Global Economy and Development
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TIGER: Tracking Indexes for the Global Economic Recovery
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Technical Appendix

OCTOBER 2020 NOTE: In April 2020, we noted the low availability of data in light of the effects of Covid-19 on the global economy. As of October 2020, the availability of data has improved; however, the data lags are still apparent. As a result, we continue to integrate real-time estimates of forthcoming data alongside the most recent figures from news accounts and data providers to ensure TIGER is up to date. This method has its limitations at a time of heightened economic uncertainty. Where possible, we have made conservative assumptions about the extent of changes in various indicators.

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	Emerging Market Economies	Euro Periphery
-Australia	-Argentina	-Greece
-Canada	-Brazil	-Italy (Advanced)
-France	-China	-Ireland
-Germany	-India	-Portugal
-Italy	-Indonesia	-Spain (Advanced)
-Japan	-Mexico	
-Korea	-Russia	
-Netherlands	-South Africa	
-Spain	-Turkey	
-United Kingdom		
-United States		

Economic Indicators

Real Activity Indicators	*Financial Indicators*	*Confidence Indicators*
-Capacity Utilization	-Equity Market Index	-Business Confidence
-Employment	-Stock Market Capitalization	-Consumer Confidence
-Exports	-Credit Growth	

-Industrial Prodn.   -Emerging Market Bond Spreads
-Imports   -TED Spread
-GDP   -VIX
-Manufacturing Orders
-Retail Sales
-Unemployment Rate

By Country:

Composite Index – Business Confidence, Consumer Confidence, Capacity Utilization, Employment, Exports, Imports, Industrial Production, GDP Growth, Manufacturing Orders, Retail Sales, Unemployment Rate, Equity Markets, Credit Growth, Ted Spread[1], VIX

Real Activity Index – Capacity Utilization, Employment, Exports, Imports, Industrial Production, GDP Growth, Manufacturing Orders, Retail Sales, Unemployment Rate

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

Confidence Index – Business Confidence, 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	National confidence indicator	OECD
Consumer Confidence	Index	National confidence indicator	OECD
Capacity Utilization	Percent	Capacity utilization rate for industrial sector	Haver Analytics; National sources
Employment	Percent	12-month growth rate of total employment levels	IMF International Financial Statistics; CEIC Data Company, Ltd.; National sources
Exports	Percent	12-month growth rate of 3 month moving average. Goods. USD	IMF Direction of Trade Statistics
Imports	Percent	12-month growth rate of 3 month moving average. Goods. USD	IMF Direction of Trade Statistics
Industrial Production	Percent	12-month growth rate of 3 month moving average. Seasonally Adjusted Volumes	World Bank, Global Economic Monitor; National sources
GDP Growth	Percent	Quarterly, year-over-year real growth rate. Each month in quarter are equal to quarterly rate	Economist Intelligence Unit
Manufacturing Orders	Percent	12-month growth rate of new manufacturing orders. Seasonally adjusted, local currency or index.	Haver Analytics; National sources
Retail Sales	Percent	12-month growth rate of 3 month moving average. Seasonally adjusted, Volume, Index	World Bank, Global Economic Monitor; National sources

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[1] The TED Spread, by construction, is available only as a single variable and is not country-specific.

Equity Markets	Percent	12-month growth rate of share price index in national currency	CEIC Data Company, Ltd.; IMF International Financial Statistics; Bloomberg
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 Financial 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	US Department of Treasury via Federal Reserve (FRED)
Unemployment Rate	Percent	OECD Harmonized Unemployment Rate	OECD via Federal Reserve (FRED)
VIX	Level	Volatility index for national stock markets	Bloomberg

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

	Bus Conf.	Cons. Conf.	Cap. Utilization	Employment	Export	Import	Ind. Prodn	GDP	Man. Orders	Retail Sales	Equity Market	Market Cap	Credit Growth	Emerging Bond Spreads	Unemployment Rate	VIX
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	x	x	-	x	x
Germany	x	x	-	x	x	x	x	x	-	-	x	x	x	-	x	x
Italy	x	x	-	x	x	x	x	x	-	-	-	x	x	-	x	-
Japan	x	x	-	x	x	x	x	x	-	-	x	x	x	-	x	x
Korea	x	x	-	x	x	x	x	x	-	-	x	x	-	-	x	x
Netherlands	x	x	-	x	x	x	x	x	-	-	x	x	x	-	-	-
Spain	x	x	-	x	x	x	x	x	-	-	x	x	x	-	x	-
UK	x	x	-	x	x	x	x	x	-	-	x	x	x	-	x	-
US	x	x	-	x	x	x	x	x	-	-	x	x	x	-	x	x
Emerging Markets:										-						
Argentina	-	-	-	-	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	x	x	-	-	-
Mexico	-	-	-	x	x	x	x	x	-	-	x	x	x	-	-	-
Russia	x	x	-	-	x	x	x	x	-	-	x	x	x	-	-	-
South Africa	x	x	-	x	x	x	x	x	-	-	x	x	x	-	-	x
Turkey	x	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, begin on January 2005, and end in the specified month of 2020. *Note: TED Spread data, not country specific, ranges from January 2005 through August 2020.*

	Bus Conf.	Cons. Conf.	Cap. Utilization	Employment	Export	Import	Ind. Prodn	GDP	Man. Ord.	Retail Sales	Equity Market	Market Cap	Credit Growth	Emerg. Bond Spreads	Unemp. Rate	VIX
Advanced:																
Australia	May	Aug	Jun'17	Aug	Jun	Jun	-	Q3	-	-	Aug	Aug	Jul	-	Jul	-
Canada	Apr	Apr	Jun'17	Aug	Jun	Jun	Apr	Q3	Jul'17	Jul'17	Jul	-	-	-	Aug	-
France	Aug	Aug	Aug'17	Jul	Jun	Jun	May	Q3	-	Jul'17	Aug	Aug	Jul	-	Jul	Aug
Germany	Aug	Aug	Aug'17	Aug	Jun	Jun	May	Q3	Jul'17	Jul'17	Aug	Jul	Jul	-	Jul	-
Italy	Aug	Aug	Jun'17	Jul	Jun	Jun	May	Q3	May	Jul'17	-	Aug	Jul	-	Jul	-
Japan	Jun	Aug	Jul'17	Aug	Jun	Jun	May	Q3	Jul'17	Jul'17	Aug	Aug	Jul	-	Jul	Aug
Korea	Aug	Aug	-	Aug	Jun	Jun	May	Q3	-	Jul'17	Aug	Aug	Jun	-	Jul	Aug
Netherlands	Aug	Aug	Jun'17	Jul	Jun	Jun	May	Q3	-	Jul'17	Aug	Aug	Jul	-	Jul	-
Spain	Aug	Aug	Jul'17	Jul	Jun	Jun	May	Q3	Jul'17	Jul'17	Aug	Aug	Jul	-	Jul	-
UK	Aug	Aug	-	Jul	Jun	Jun	May	Q3	-	Jul'17	Aug	Aug	Jul	-	May	-
US	Aug	Aug	Aug'17	Aug	Jun	Jun	Aug	Q3	Jul'17	Jul'17	Aug	Aug	Aug	-	Aug	Aug
Emerging:																
Argentina	-	-	-	-	Jun	Jun	-	Q3	-	-	Aug	Aug	-	May '14	-	-
Brazil	Aug	Aug	-	-	Jun	Jun	May	Q3	-	Jul'17	Aug	Aug	May	May '14	-	-
China	Aug	Jun	-	-	Jun	Jun	Jun	Q3	-	Jul'17	Aug	Aug	Jul	May '14	-	-
India	-	-	-	-	Jun	Jun	May	Q3	-	-	Aug	Aug	-	-	-	-
Indonesia	Jun	Jul	-	-	Jun	Jun	-	Q3	-	Jul'17	Aug	Aug	Jul	-	-	-
Mexico	-	-	-	Apr	Jun	Jun	May	Q3	-	Jul'17	Aug	Jul	Jul	May '14	-	-
Russia	Aug	May	-	-	Jun	Jun	Jun	Q3	-	-	Jul	Aug	Jul	May '14	-	-
South Africa	Jun	Jun	-	Jul	Jun	Jun	Apr	Q3	-	Jul'17	Jul	Aug	Jul	May '14	-	Aug
Turkey	Aug	Aug	-	Jul	Jun	Jun	May	Q3	-	Jul'17	Jul	Aug	Jul	May '14	-	-

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, begin on January 2005, and end in the specified month of 2020.

	Bus Conf.	Cons. Conf.	Cap. Utilization	Employ ment	Export	Import	Ind. Prodn	GDP	Man. Order	Retail Sales	Equity Market	Market Cap	Credit Growth	Emerging Bond Spreads	Unem ploym ent Rate	VIX
Greece	Aug	Aug	-	-	Jun	Jun	May	Q3	-	Jan'17	Aug	Aug	Jul	-	May	-
Ireland	Aug	Aug	-	-	Jun	Jun	May	Q3	-	Jun'17	Aug	Aug	Jul	-	Jul	-
Portugal	Aug	Aug	-	-	Jun	Jun	May	Q3	-	Jun'17	Aug	Aug	Jul	-	Jul	-

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.

	Bus Conf.	Cons. Conf.	Cap. Utilization	Employ ment	Export	Import	Ind. Prodn	GDP	Man. Orders	Retail Sales	Equity Market	Market Cap	Credit Growth	Emerging Bond Spreads	Unemp. Rate	VIX
Greece	x	x	-	-	x	x	x	x	-	-	x	x	x	-	x	-
Ireland	x	x	-	-	x	x	x	x	-	-	x	x	x	-	x	-
Portugal	x	x	-	-	x	x	x	x	-	-	x	x	x	-	x	-