

## TIGER index technical appendix

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### Methodology

In our analysis, we employ a statistical procedure called Principal Component Analysis (PCA) that is used widely in the physical and social sciences to extract indicators that capture common fluctuations among variables in large datasets. PCA is a transparent and straightforward procedure that can easily handle a large number of variables and enables one to construct indicators of comovement across all variables in a dataset or a subset of them. This procedure is ideal for creating the TIGER indices as it allows us to combine information from different types of economic variables and multiple countries.

Each variable that enters into the PCA is a priori given an equal weight in the calculations. The procedure then assigns different weights to different variables depending on how important they turn out to be in capturing fluctuations in the entire set of variables. PCA is a special case of a more general technique called factor analysis that captures more complicated patterns of lead and lag correlations across the variables—it is important to note that PCA picks up only contemporaneous correlations.

### Dataset

Our dataset covers most of the G-20 countries and contains a set of key real, financial and confidence variables. The main constraint in expanding our dataset to cover more variables is the lack of consistent data availability at a high frequency, especially among the emerging markets. For example, it is difficult to get good data on employment levels for the emerging markets. Nevertheless, we have assembled a set of variables on which we were able to get reasonably timely and high-quality data. The countries and variables in our dataset are listed below.

#### Advanced Economies

- Australia
- Canada
- France
- Germany
- Italy
- Japan
- Korea
- Netherlands
- Spain
- United Kingdom
- United States

#### Emerging Market Economies

- Argentina
- Brazil
- China
- India
- Indonesia
- Mexico
- Russia
- South Africa
- Turkey

#### Economic Indicators

##### *Real Indicators*

- Employment
- Exports
- Industrial Prodn.
- Imports
- GDP

##### *Financial Indicators*

- Equity Market Index
- Stock Market Capitalization
- Credit Growth
- Emerging Market Bond Spreads
- TED Spread

##### *Confidence Indicators*

- Business Confidence
- Consumer Confidence

We create composite indices separately for the groups of advanced economies and emerging markets covering all of the above variables. We also create additional indices for each of these groups based on each category of variables listed below (real, financial, confidence). Finally, we generate country-specific indicators that cover all the variables for a given country and also variable-specific indicators that cover all countries' data for a given variable.

### Description of Data and Source Information:

Indicator Variable	Unit	Description	Source
Business Confidence	Index	Confidence indicator for manufacturing	OECD
Consumer Confidence	Index	National confidence indicator	OECD
Employment	Percent	12-month growth rate of total employment levels	International Labor Organization; Official statistics
Exports	Percent	12-month growth rate of 3 month moving average. Seasonally Adjusted, Volume, USD	World Bank, Global Economic Monitor
Imports	Percent	12-month growth rate of 3 month moving average. Seasonally Adjusted, Volume, USD	World Bank, Global Economic Monitor
Industrial Production	Percent	12-month growth rate of 3 month moving average. Seasonally Adjusted Volumes	World Bank, Global Economic Monitor
GDP Growth	Percent	Quarterly, year-over-year real growth rate. Each month in quarter are equal to quarterly rate	Economist Intelligence Unit
Equity Markets	Percent	12-month growth rate of share price index in national currency	World Bank, Global Economic Monitor and Yahoo Finance
Stock Market Capitalization	Percent	12-month growth rate in national currency	CEIC Data Company, Ltd.
Credit Growth	Percent	12-month growth rate in national currency. Banking claims on private sector	IMF International Finance Statistics; Federal Reserve; Bank of Japan
Emerging Bond Spreads	Level	Basis points over US treasury	World Bank, Global Economic Monitor
TED Spread	Level	Difference between 3-month LIBOR and U.S. Treasury, basis points	World Bank, Global Economic Monitor and US Dept of Treasury

## Data Composition of TIGER Indices

The matrix below shows which countries and variables are included across the aggregated TIGER indices.

	Business Confidence	Consumer Confidence	Employment	Exports	Imports	Industrial Production	GDP Growth	Equity Markets	Market Capitalization	Credit Growth	Emerging Bond Spreads
<b>Advanced:</b>											
Australia	x	x	x	x	x	x	x	x	x	x	-
Canada	-	x	x	x	x	x	x	x	-	-	-
France	x	x	-	x	x	x	x	x	-	x	-
Germany	x	x	x	x	x	x	x	x	x	x	-
Italy	x	x	-	x	x	x	x	-	x	x	-
Japan	x	x	x	x	x	x	x	x	x	x	-
Korea	x	x	x	x	x	x	x	x	x	x	-
Netherlands	x	x	-	x	x	x	x	x	x	x	-
Spain	x	x	-	x	x	x	x	x	x	x	-
UK	x	x	-	x	x	x	x	x	x	x	-
US	x	x	x	x	x	x	x	x	x	x	-
<b>Emerging Markets:</b>											
Argentina	-	-	-	x	x	x	x	x	x	x	x
Brazil	x	x	-	x	x	x	x	x	x	x	x
China	x	x	-	x	x	x	x	x	x	x	x
India	-	-	-	x	x	x	x	x	x	x	-
Indonesia	-	-	-	x	x	x	x	x	x	-	-
Mexico	x	-	-	x	x	x	x	x	x	x	x
Russia	-	-	-	x	x	x	x	x	x	x	x
South Africa	x	x	-	x	x	x	x	x	x	x	x
Turkey	x	-	-	x	x	x	x	x	x	x	x

### By Country:

*Overall Growth Index* – Business Confidence, Consumer Confidence, Employment, Exports, Imports, Industrial Production, GDP Growth, Equity Markets, Credit Growth, TED Spread<sup>1</sup>

*Real Activity Index* – Employment, Exports, Imports, Industrial Production, and GDP Growth

*Financial Index* – Equity Markets, Market Capitalization, Credit Growth, Emerging Bond Spreads, TED Spread

*Confidence Index* – Business Confidence and Consumer Confidence

### By Indicator Variable:

Advanced Economies, Emerging Market Economies, and Total Indices are found by aggregating directly across country data.

<sup>1</sup> The TED Spread is the difference between the interest rates on interbank loans and short-term U.S. government debt; by construction, it is available only as a single variable and is not country-specific

## Data Availability

The table below describes the availability of each variable by country. All data are monthly and begin on January 2003 and end in the specified month of 2012.

	Business Confidence	Consumer Confidence	Employment	Exports	Imports	Industrial Production	GDP Growth	Equity Markets	Market Capitalization	Credit Growth	Emerging Bond Spreads
<b>Advanced:</b>											
Australia	Nov '11	Feb	Feb	Dec '11	Dec '11	Dec '11	Q4 '11	April	Mar	Jan	-
Canada	-	Feb	Mar	Jan	Jan	Dec '11	Q4 '11	April	-	-	-
France	Feb	Feb	-	Dec '11	Dec '11	Jan	Q4 '11	April	-	Jan	-
Germany	Feb	Feb	Feb	Nov '11	Jan	Feb	Q4 '11	April	Mar	Jan	-
Italy	Feb	Feb	-	Jan	Jan	Jan	Q4 '11	-	Mar	Jan	-
Japan	Dec '11	Dec '11	Feb	Jan	Jan	Jan	Q4 '11	April	Mar	Feb	-
Korea	Feb	Feb	Feb	Dec '11	Jan	Feb	Q4 '11	April	Mar	Dec '11	-
Netherlands	Feb	Feb	-	Jan	Jan	Dec '11	Q4 '11	April	Mar	Jan	-
Spain	Feb	Feb	-	Jan	Jan	Jan	Q4 '11	April	Mar	Jan	-
UK	Feb	Feb	-	Dec '11	Dec '11	Dec '11	Q4 '11	April	Mar	Jan	-
US	Feb	Feb	Mar	Jan	Jan	Feb	Q4 '11	April	Mar	Feb	-
<b>Emerging Markets:</b>											
Argentina	-	-	-	Dec '11	Dec '11	Feb	Q4 '11	April	Mar	Jan	April
Brazil	Feb	Jan	-	Dec '11	Jan	Feb	Q4 '11	April	Mar	Dec '11	April
China	Dec '11	Dec '11	-	Dec '11	Dec '11	Feb	Q4 '11	April	Mar	Dec '11	April
India	-	-	-	Dec '11	Dec '11	Jan	Q4 '11	April	Mar	Dec '11	-
Indonesia	-	-	-	Dec '11	Dec '11	Jan	Q4 '11	April	Mar	-	-
Mexico	Jan	Jan	-	Jan	Jan	Jan	Q4 '11	April	Mar	Jan	April
Russia	-	-	-	Dec '11	Dec '11	Feb	Q4 '11	April	Mar	Jan	April
South Africa	Dec '11	Dec '11	-	Dec '11	Dec '11	Jan	Q4 '11	April	Mar	Jan	April
Turkey	Feb	-	-	Jan	Jan	Jan	Q4 '11	April	Mar	Jan	-

Note: TED Spread data, not country specific, ranges from January 2003 through April 2012