

TIGER: Tracking Indexes for the Global Economic Recovery

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Technical Appendix

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 indexes 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. Note that composite total indexes include only Advanced Economies and Emerging Market Economies groups.

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

Euro Periphery

- Greece
- Italy (Advanced)
- Ireland
- Portugal
- Spain (Advanced)

Economic Indicators

Real Activity 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

By Country:

Overall Growth Index – Business Confidence, Consumer Confidence, Employment, Exports, Imports, Industrial Production, GDP Growth, Equity Markets, Credit Growth, Ted Spread¹

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 Indexes are found by aggregating directly across country data.

We create composite indexes separately for the groups of advanced economies and emerging markets covering all of the above variables. We also create additional indexes 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	IMF International Finance Statistics; 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

¹ 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 Composition of TIGER Indexes

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

	Business Confidence	Consumer Confidence	Employment	Exports	Imports	Industrial Production	GDP Growth	Equity Markets	Market Capitalization	Credit Growth	Emerging Bond Spreads
Advanced:											
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	-
Emerging Markets:											
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

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 2013.

	Business Confidence	Consumer Confidence	Employment	Exports	Imports	Industrial Production	GDP Growth	Equity Markets	Market Capitalization	Credit Growth	Emerging Bond Spreads
Advanced:											
Australia	May	Aug	Aug	Jul	Jul	Jun	Q2	Sep	Aug	Feb	-
Canada	-	Aug	Aug	Jul	Jul	Jun	Q2	Sep	-	-	-
France	Aug	Aug	-	Jul	Jul	Jul	Q2	Sep	-	Jun	-
Germany	Aug	Aug	Jul	Jul	Jul	Jul	Q2	Sep	Aug	Jun	-
Italy	Aug	Aug	-	Jul	Jul	Jun	Q2	Sep	Aug	Jun	-
Japan	Jun	Jul	Jul	Jul	Jul	Jul	Q2	Sep	Aug	Jul	-
Korea	Aug	Aug	Aug	Aug	Aug	Jul	Q2	Sep	Aug	Jun	-
Netherlands	Jul	Aug	-	Jul	Jul	Aug	Q2	Sep	Aug	Jun	-
Spain	Aug	Aug	-	Jun	Jun	Jul	Q2	Sep	Aug	Jun	-
UK	Aug	Aug	-	May	May	Jul	Q2	Sep	Aug	Jun	-
US	Aug	Aug	Aug	Jul	Jul	Jul	Q2	Sep	Aug	Aug	-
Emerging Markets:											
Argentina	-	-	-	Jul	Jul	Jul	Q2	Sep	Aug	Jun	Sep
Brazil	Aug	Aug	-	Aug	Aug	Jul	Q2	Sep	Aug	Jun	Sep
China	Nov '12	Jul	-	Aug	Aug	Aug	Q2	Sep	Aug	Jun	Sep
India	-	-	-	Jul	Jul	Jul	Q2	Sep	Aug	Jun	-
Indonesia	-	-	-	Aug	Aug	Jun	Q2	Sep	Aug	Jun	-
Mexico	Jul	Aug	-	Jul	Jul	Aug	Q2	Sep	Aug	Jun	Sep
Russia	-	-	-	Jul	Jul	Jul	Q2	Sep	Aug	Jun	Sep
South Africa	Jun	Jun	-	Jul	Jul	Jul	Q2	Sep	Aug	Jun	Sep
Turkey	Aug	-	-	Jul	Jul	Jul	Q2	Sep	Aug	Jun	-

Note: TED Spread data, not country specific, ranges from January 2003 through September 2013.

Data Availability for Euro Periphery

The table below describes the availability of each variable for Greece, Ireland, and Portugal. Availability for Italy and Spain are included in the above Advanced Economy group. All data are monthly and begin on January 2003 and end in the specified month of 2013.

	Business Confidence	Consumer Confidence	Employment	Exports	Imports	Industrial Production	GDP Growth	Equity Markets	Market Capitalization	Credit Growth	Emerging Bond Spreads
Greece	Aug	Aug	-	Feb	Feb	Jul	Q2	Sep	-	Jun	-
Ireland	-	-	-	Jun	Jun	Jul	Q2	Sep	Sep	Jun	-
Portugal	Aug	Aug	-	Jul	Jul	Jul	Q2	Sep	-	Jun	-

Data Composition of Euro Periphery Country Indexes

The matrix below shows which countries and variables are included in the country indexes for Greece, Ireland, and Portugal. Italy and Spain are included in the above Advanced Economy group.

	Business Confidence	Consumer Confidence	Employment	Exports	Imports	Industrial Production	GDP Growth	Equity Markets	Market Capitalization	Credit Growth	Emerging Bond Spreads
Greece	x	x	-	x	x	x	x	x	-	x	-
Ireland	-	-	-	x	x	x	x	x	x	x	-
Portugal	x	x	-	x	x	x	x	x	-	x	-