TIGER: Tracking Indexes for the Global Economic Recovery
By Eswar Prasad and Karim Foda

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.

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	*Financial Indicators*	*Confidence Indicators*
-Employment	-Equity Market Index	-Business Confidence
-Exports	-Stock Market Capitalization	-Consumer Confidence
-Industrial Prodn.	-Emerging Market Bond Spreads	
-Imports	-TED Spread	
-GDP		

By Country:
Overall Index – Business Confidence, Consumer Confidence, Employment, Exports, Imports, Industrial Production, GDP Growth, Equity Markets, Ted Spread[1]
Real Index – Employment, Exports, Imports, Industrial Production, and GDP Growth
Financial Index – Equity Markets, Market Capitalization, Emerging Bond Spreads, TED Spread

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	International Labor Organization
Exports	Percent	12-month growth rate of 3 month moving average. Seasonally adjusted volumes	World Bank, Global Economic Monitor
Imports	Percent	12-month growth rate of 3 month moving average. Seasonally adjusted Volumes	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[2]	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.
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.
[2] Monthly GDP series created from quarterly data by using the quarterly figure for all three months in a quarter.

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	Emerging Bond Spreads
Advanced:										
Australia	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	-	-
Germany	x	x	x	x	x	x	x	x	x	-
Italy	x	x	-	x	x	x	x	-	x	-
Japan	x	x	x	x	x	x	x	x	x	-
Korea	x	x	x	x	x	x	x	x	x	-
Netherlands	x	x	-	x	x	x	x	x	-	-
Spain	x	x	-	x	x	x	x	x	x	-
UK	x	x	-	x	x	x	x	x	-	-
US	x	x	x	x	x	x	x	x	x	-
Emerging Markets:										
Argentina	-	-	-	x	x	x	x	x	x	x
Brazil	x	x	-	x	x	x	x	x	x	x
China	x	x	-	x	x	x	x	x	x	x
India	-	-	-	x	x	x	x	x	x	-
Indonesia	-	-	-	x	x	x	x	x	x	-
Mexico	x	-	-	x	x	x	x	x	x	x
Russia	-	-	-	x	x	x	x	x	x	x
South Africa	x	x	-	x	x	x	x	x	x	x
Turkey	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 2000 and end in the specified month of 2010 unless otherwise noted.

	Business Confidence	Consumer Confidence	Employment	Exports	Imports	Industrial Production	GDP Growth	Equity Markets	Market Capitalization	Emerging Bond Spreads
Advanced:										
Australia	Feb	April	Mar	Mar	Mar	Dec	Q4 09	April	April	-
Canada	Jan-08	April	Mar	Mar	Mar	Feb	Q4 09	April	-	-
France	April	April	-	Mar	Mar	Mar	Q4 09	April	-	-
Germany	April	April	Jan	Mar	Mar	Mar	Q4 09	April	Jan	-
Italy	April	April	-	Feb	Feb	Mar	Q4 09	-	April	-
Japan	Mar	Mar	Feb	Mar	Mar	Mar	Q4 09	April	April	-
Korea	April	April	Mar	April	April	Mar	Q4 09	April	Mar	-
Netherlands	April	April	-	Feb	Feb	Feb	Q4 09	April	Jan 02 - April 10	-
Spain	April	April	-	Feb	Feb	Mar	Q4 09	April	April	-
UK	April	April	-	Jan	Feb	Mar	Q4 09	April	-	-
US	April	April	Mar	Mar	Mar	Mar	Q4 09	April	April	-
Emerging Markets:										
Argentina	-	-	-	Mar	Mar	Mar	Q4 09	April	April	April
Brazil	May	April	-	April	April	Mar	Q4 09	April	April	April
China	Mar 00 - Dec 09	Feb	-	April	April	Mar	Q4 09	April	April	April
India	Jul-08	-	-	Mar	Mar	Mar	Q4 09	April	April	-
Indonesia	-	-	-	Mar	Mar	Mar	Q4 09	April	Mar	-
Mexico	Mar	Apr 01 – Mar 10	-	Mar	Mar	Mar	Q4 09	April	Mar	April
Russia	-	-	-	Mar	Mar	Mar	Q4 09	April	April	April
South Africa	Mar	Mar	-	Mar	Mar	Mar	Q4 09	April	April	April
Turkey	-	-	-	Mar	Mar	Feb	Q4 09	April	April	April

Note: TED Spread data, not country specific, ranges from January 2000 through April 2010.