

# Measuring Productivity in a Globalized World

UN Expert Group on International Trade and Economic Globalization Statistics  
New York, NY -- November 29, 2016

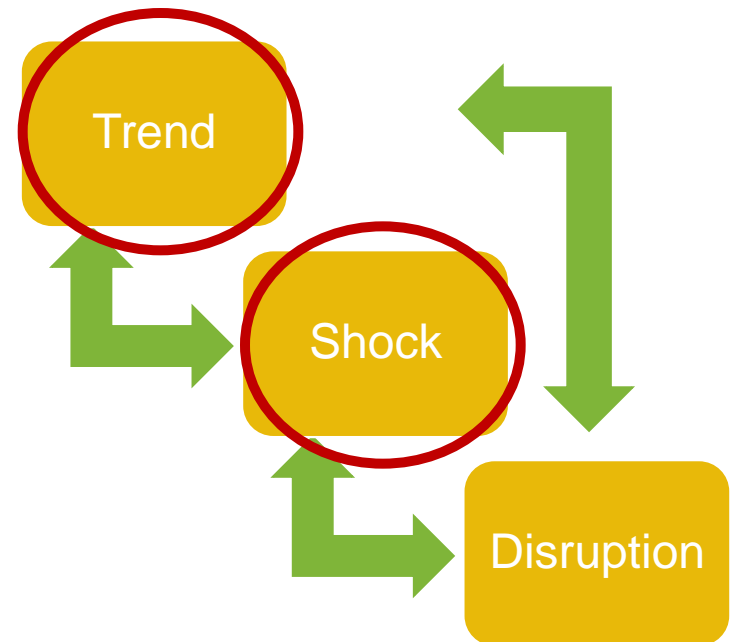
Ataman Ozyildirim, [a.ozyildirim@tcb.org](mailto:a.ozyildirim@tcb.org)

Director, Business Cycles and Growth Research



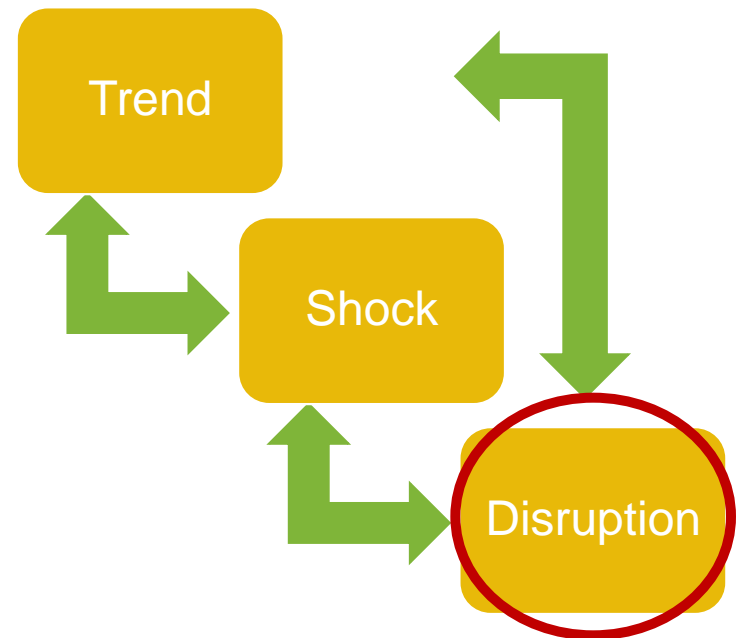
# Trend, shocks and disruptions that will determine the world economy's future (1)

- Trend:
  - ✓ Ongoing stagnant growth (2.5 percent for 2016 and 2.8 percent in 2017) - well below the 3.5+ percent growth of past decade
  - ✓ Supply side constraints (slowing labor force growth and weak productivity) vs. secular stagnation (lack of demand)
- Shocks and uncertainties:
  - ✓ Geo-political and economic challenges (Brexit, US elections, immigration, terrorism, China, Brazil) weigh unusually heavily on the global economic outlook
  - ✓ Business is taking a wait-and-see attitude towards investment

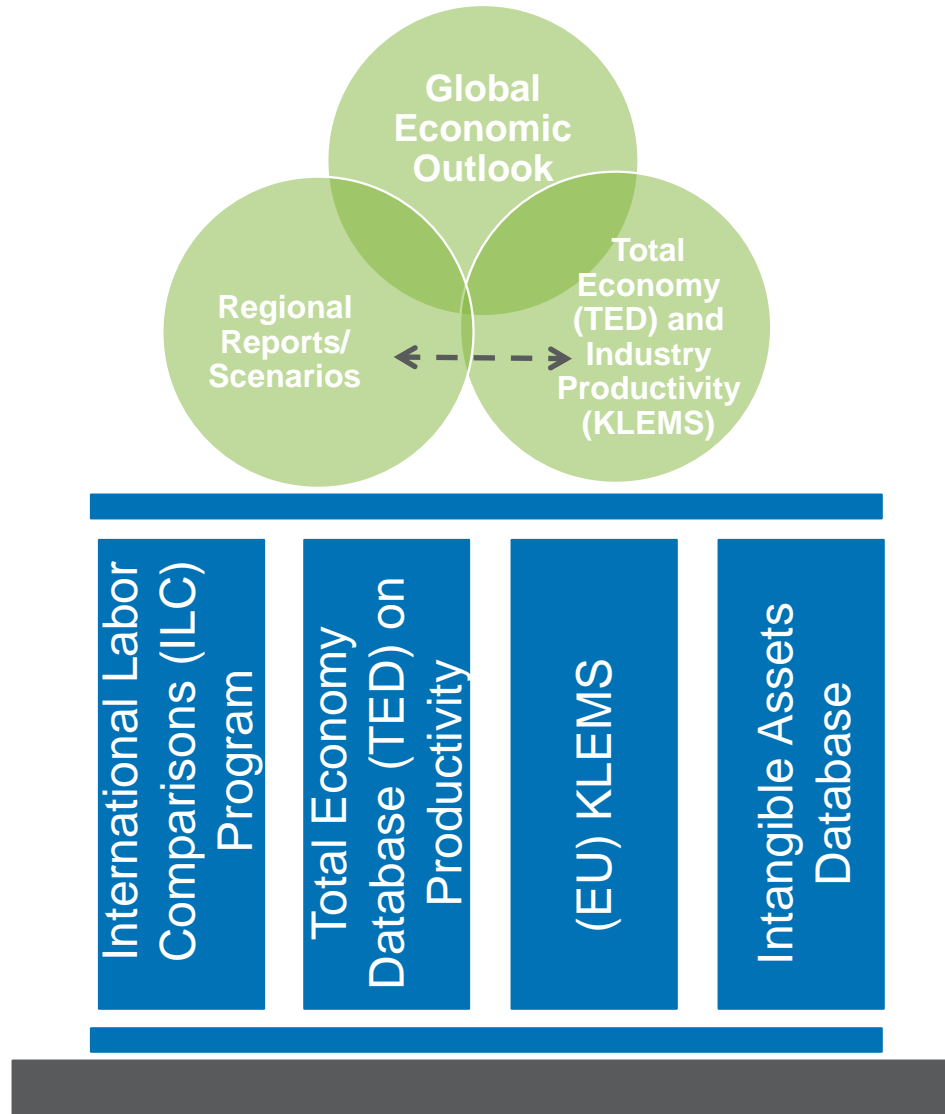


# Trend, shocks and disruptions that will determine the world economy's future (2)

- Disruptions:
  - ✓ Monetary and fiscal policy stances and their impact on debt – how sustainable?
  - ✓ Transformation in energy demand and supply – how large?
  - ✓ A shift in the long-term elasticity of global trade and growth – how big?
  - ✓ Digital transformation provides the upside for innovation, productivity and growth – but when will the effects emerge?



# TCB data used to support Global Economic Outlook



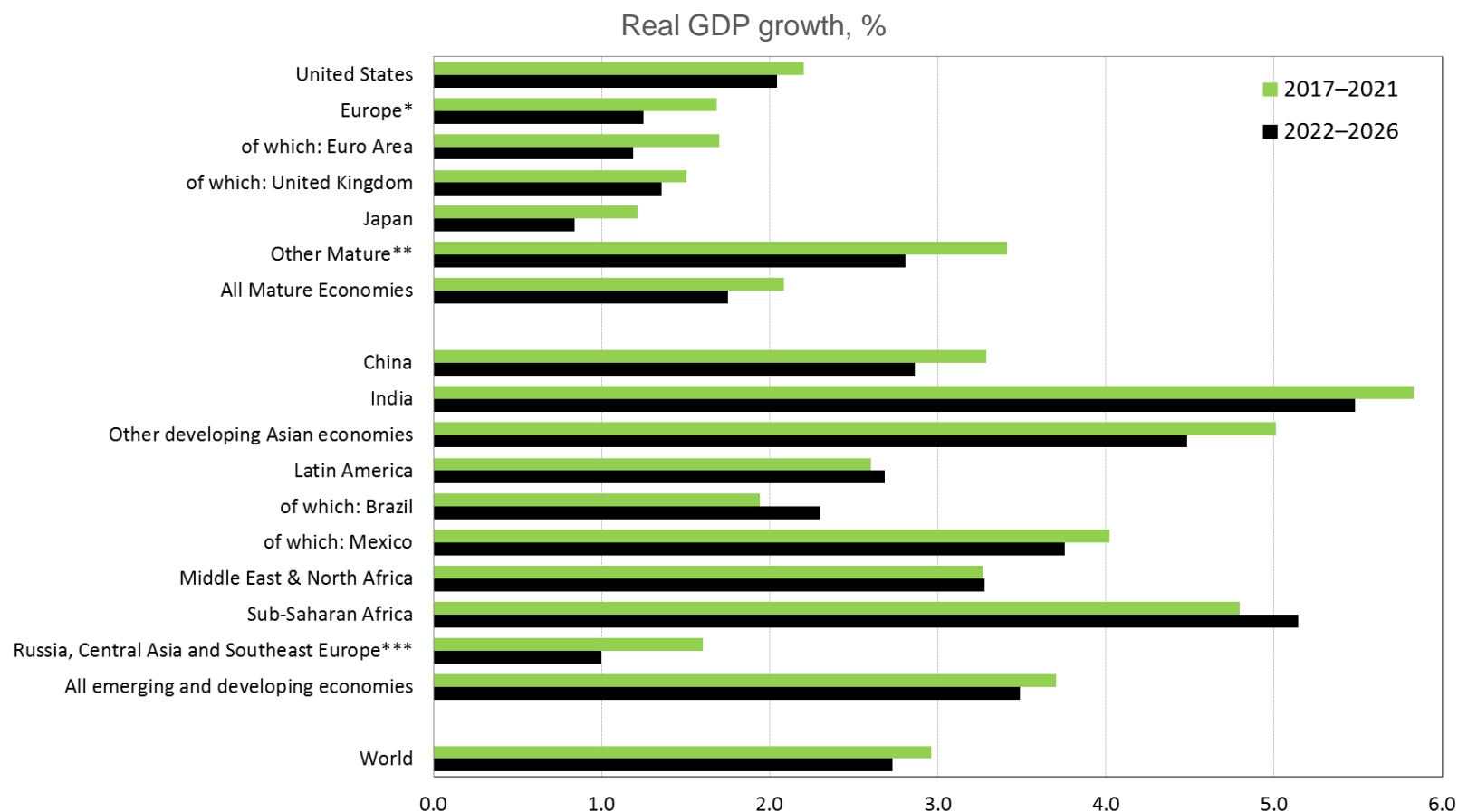
## Growth projections are based on measurement of trend growth (as proxy for potential output growth)

- **Projections of Gross Domestic Product (GDP)** for medium- (2017-2021) and long-term (2022-2026) trend growth cover 11 regions, including 33 advanced economies and 32 major emerging economies
- Model uses a **supply side-based growth accounting framework** which measures supply side contributions of labor, capital and productivity.
  - Labor is projected by demographic information (UN population and ILO labor force participation)
  - Capital services growth and total factor productivity growth are estimates by regression approach using relevant variables
  - Results from the model represent **trend growth** which measures growth based on historical relationships between variables, as measured in the model.
- Trend growth is a proxy for **potential output growth**, which represents the level of output an economy can produce in a noninflationary way, given the size of its labor force and its potential to invest in and create technological progress
- We adjust 2017-2021 and 2017 itself for short-term deviations from the **trend growth because of output gaps**

## What's new this year in productivity data?

- New investment data, in particular for ICT (Information and Communication Technologies)
- Include residential structures
- New ICT investment prices (Corrado-Byrne)
  - ✓ Official deflators don't adequately reflect ongoing decline in ICT prices
    - Adjust real ICT investment in all countries upward to reflect the ICT price decline
    - Adjust GDP growth upward in 10 countries that produce and export ICT
- ICT investment and non-ICT machinery investment are treated separately
- New investment data by assets for China (Harry Wu)
- Updated China growth data (Harry Wu, TCB's own estimates)

# In the medium-term, global GDP growth will remain modest at less than 3 percent



Note: GDP growth for select countries with significant ICT production and trade are revised upward to reflect ICT price declines

\*Europe includes European Union -28 as well as Switzerland, Iceland and Norway.

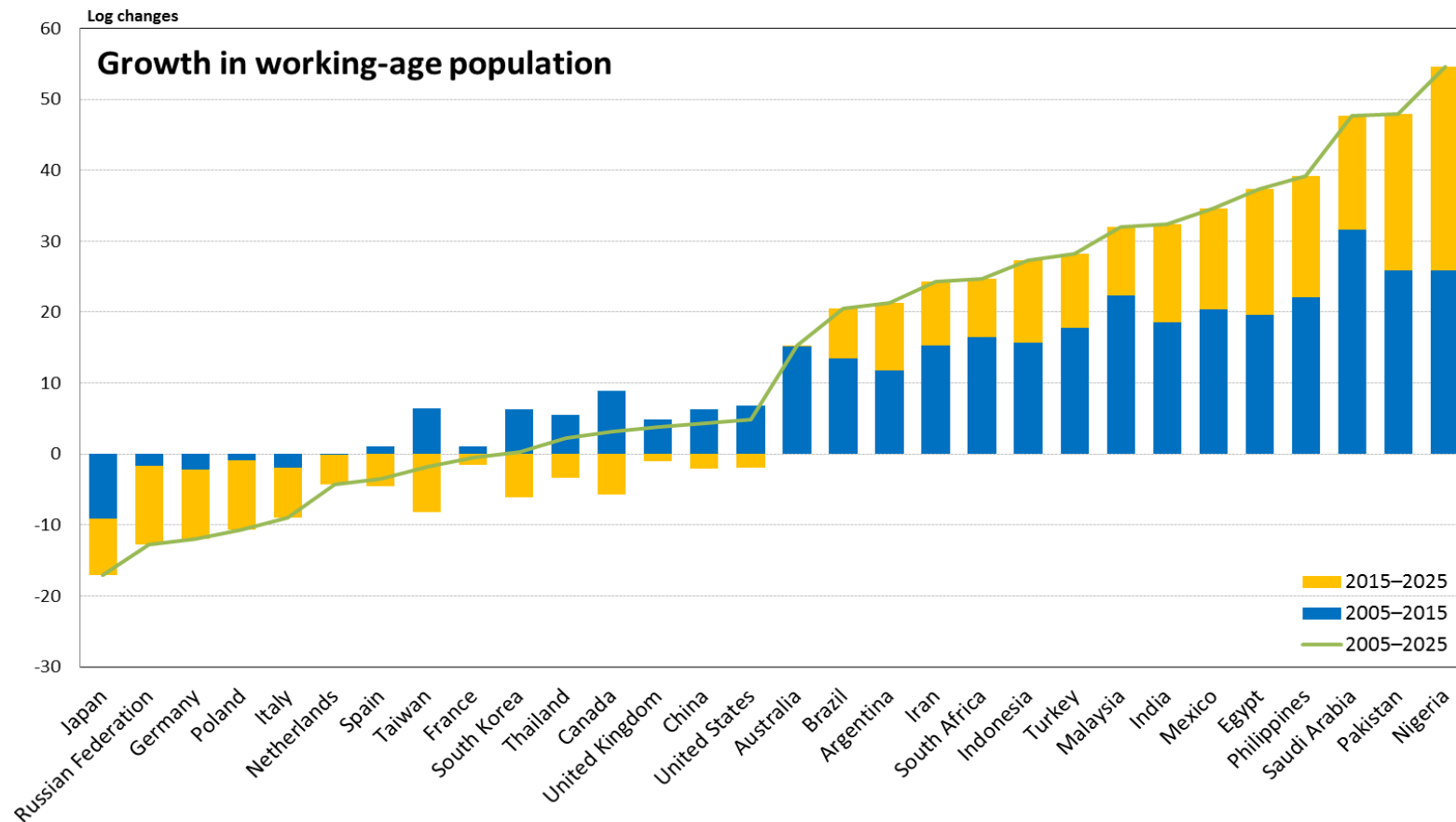
\*\*Other mature economies are Australia, Canada, Israel, Hong Kong, South Korea, New Zealand, Singapore, and Taiwan.

\*\*\*Russia, Central Asia, and Southeast Europe include projections for Russia, Kazakhstan, Turkmenistan, Uzbekistan, Belarus, and Turkey.

Source: The Conference Board Global Economic Outlook 2017.



# Advanced economies show rapid declines in working-age population growth – demographic dividends in emerging markets gradually waning



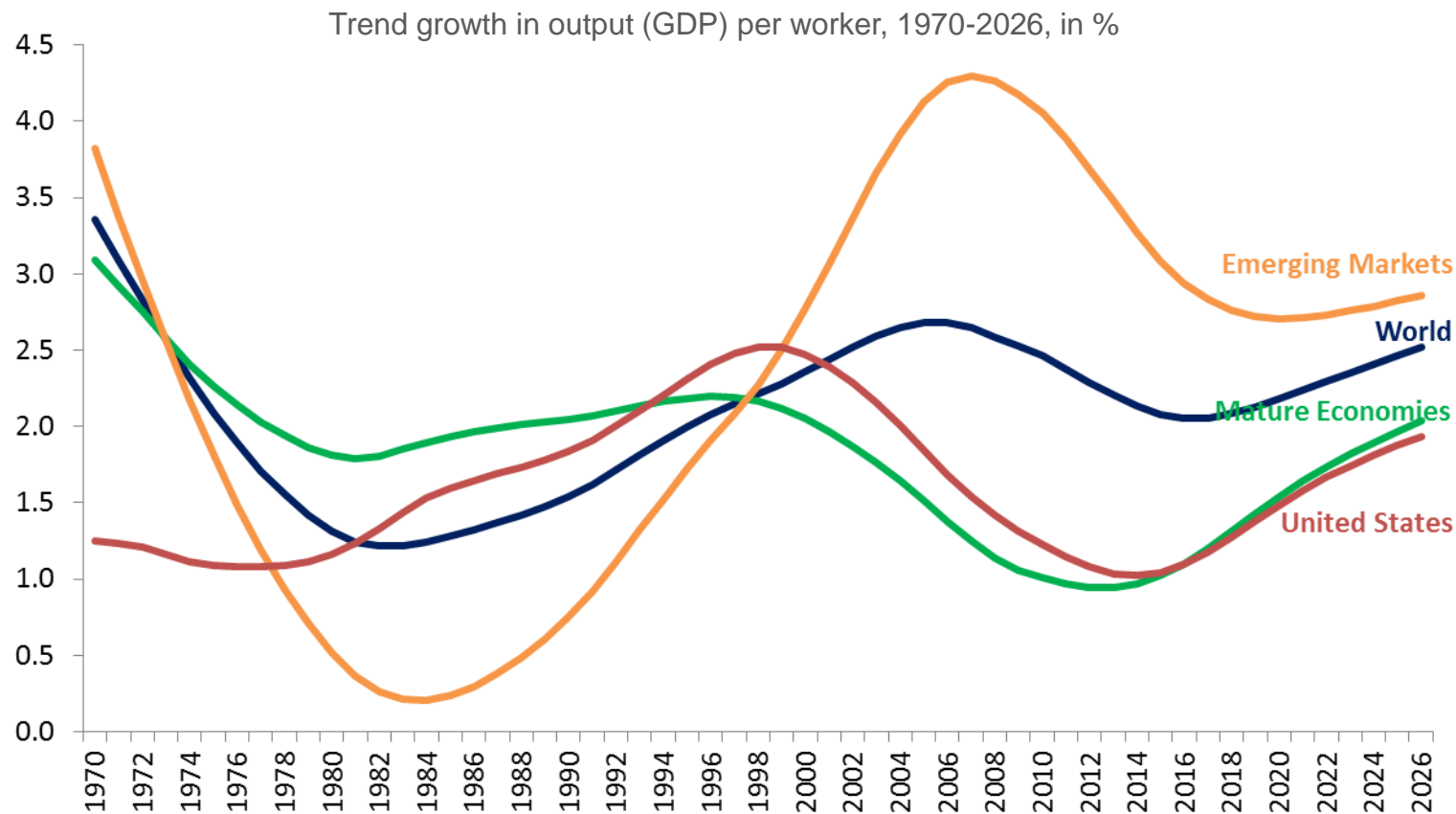
\* "Natural" refers to growth in population excluding migration

Source: United Nations Population Division





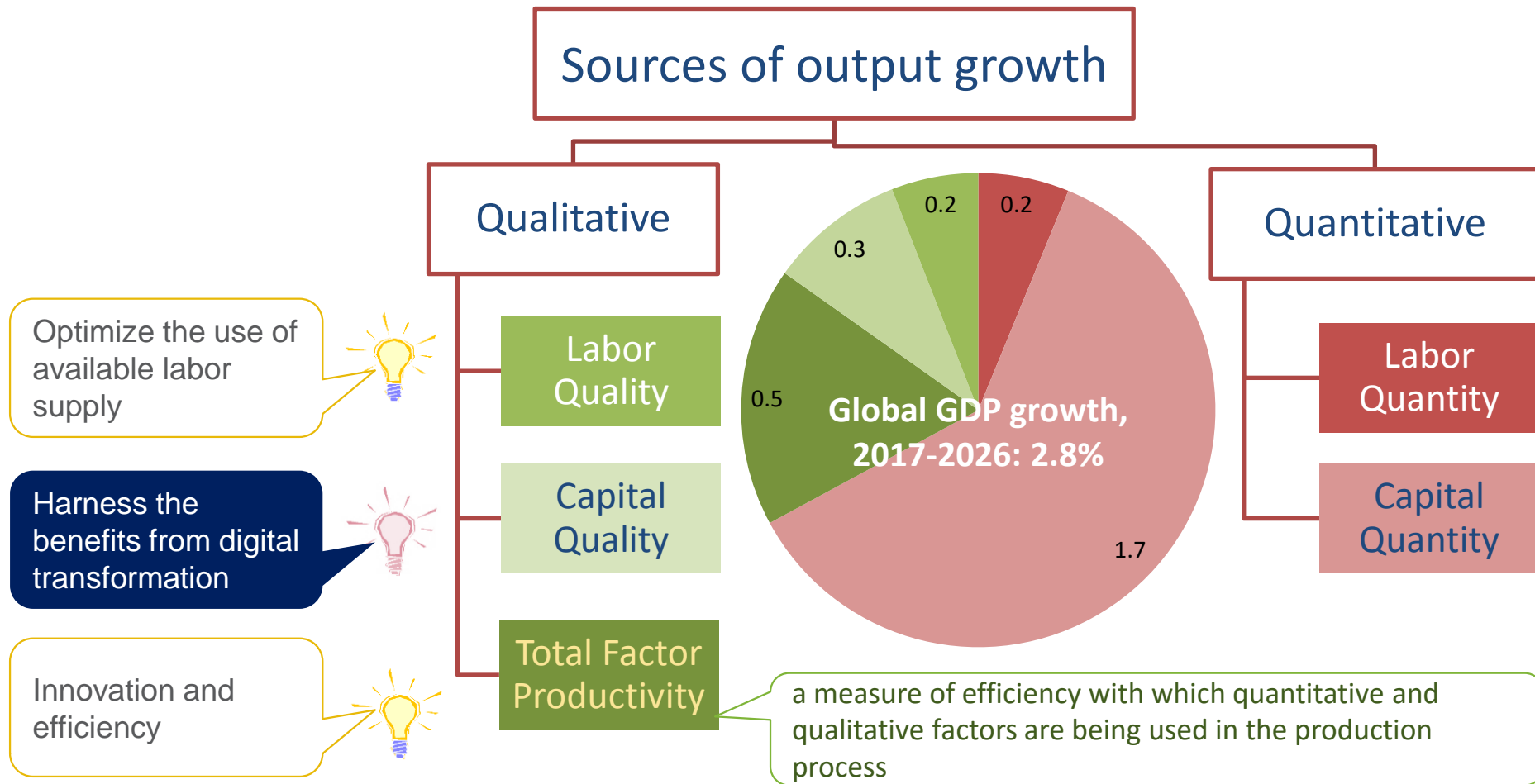
# Productivity growth will recover somewhat but not enough to offset other supply-side constraints



Note: Trend growth rates are obtained using HP filter, assuming a  $\lambda=100$ .

Source: The Conference Total Economy Database & The Conference Board Global Economic Outlook 2017 (November 2016)

# One-third of global growth is to come from qualitative factors



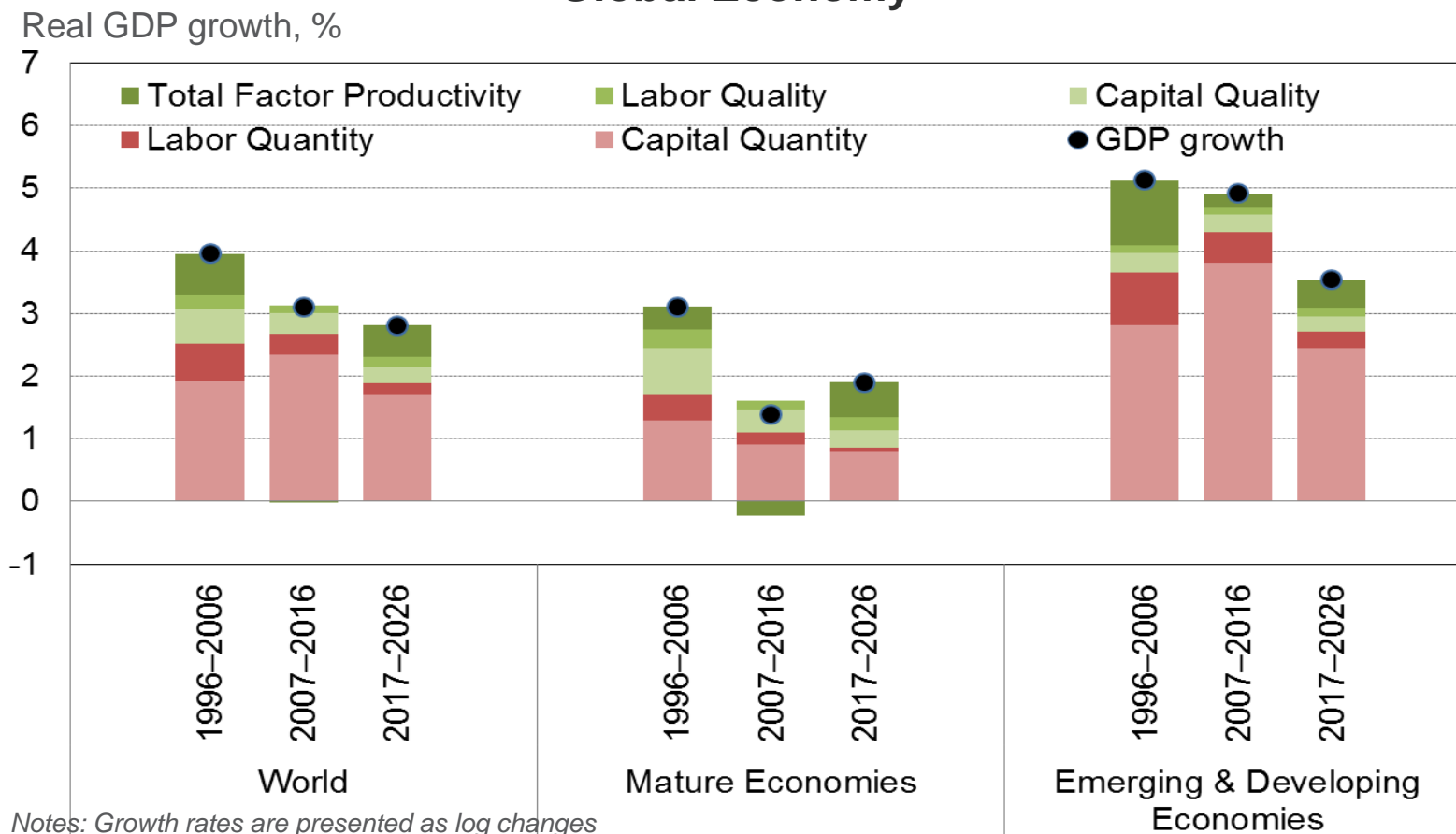
Note: \*Contributions, which are expressed in log term, may not add up to GDP growth, as the latter is in % changes.

Source: The Conference Board Global Economic Outlook 2017.



# While global growth will slow in the next decade, qualitative growth factors play a larger role even in emerging markets

## Global Economy



Notes: Growth rates are presented as log changes  
 Source: The Conference Board Global Economic Outlook 2017



# Creating value through qualitative rather than quantitative growth

1. Overcome the pressures from weak labor supply and talent shortages
  - Aging, participation, immigration, education and training
2. Harness the benefits and digital transformation
  - Shift to digital services, price declines in digital economy, and investments in knowledge-based assets
3. Drive productivity growth through innovation and efficiency
  - Revenue growth potential, cost management, global trade, financial and investment climate
4. Take advantage of remaining catch-up potential in low-income emerging markets
  - Rapid growth potential for economies at less than half of mature economies' level of incomes, rising middle classes

# How to improve measurement?

- Faster improvement and implementation of better and harmonized ICT prices
- Improvement in measures of GDP to reflect faster declines in ICT prices
- Improved measures of educational composition of workers to reflect labor quality
- Faster implementation of KLEMS methodology in national accounting to create official industry level growth accounts (Jorgenson)
- Integration of productivity with global value chain analysis

# Overview of the Total Economy Database (TED)

# TED - Purpose, indicators and coverage (1)

[www.conference-board.org/data/economydatabase](http://www.conference-board.org/data/economydatabase)

- Originally developed at University of Groningen, taken over by TCB in 2008
  
- Distinct database, very well known in both academic circles as well as with the general public
  
- Purpose:
  - ✓ Publicly accessible database – *mainly used for international productivity research*
  - ✓ Provides input for the Global Economic Outlook
  
- Coverage:
  - ✓ 128 countries (44 advanced, 88 developing), 98% of global GDP
  - ✓ 1950-2013

# TED - Purpose, indicators and coverage (2)

TED I – Basic data	
GDP	GDP in 2014 PPP\$
Persons engaged	All persons engaged in production (incl. unpaid family workers)
Hours worked	All actual hours worked (incl. paid overtime, excl. vacation etc.)
Population	
PPPs	ICP 2011, updated to 2014\$ using relative prices
<i>GDP per capita</i>	
<i>Labor productivity</i>	<i>Per person and per hour</i>
TED II – Growth accounting	
Growth of Labor Quantity	Measured as hours worked or persons engaged (depending on avail.)
Growth of Labor Quality	Labor composition index based on skills by educ. Attainment
Growth of Capital Services	Broken down by ICT and non-ICT investment
Labor share in GDP	
Growth of TFP	
<i>Contributions to GDP growth</i>	Contributions of labor quantity, labor quality, capital services, etc.



# TED - Basic sources used (1)

## GDP

1950-1990

- Maddison Historical Statistics

1990-2015

- National Accounts (as compiled by international agencies such as Eurostat, OECD, UN, IMF, etc.)
- ArKLEMS for Argentina
- Maddison and Wu for China official, downward adjustment of 0.774, and IMF for years 2004-2013.
- Wu (2014) with 2016 update for China alternative
- Sporadically from National Statistical Agencies

2017

Projections from GEO, ECFIN, OECD, IMF, etc. and based on discussions among TCB economists

## Employment

- National Accounts when available, otherwise trends from LFS and finally economically active population (ILO based)
  - Data is taken from international databases (ILO, GGDC, Eurostat, OECD, ADB, APO), sporadically from National Statistical Agencies

## Hours worked

- Historical data:
  - Point estimates, interpolation in between
  - Maddison (1982, 1995, 2001) for OECD, Asian and Latin American countries
  - Hoffman (1998) for Latin American countries
  - Crafts (1997) for Asian countries
- When available: Annual National Accounts hours data from Eurostat, OECD, APO, ILO and for some countries National

# TED - Basic sources used (2)

## Population

1950-1990

- Maddison Historical Statistics

1990-2017

- IDB

## PPPs

2014 EKS \$, updated from 2011 ICP round (World Bank)

# Overview of the International Labor Comparisons (ILC) Database

# ILC prepares economic indicators that are comparable across countries

[www.conference-board.org/ilcprogram](http://www.conference-board.org/ilcprogram)

## Manufacturing Sector

annual releases



### Productivity & Unit Labor Cost Trends

- 1950-2015
- indexes
- and underlying trends in output, hours worked, employment, compensation



### Hourly Compensation Cost Levels

- 1996-2015
- USD & nat currencies
- by industry
- wages and benefits

## Total Economy

monthly releases



### Employment, Unemployment & Labor Force Participation

- 1970-2016



### Consumer Prices

- 1950-2016
- harmonized inflation rates

# ILC Background and Purpose

[www.conference-board.org/ilcprogram](http://www.conference-board.org/ilcprogram)

- Originally developed by U.S. Bureau of Labor Statistics, taken over by TCB in 2013
- Regarded as the “Gold Standard” of international comparisons: users include government, academia, business, and labor organizations in the U.S. and internationally
- Purpose
  - ✓ Prepare economic indicators that are comparable across countries in order to assess international competitiveness
- Publicly accessible databases
  - ✓ Productivity and unit labor costs (trends)
  - ✓ Hourly compensation (levels)

# ILC Data Coverage and Sources

- Country coverage
  - ✓ EU countries – Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden, United Kingdom
  - ✓ Asia – Japan, Singapore, South Korea, Taiwan
  - ✓ Others – Australia, Canada, Norway, USA
- Sector coverage – Manufacturing sector (ISIC C) and 2-digit industry data (ISIC 10-32)
- Time period coverage – 1950-2015 or most recent year available
- Sources
  - National statistical agencies: primarily National Accounts programs, labor force and establishment surveys to fill data gaps

# ILC Indicators

Data refer to **trends** and are presented as **indexes (2002 = 100)**:

- **Productivity**: output per hour, output per employed person
- **Output**: real value-added output
- **Hours Worked**: total and average hours worked per employed person
- **Employment**: all employed persons
- **Labor Costs**: unit labor costs, total labor cost, hourly labor costs (nominal), real hourly compensation, average annual labor cost per employed person, real average annual compensation per employed person

# Overview of the EU-KLEMS Database



## Main elements of EU KLEMS: [www.euklems.net](http://www.euklems.net)

- Provide two revised and updated versions of the EU KLEMS Productivity and Growth Accounts on industry level:
  - ✓ Phase 1: 2013 with headline estimates to 2014
  - ✓ Phase 2: 2014 with headline estimates to 2015
- Decompose output into the contributions of capital (K), labor (L), energy (E), material inputs (M) and service inputs (S), and TFP (Phase 2)
- Coverage: 34 industries, all EU-28 economies, several EU-aggregates, Japan, and the United States
- Switch to new European System of National Accounts (ESA 2010) in accordance with the latest industry classification (ISIC Rev. 4/NACE Rev 2)
- Establish linkages to the EU KLEMS historical series to optimize continuity and accuracy of the database

## Phase I: December 2015-July 2016: First update of the database

- First update of the database
  - ✓ Limited number of countries (depending on availability of data)
    - ⇒ start with 12 countries of last EU KLEMS release
  - ✓ Time period: 1995-2013/2014 based on ESA 2010 (where possible)
  - ✓ Collect variables with highest priorities (where possible)
  - ✓ Growth accounting: contributions to VA growth
- Transmission of the first update to DG ECFIN (July)
- Posting on EU KLEMS website - euklems.net (August)
- Preliminary documentation of the database in pdf format

## Phase II: August 2016-April 2017: Second update of the database

- Second update of the database
  - ✓ Full set of countries / aggregates
  - ✓ Time period: 1995-2014/2015 based on ESA 2010 (where possible)
  - ✓ Establish linkages to the EU KLEMS historical series (where possible)
  - ✓ Collect variables with all priorities, including K, L, E, M, S (where possible)
  - ✓ Growth accounting: contributions to growth of GO, VA, VA/H\_EMP, VA/EMP
- Transmission of the second update to DG ECFIN
- Posting on EU KLEMS website - [euklems.net](http://euklems.net)
- Full documentation of the database in pdf format

# Sources

- Main source: Eurostat
- Additional sources:
  - ✓ National Statistical Institutes
  - ✓ Former EU KLEMS partners
  - ✓ EC – DG Joint Research Centre  
mainly Isabelle Rémond-Tiedrez, Antonio F. Amores, and José Manuel Rueda-Cantuche
  - ✓ NIESR: Mary O’Mahony and Ana Rincon-Aznar  
Labor quality ingredients. employment and wages by gender, age, and 19 industries 2008-2014
  - ✓ Former EU KLEMS files

# Overview of the INTAN Invest Database

# INTAN Invest - Purpose of the database

[www.intan-invest.net](http://www.intan-invest.net)

- Provision of market sector data on intangible assets for 27 EU countries plus Norway and the US.

# INTAN Invest Data coverage

- Country coverage
  - ✓ EU countries – Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany (including ex-GDR from 1991), Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom,
  - ✓ Others – Norway, USA
- Sector coverage – NACE sectors A through K (excluding real estate) plus sector O. Note that EUKLEMS includes, in addition to this, sector P (private households) in its market sector data. Unlike EUKLEMS, INTAN-Invest data at the industry level are not available.
- Time period coverage – 1995-2010 or most recent year available.

# INTAN Invest Indicators (1)

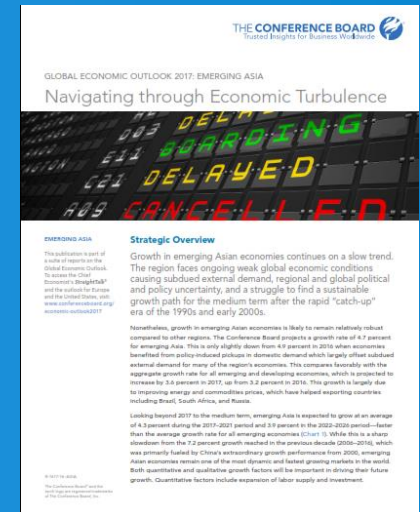
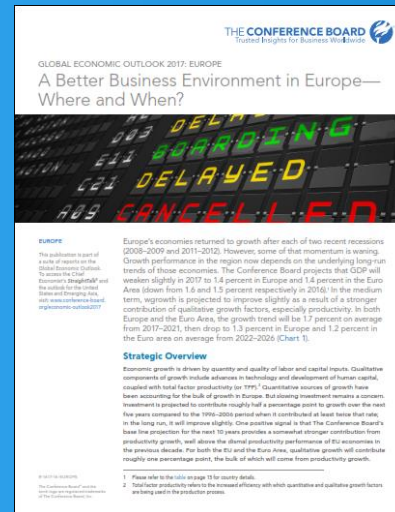
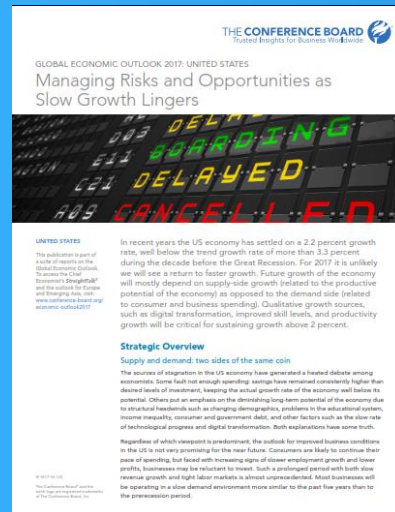
- Nominal investment.
- Net capital stocks real
- Net capital stocks nominal
- Price deflators for intangible investment
- Other data: value added consistent with new intangibles treated as investment, hours worked, investment in tangible assets and total economy GDP.
- Nominal investment



## INTAN Invest Indicators (2)

- Data refer to the intangible assets:
  - ✓ Computerized information: software and databases
  - ✓ Innovative property: R&D; design; product development in financial services; mineral exploration and spending on the production of artistic originals
  - ✓ Economic competencies: market research; advertising; training; organizational capital (own account and purchased).
- Data use harmonized software deflators, that is, software deflators calculated consistently across countries.

# The Conference Board's Global Economic Outlook 2017 Trend, Shocks and Disruption



Available for download on November 16:  
<https://www.conference-board.org/economic-outlook2017>

For webcast registrations on November 22<sup>nd</sup> and 29<sup>th</sup>  
<https://www.conference-board.org/webcasts/>

## THE CONFERENCE BOARD GLOBAL ECONOMIC OUTLOOK, 2010–2026

	2010-2015	2016	2017	2017-2021	2022-2026
	ACTUAL GROWTH	ESTIMATED GROWTH	FORECAST GROWTH	PROJECTED GROWTH	TREND GROWTH
UNITED STATES	2.3%	1.6%	2.0%	2.2%	2.0%
EUROPE*	1.2	1.6	1.4	1.7	1.3
EURO AREA	0.8	1.5	1.4	1.7	1.2
UNITED KINGDOM	2.0	1.7	0.8	1.5	1.4
JAPAN	1.5	0.9	0.6	1.2	0.8
OTHER MATURE**	3.9	3.0	3.0	3.4	2.8
<b>ALL MATURE ECONOMIES</b>	<b>2.0</b>	<b>1.7</b>	<b>1.8</b>	<b>2.1</b>	<b>1.8</b>
CHINA <sup>a</sup>	7.4	3.9	3.8	3.3	2.9
INDIA	7.1	6.8	6.5	5.8	5.5
OTHER DEVELOPING ASIAN ECONOMIES	5.4	5.1	5.0	5.0	4.5
LATIN AMERICA	2.6	-1.3	1.2	2.6	2.7
BRAZIL	2.0	-3.8	0.0	1.9	2.3
MEXICO	3.2	2.4	2.6	4.0	3.8
MIDDLE EAST & NORTH AFRICA	3.2	3.7	2.7	3.3	3.3
SUB-SAHARAN AFRICA	4.9	1.7	2.3	4.8	5.1
RUSSIA, CENTRAL ASIA, AND SOUTHEAST EUROPE***	3.0	0.0	2.0	1.6	1.0
<b>ALL EMERGING AND DEVELOPING ECONOMIES</b>	<b>5.2</b>	<b>3.2</b>	<b>3.6</b>	<b>3.7</b>	<b>3.5</b>
<b>WORLD TOTAL</b>	<b>3.6</b>	<b>2.5</b>	<b>2.8</b>	<b>3.0</b>	<b>2.7</b>

Note: GDP growth for select countries with significant ICT production and trade are revised upward to reflect ICT price declines

\*Europe includes European Union -28 as well as Switzerland, Iceland and Norway.

\*\*Other mature economies are Australia, Canada, Israel, Hong Kong, South Korea, New Zealand, Singapore, and Taiwan.

\*\*\*Russia, Central Asia, and Southeast Europe include projections for Russia, Kazakhstan, Turkmenistan, Uzbekistan, Belarus, and Turkey.

Source: The Conference Board Global Economic Outlook 2017.

## The Conference Board Global Economic Outlook, 2010–2026, European Economies

	Actual growth 2010–2015	Estimated growth 2016	Forecast growth 2017	Projected growth 2017–2021	Trend growth 2022–2026
Austria	1.2	1.3	1.6	2.2	1.8
Belgium	1.2	1.2	1.5	1.9	1.7
Cyprus	-1.3	1.7	2.0	2.9	2.5
Finland	0.5	0.8	1.2	2.2	2.0
France	1.1	0.9	1.1	2.0	1.6
Germany	1.9	1.5	1.0	1.5	1.2
Greece	-4.2	-0.2	2.5	2.6	1.0
Ireland	3.3	5.7	3.0	3.1	3.0
Italy	-0.3	0.9	1.0	1.1	0.2
Luxembourg	3.4	3.7	3.0	2.8	2.8
Malta	3.7	4.1	3.5	1.4	0.9
Netherlands	0.7	1.8	1.8	2.1	1.7
Portugal	-0.5	1.2	1.3	1.9	1.3
Spain	-0.1	2.6	2.3	1.6	0.5
<b>EURO AREA</b>	<b>0.8</b>	<b>1.5</b>	<b>1.4</b>	<b>1.7</b>	<b>1.2</b>
Czech Republic	1.5	2.4	2.6	0.8	0.6
Denmark	0.8	1.0	1.8	1.8	1.6
Hungary	1.5	1.7	1.5	1.1	0.8
Iceland	1.6	4.0	3.0	0.9	0.6
Norway	1.5	0.6	1.3	2.6	2.4
Poland	3.1	3.0	3.0	1.9	1.3
Sweden	2.6	3.4	2.3	1.7	2.1
Switzerland	1.7	1.2	1.5	1.9	1.0
United Kingdom	2.0	1.7	0.8	1.5	1.4
<b>EUROPE</b>	<b>1.2</b>	<b>1.6</b>	<b>1.4</b>	<b>1.7</b>	<b>1.3</b>

Source: The Conference Board Global Economic Outlook 2017

## THE CONFERENCE BOARD GLOBAL ECONOMIC OUTLOOK, 2010–2026

### EMERGING ASIAN ECONOMIES

	2010-2015	2016	2017	2017-2021	2022-2026
	ACTUAL GROWTH	ESTIMATED GROWTH	FORECAST GROWTH	PROJECTED GROWTH	TREND GROWTH
INDONESIA	5.6%	5.0%	5.3%	5.1%	4.5%
MALAYSIA	7.1	6.7	4.7	4.3	3.6
PAKISTAN	4.0	4.4	4.6	4.5	4.0
PHILIPPINES	6.8	7.3	6.4	6.1	5.5
THAILAND	3.7	3.0	3.1	4.2	3.6
VIETNAM	6.0	6.2	6.5	6.7	6.1
<b>OTHER DEVELOPING ASIA</b>	<b>5.4</b>	<b>5.1</b>	<b>5.0</b>	<b>5.0</b>	<b>4.5</b>
CHINA	7.4	3.9	3.8	3.3	2.9
INDIA	7.1	6.8	6.5	5.8	5.5
<b>EMERGING ASIA</b>	<b>6.8</b>	<b>4.9</b>	<b>4.7</b>	<b>4.3</b>	<b>3.9</b>

Notes: GDP growth is revised upward in order to reflect faster declines in alternative ICT prices for 10 countries with significant ICT production and trade, including Singapore, Malaysia, Philippines, Ireland, Taiwan, South Korea, Japan, United States, Canada and China. See “About The Conference Board Global Economic Outlook 2017,” below.

Growth rates for China reflect The Conference Board’s own estimates. See “Frequently Asked Questions on The Conference Board’s Alternative China GDP series.”

Source: The Conference Board Global Economic Outlook 2017, November 2016

# The Economic Inequality Symposium

## The Top Line Issues with the Bottom Line Impact

November 30, 2016

The Conference Board Conference Center

- Economic Inequality has become one of the central political, socio-economic, and cultural issues of this decade.
- Representatives from TCB and CED will be presenting a recent report on short-termism as well as recommendations for tackling inequality.
- Also featured will be corporate practitioners from GE, Cisco, Nielsen, and Time Warner discussing this issue from the legal, governance, communications, diversity and CSR perspectives.

We are glad to make this Symposium available to you on a complimentary basis – you can register by contacting the Conference Board Customer Service Department at 212-339-0345 or by e-mailing [Customer.Service@conference-board.org](mailto:Customer.Service@conference-board.org) .

