outside the tail of the distribution.

4.3 Weighting

Finally, the indicators were weighted together. The weights are documented in the table below. In general, they have been developed based on our judgement, in conjunction with the ICBC Standard working group based on relative prioritisation. The weights have also been designed to minimise the influence of missing data. Therefore, whilst in absolute terms the number of missing indicators accounted for 5.7 percent of the index values, on an effective basis—accounting for the relative weight of each indicator—this value fell to 3.7 percent.

In some cases the weights that have been developed are country-specific based on the relative structural characteristics of that economy. This most notably relates to the current outlook sub-component where the external demand and domestic demand indicator themes were weighted together based on the relative importance of that variable to GDP.

Fig. 5. Overview of weighting structure in the B&R Economic Health Index

| Sub-component weight | Theme weight | Indicator | Indicator weight |
|------------------------|---|-----------------------------------|---|
| | Domestic demand (0.5 * country share of | Consumer spending | Consumption's share of domestic demand |
| | | Investment | Investment's share of domestic demand |
| 0 | domestic demand in GDP) | Government consumption | Government consumption's share of domestic demand |
| Current outlook (0.35) | External demand (0.5 * country share of | World trade - goods | Goods share of exports in that country |
| | exports in GDP) | World trade - tourism | Services share of exports in that country |
| | | Economic growth | 0.5 |
| | Short-term prospects (0.5) | Consumer spending growth | 0.5 |
| | | Growth stability | 0.15 |
| | Market size and growth (1/3) | Market size | 0.25 |
| | | Long-run growth | 0.6 |
| | | Trading across borders | 0.2 |
| | | Paying taxes | 0.2 |
| | Tax and regulatory environment (1/3) | Starting a business | 0.2 |
| Market fundamentals | | Dealing with construction permits | 0.2 |
| (0.65) | | Registering a property | 0.2 |
| | | Getting electricity | 0.2 |
| | | Fixed broadband subscriptions | 0.2 |
| | Einensiel and physical infrastructure $(1/2)$ | Transport infrastructure | 0.2 |
| | Financial and physical infrastructure (1/3) | Monetary base | 0.1 |
| | | Private sector loans | 0.1 |
| | | Interest rate spread | 0.2 |
| | | M2 | 0.2 |
| | Monetary policy (0.15) | Consumer credit | 0.2 |
| | Monetary policy (0.15) | Business lending | 0.2 |
| | | Real interest rate | 0.4 |
| | | Government debt | 0.3 |
| | Sovereign rick (0.35) | Fiscal balance | 0.3 |
| | Sovereight hisk (0.55) | Government revenue growth | 0.15 |
| | | GDP per capita | 0.25 |
| Economic risk (0.65) | | Reserve coverage | 0.2 |
| | | Current account balance | 0.2 |
| | External risk (0.35) | External debt | 0.2 |
| | | External debt | 0.2 |
| | | Term structure | 0.2 |
| | | Inflationary outlook | 0.3 |
| | Price and cost stability (0.15) | Inflation volatility | 0.3 |
| | | Energy import dependence | 0.2 |
| | | Exchange rate valuation | 0.2 |
| | | Investor protection | 0.333 |
| | Business environment (0.5) | Contract enforcement | 0.333 |
| | | Insolvency law | 0.333 |
| Political risk (0.35) | | Security environment | 0.333 |
| | Conflict and security (0.25) | Social cohesion | 0.333 |
| | | International relations | 0.333 |
| | Political outlook and policy (0.25) | Political stability | 0.5 |
| | | Ideology and policy | 0.5 |

Source: Oxford Economics

The table above, gives rise to a series of effective weights—essentially the relative contribution of each indicator to the final index value. These are documented in the table below. Overall, the average indicator's effective weight was 4.45 percent with a relatively low variance of 0.05 percent.

Fig. 6. Indicator effective weights in the B&R Economic Health Index

| Sub-component | Theme | Indicator | Effective weight |
|---------------------|---------------------------------------|-----------------------------------|------------------|
| | | Consumer spending | 3.55%* |
| | Domestic demand | Investment | 1.54%* |
| | | Government consumption | 0.94%* |
| Current outlook | Entermediatenend | World trade - goods | 2.22%* |
| | | World trade - tourism | 0.49%* |
| | Short term prospects | Economic growth | 8.75% |
| | Short-term prospects | Consumer spending growth | 8.75% |
| | | Growth stability | 3.25% |
| | Narket size and growth | Market size | 5.42% |
| | | Long-run growth | 13.00% |
| | | Trading across borders | 4.33% |
| | | Paying taxes | 4.33% |
| | Tax and regulatory environment | Starting a business | 4.33% |
| Market fundamentals | | Dealing with construction permits | 4.33% |
| markot randamontalo | | Registering a property | 4.33% |
| | | Getting electricity | 4.33% |
| | | Fixed broadband subscriptions | 4.33% |
| | Financial and physical infrastructure | Transport infrastructure | 4.33% |
| | | Monetary base | 2.17% |
| | | Private sector loans | 2.17% |
| | | Interest rate spread | 4.33% |
| | Monetary policy | M2 | 1.95% |
| | | Consumer credit | 1.95% |
| | | Business lending | 1.95% |
| | | Real interest rate | 3.90% |
| | | Government debt | 6.83% |
| | Sovereign risk | Fiscal balance | 6.83% |
| | | Government revenue growth | 3.41% |
| | | GDP per capita | 5.69% |
| Economic risk | | Reserve coverage | 4.55% |
| | | Current account balance | 4.55% |
| | External risk | External debt | 4.55% |
| | | External debt | 4.55% |
| | | Term structure | 4.55% |
| | | Inflationary outlook | 2.93% |
| | Price and cost stability | | 2.93% |
| | | Energy import dependence | 1.95% |
| | | Exchange rate valuation | 1.95% |
| | _ | Investor protection | 5.83% |
| | Business environment | | 5.83% |
| | | Insolvency law | 5.83% |
| Political risk | | | |
| | connict and security | | |
| | | International relations | 2.92% |
| | Political outlook and policy | | 4.00% |
| | | ideology and policy | 4.38% |

Source: Oxford Economics *These weights are country specific - the values refer to the average across B&R

5. Data scoping

In order to help inform index design, we undertook an initial scoping exercise of available data in the 65 markets. This work included three primary facets as follows:

- a comprehensive review of available data sources focusing on a set of 28 identified indicators;
- background research on the structure of each economy to inform the design and selection of data relating to the strength of external conditions; and
- review of the frequency and depth of OE's in-house forecasting services of each market focussed around indicators that might be used for the forwardlooking elements in the indices.

5.1 Secondary data review

As part of the secondary data review, we identified a set of 28 indicators based on our knowledge of data sources that relate to the topics outlined in the previous chapter and that are typically published with a periodicity suitable for this project (at least once a quarter). These are summarised in the table below.

Fig. 7. Secondary indicators by theme

| Macroeconomic health | Monetary and financial conditions | Economic risk |
|-----------------------------|-----------------------------------|---------------------------|
| International trade data | Policy interest rate | Foreign exchange reserves |
| Industrial production | Price indicators | Current account balance |
| Remittance inflows | Exchange rate value | Fiscal balance |
| Employment | Consumer credit | Government debt |
| Unemployment | Business lending | External debt |
| Earnings | Equity market value | |
| Retail sales | Government bond yield (10-year) | |
| Surveys of confidence | | |
| Energy/commodity production | | |
| Foreign visitor arrivals | | |
| Car production | | |
| House prices | | |
| Car registrations | | |
| Capacity utilization | | |
| Business conditions surveys | | |
| Source: Oxford Economics | | |

These indicators are ranked below in terms of the extent to which they are published by the countries which make up the B&R region. This is sub-divided between whether they are published on a monthly, quarterly or annual basis. In general, indicators related to macroeconomic health were less widely available, although as demonstrated in 0 this is slightly mitigated by the fact that we have identified a larger set of variables in this category to draw upon.

The results underlined that to fully cover the range of topics identified during concept development it would be necessary to rely upon both quarterly and higher-frequency data. This is particularly the case for indicators related to economic risk, which are typically published on a slightly lower frequency basis e.g. data contained within the balance of payments accounts or indicators related to debt stocks. This is not ideal from the perspective of producing a model that will be maintained, updated and published on a monthly basis, but was deemed to be a necessary trade-off given the constraints on data availability.

| Indicator | Category | Monthly | Quarterly | Annual | Total |
|------------------------------------|-----------------------------------|---------|-----------|--------|-------|
| International trade data | Macroeconomic health | 33 | 22 | 10 | 65 |
| Base interest rate (policy rate) | Monetary and financial conditions | 62 | 2 | 0 | 64 |
| Price indicators | Monetary and financial conditions | 62 | 1 | 1 | 64 |
| FX reserves | Economic risk | 63 | 0 | 0 | 63 |
| Exchange rate value | Monetary and financial conditions | 60 | 0 | 1 | 61 |
| Current account balance | Economic risk | 22 | 24 | 4 | 50 |
| Employment | Macroeconomic health | 19 | 20 | 11 | 50 |
| Remittance inflows | Macroeconomic health | 0 | 50 | 0 | 50 |
| Fiscal balance | Economic risk | 38 | 7 | 4 | 49 |
| Government debt | Economic risk | 14 | 25 | 8 | 47 |
| Consumer credit | Monetary and financial conditions | 42 | 4 | 0 | 46 |
| Industrial production | Macroeconomic health | 39 | 3 | 3 | 45 |
| Business lending | Monetary and financial conditions | 43 | 2 | 0 | 45 |
| Inward FDI | Macroeconomic health | 8 | 24 | 13 | 45 |
| Equity market value | Monetary and financial conditions | 44 | 0 | 0 | 44 |
| Unemployment rate | Macroeconomic health | 18 | 17 | 8 | 43 |
| Earnings | Macroeconomic health | 21 | 14 | 5 | 40 |
| External debt | Economic risk | 8 | 28 | 4 | 40 |
| Retail sales | Macroeconomic health | 27 | 3 | 2 | 32 |
| Indicators of confidence | Macroeconomic health | 21 | 3 | 1 | 25 |
| Business conditions surveys | Macroeconomic health | 16 | 6 | 2 | 24 |
| Energy/commodity production | Macroeconomic health | 22 | 1 | 1 | 24 |
| Foreign visitor arrivals | Macroeconomic health | 20 | 1 | 3 | 24 |
| Car production | Macroeconomic health | 22 | 0 | 1 | 23 |
| House prices | Macroeconomic health | 3 | 14 | 0 | 17 |
| Government bond yield (10-year) | Monetary and financial conditions | 16 | 0 | 0 | 16 |
| Car registrations | Macroeconomic health | 13 | 0 | 3 | 16 |
| Capacity utilization | Economic risk | 5 | 2 | 0 | 7 |
| | | | | | |

Fig. 8. Overview of data coverage by indicator

Source: Oxford Economics

Based on our review of available data, we have also concluded that for certain information relevant to economic risk, we will be better placed relying on standardised datasets published by third-party providers such as the IMF and the World Bank. As part of relatively recent initiatives, these organisations publish timely data for a wide group of countries on debt stocks (both sovereign and external) including both aggregate figures and breakdowns that are highly relevant to economic risk e.g. currency composition, term structure. These include the Quarterly Public Sector Debt (QPSD) statistics published by the World Bank, and the Quarterly External Debt Statistics (QEDS) jointly collated by the IMF and the World Bank.

5.2 Economic structure and the importance of external factors

Beyond published secondary data related specifically to conditions in the home country, we also think that it is important to incorporate information related to changes in the global economic outlook. Of course, the countries in the B&R region vary significantly in terms of their sensitivity to different types of global change, a factor that needs to be accounted for in our design of the indices. Specifically, we have identified three areas where we think that our country models can benefit from the inclusion of external data as follows:

- Monitoring the strength of external demand for that country's exports as proxied by import demand in trading partners;
- Tracking changes in benchmark energy and commodity prices where that country has a high reliance on a product as a source of export revenues⁵; and

⁵ This topic was eventually excluded from the Index on the grounds that it would be hard to generate comparability across countries. However, as documented in the White Paper, the Index is able to capture the wider trends that are driven in part by the commodity price cycle.

• Reviewing changes in outbound travel patterns in partner countries where an economy is highly dependent on tourism as a source of exports.

For the first item, we will construct an indicator of external demand based on the historic bi-lateral export pattern of each B&R economy and our forecasts for import growth in countries which are covered on the GEM and updated each month. Based on our initial analysis, this selection of partner economies typically accounts for a very high share (at least 80 percent) of total exports for the 65 B&R countries. However, in cases where this share is lower, we may also supplement the group of partner economies to include countries where the import growth forecast is updated less frequently.

For energy and commodity prices, we have undertaken a review of the 65 countries' exports data to try to identify cases where an economy is highly dependent on commodity revenues. The results are displayed in the table below, which records cases where a single export commodity accounted for over 10 percent of GDP during the period 2011-2014—a period when a broadly complete set of data is available for the 65 countries.

Beyond the examples listed below, a couple of notable omissions were Russia (where oil and gas exports combined accounted for over 15 percent of GDP during this period) and Bhutan where iron and steel exports accounted for just under 10 percent of GDP during this period. Certainly, in the case of the former, we think there is a strong case for including benchmark energy prices as a high frequency indicator of economic health. In addition, East Timor and Turkmenistan were identified as countries within the B&R region with a high dependence on the extractive sector, but where no breakdown of export data could be sourced.

Fig. 9. Overview of commodity dependence in the B&R region

| Country | Commodity | Share of GDP, 2011-2014 |
|--------------|--------------|-------------------------|
| Azerbaijan | Crude oil | 28.90% |
| Bahrain | Refined oil | 36.20% |
| Belarus | Refined oil | 17.70% |
| Brunei I | Crude oil | 28.90% |
| Brunei II | Natural gas | 32.20% |
| Iran | Crude oil | 14.30% |
| Iraq | Crude oil | 43.30% |
| Kazakhstan | Crude oil | 27.00% |
| Kuwait I | Crude oil | 44.20% |
| Kuwait II | Refined oil | 14.90% |
| Mongolia | Copper ores | 14.40% |
| Oman | Crude oil | 41.20% |
| Qatar I | Crude oil | 12.90% |
| Qatar II | Natural gas | 42.70% |
| Saudi Arabia | Crude oil | 39.10% |
| UAE | Crude oil | 22.10% |
| Ukraine | Iron & steel | 10.40% |
| Yemen | Crude oil | 11.00% |
| | | |

Source: Oxford Economics

Finally, a number of the B&R economies are dependent on tourism as a source of economic demand. Based on our own in-house estimates compiled on behalf of the World Travel and Tourism Council (WTTC), the B&R countries where tourism directly contributed over 10 percent of GDP included: Cambodia; Croatia; the Maldives; Montenegro; and Thailand. In these countries, it would be useful to incorporate data on the volume of visitor arrivals (or an indicator of foreign visitor spending) if available on a sufficiently timely basis. A potential alternative will be to construct an estimate of demand based on outbound travel data in origin markets.

5.3 OE Country coverage

Beyond data from secondary sources we will also be able to draw insights from our own in-house macroeconomic forecasting services. This resource will be highly valuable by providing expert judgement-led insights to help to mitigate for areas where we are more data-deficient and to provide more forward looking information.

The table below categorises countries in terms of the depth of our coverage and the frequency of forecast updates. Approximately half of the countries in the Belt and Road region are covered by our Global Economic Model (GEM). The remainder are included as part of our Global Macro Service (GMS). For countries in the GEM we maintain forecasts for a wider set of economic indicators, some of which may be relevant to this project e.g. estimates of potential (or supply side) growth. However, probably more pertinent to the demands of the index is the frequency of our forecast updates. The countries are reasonably evenly divided between those which are forecast on a monthly (25), quarterly (21) and biannual (19) basis.

In terms of the information that can be taken from our in-house forecasting services, this can be broadly categorised into two functions. On the one hand, we will be able to use this resource to introduce a forward-looking dimension into the indices. This could include both near term prospects and long-term projections based on our judgement of economic fundamentals. Secondly, where there is a lack of high frequency data relevant to particular topics in a given country we can use in-house estimates for related variables as a substitute for secondary data. The vast majority of country models are sufficiently detailed on this basis with the exception of Afghanistan and Bhutan. In these cases, we suggest relying on forecasts reported by the IMF on a biannual basis as part of their World Economic Outlook (WEO) publication.

5.4 Political risk data

Our review of secondary data sources that relate to political risk indicates that this is typically a topic that is covered on a high-frequency basis. The majority of indicators that we have identified are updated on either an annual or potentially a biannual basis. This reflects the nature of political risk which is typically a more slowly evolving concept compared to economic activity. However, by combining these together, we should be able to achieve a higher frequency reporting structure (because they are updated at different points of the year).

A second point that needs to be considered is the type of political risk that you think is most relevant to the target audience. Political risk is a somewhat nebulous term and could be conceptualised in a variety of ways including:

- Security risk: relating to the likelihood of war, civil unrest, terrorism etc.
- **Governance risk:** relating to the quality and effectiveness of governance, as measured by the degree of corruption, the security of property rights etc.
- **Business operations:** how the state affects the cost and ease of doing business in a country.
- Political stability: the stability of the political system and more broadly whether the country is subject to very strong swings in policy or operates within a more consensual environment.

Our review covered a number of sources but the most promising from the perspective of the project included the World Bank's Ease of Doing Business Survey (EDBS) and our own analysis in conjunction with Control Risks as part of our Economic and Political Risk Evaluator (EPRE) tool. The Political Risk Services Group also report on political risk every six months focusing on topics that we think are highly relevant to the project but their B&R coverage (38 out of 65 economies) is insufficient for the demands of this project as a stand-alone source. However, it may be possible to use this in conjunction with other sources⁶.

The EDBS survey is desirable in terms of its coverage, as it tracks conditions in all B&R economies with the exception of Turkmenistan⁷. Countries are scored and ranked according to their ease of doing business i.e. the extent to which a country's regulatory, tax and legislative processes are conducive to running a business. It offers highly valuable information to greenfield investors but also provides insights that could be of use to a financial investor e.g. extent of shareholder rights, extent of corporate transparency. A full list of the indicators that are covered in the survey can be found by reviewing a country table <u>here</u>.

Of the set of topics covered by the EDBS, we think that the most relevant to the political risk sub-category of the index are protecting investors, enforcing contracts and resolving insolvency. Other topics related to issues such as registering a property, dealing with construction permits and paying taxes, on the other hand, are more relevant to operating a profitable business in that market.

The EPRE tool covers 59 of the 65 B&R economies (countries not covered are Afghanistan, Bhutan, East Timor, the Maldives, Palestine and Yemen). Updates on political risk scores are made on either a quarterly or a biannual basis—we are still working with Control Risks to get a breakdown of the update frequency for the relevant 59 economies. The political risk scores are derived from the expert judgement of Control Risk analysts for that country (on a 1-10 scale) and covers the topics described below:

- Political stability: The outlook for the stability and legitimacy of the current government, and the political system more broadly. Influenced by planned, anticipated and unplanned political transitions, economic performance, corruption, personnel changes, etc.
- Ideology and policy: The ideological and policy trajectories of the current and/or prospective government, including major formal and informal influences. Encompasses attitude towards the private sector, foreign investment, management of the economy, strategic objectives, political ideology (nationalism, populism, etc.), policy platforms and agendas, etc.
- Social cohesion: The outlook for social stability, including the prospect of social unrest, and the significance of socio-cultural issues to policymaking. Influenced by economic inequality, ethno-religious tensions, nationalism and immigration, government policies, labour organisation, demographics, etc.
- Security environment: The outlook for the domestic security environment, encompassing war, crime, violent unrest, terrorism, insurgency and other security issues.
- Business environment: The risks relating to the influence of societal and
 structural variables on business activity, including state and non-state actors.
- International relations: The outlook for the country's relations with its neighbours, major trade partners, international organisations, and the broader international community. Encompasses access to multilateral lending, threat of sanctions, participation in trade or security blocs, territorial disputes, etc.

 $^{^{6}}$ A full breakdown of country coverage for the three sources is provided in the appendix.

⁷The most recently published rankings for 190 countries can be found here

Disclaimer

This is a marketing communication which has been prepared by ICBC Standard Bank Plc (ICBCS) working in conjunction with Oxford Economics, and is provided for informational purposes only.

The Belt and Road Economic Health Index and China Connectivity Index ("Indexes") are non-financial custom indexes designed and calculated by Oxford Economics for, and as requested by ICBCS. None of the material, nor its content, nor any copy of it, may be altered in any way, transmitted to, copied or distributed to any other party, without the prior express written permission of ICBCS, and in particular may not be used as a basis for or a component of any financial instruments or products or indices. The material does not constitute, nor should it be regarded as, investment research. It has not been prepared in accordance with the full legal requirements designed to promote independence of research and is not subject to any prohibition on dealing ahead of the dissemination of investment research.

Additional information with respect to any data modelling or analysis referred to herein may be made available on request. This material is for the general information of institutional and market professional clients of ICBCS and should not be considered to be investment advice. The information, tools and material presented in this marketing communication are provided to you for information purposes only and are not to be used or considered as an offer or the solicitation of an offer to sell or to buy or subscribe for securities, commodities or other financial instruments, or to participate in any particular trading strategy, nor shall it, or the fact of its distribution, form the basis of, or be relied upon in connection with, any contract relating to such action. This material is based on information that we consider reliable, but ICBCS does not warrant or represent (expressly or impliedly) that it is accurate, complete, not misleading or as to its fitness for the purpose intended and it should not be relied upon as such. ICBCS accepts no liability for loss, either directly or indirectly, arising from the use of the material presented in this communication, except that this exclusion of liability does not apply to the extent that liability arises under specific statutes or regulations applicable to ICBCS. The information and opinions contained in this document were produced by ICBCS as per the date stated and may be subject to change without prior notification. Opinions expressed are our current opinions as of the date appearing on this material only. We endeavour to update the material in this report on a timely basis, but regulatory compliance or other reasons may prevent us from doing so.

All trademarks, service marks and logos used in this communication are trademarks or service marks or registered trademarks or service marks of ICBCS or Oxford Economics.

This communication is distributed by ICBC Standard Bank Plc. 20 Gresham Street, London EC2V 7JE which is authorised by the Prudential Regulation Authority ("PRA") and regulated by the PRA and the Financial Conduct Authority ("FCA").

Copyright 2016 ICBC Standard. All rights reserved.



ICBC Standard Bank | Financial Markets and Commodities 20 Gresham Street | London EC2V 7JE, United Kingdom