ANNUAL REPORT 2016

Emerging and Growth Leading Economies

Economic Outlook

BBVA

EAGLEs

An special chapter of Digital EAGLEs

Index

The shifting of the economic centre of gravity from the Atlantic to the Pacific area continues

Regional contribution to world growth in the next ten years (%)

Global growth will be concentrated in the Asia-Pacific region, which will account for **78.2%** of the increase in GDP between 2015 and 2025.

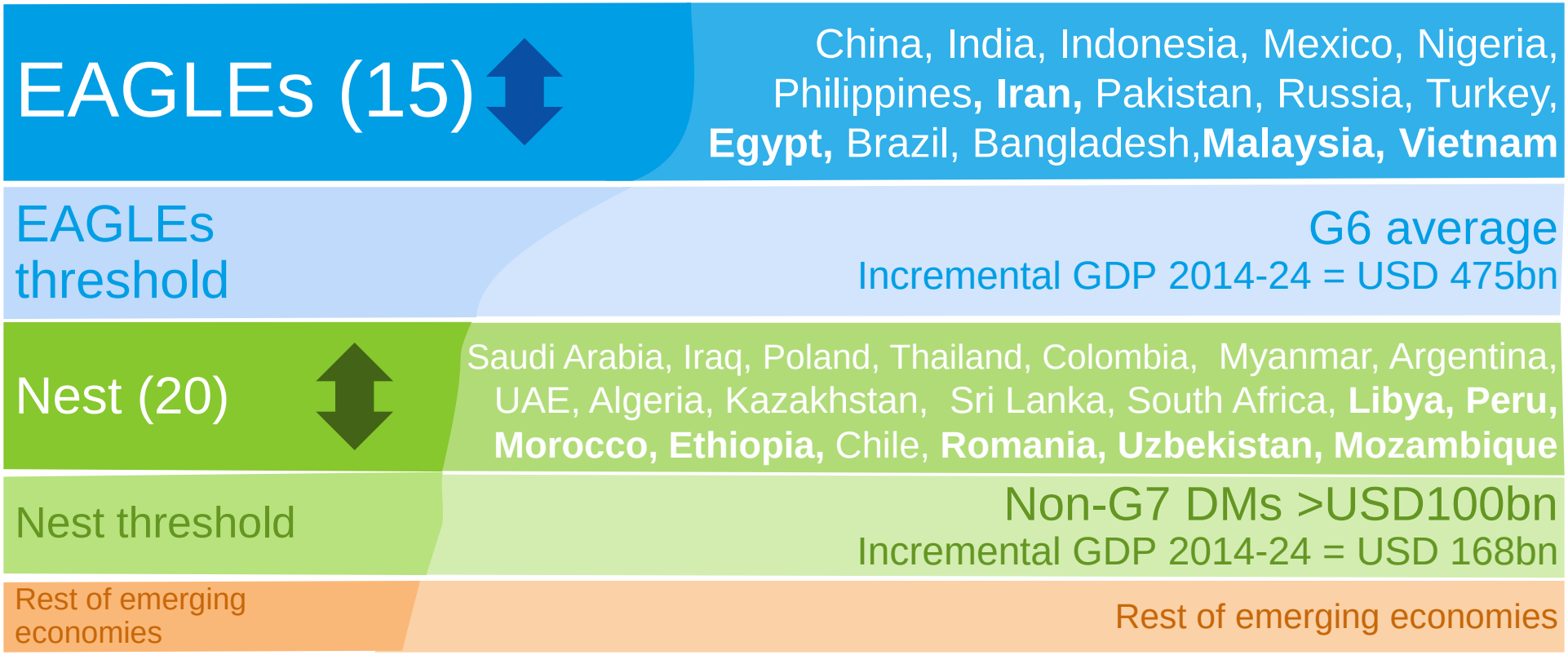
Source: BBVA Research, IMF and Quah D., 2011, "The Global Economy's Shifting Centre of Gravity".

The role of

EAGLEs & Nest

in the global economy

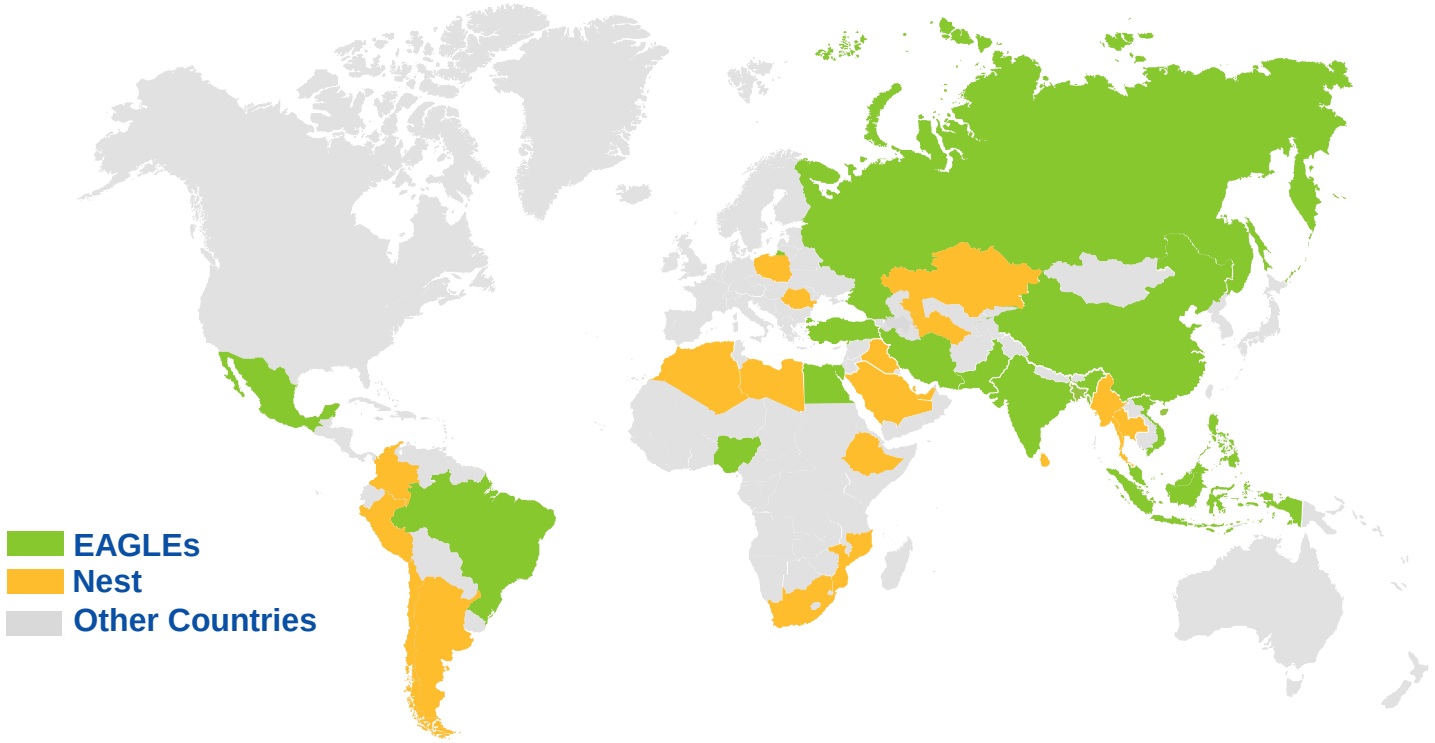
BBVA EAGLEs and Nest 2016 membership



See the annex for further information about the methodology.

BBVA EAGLEs and Nest 2016 membership

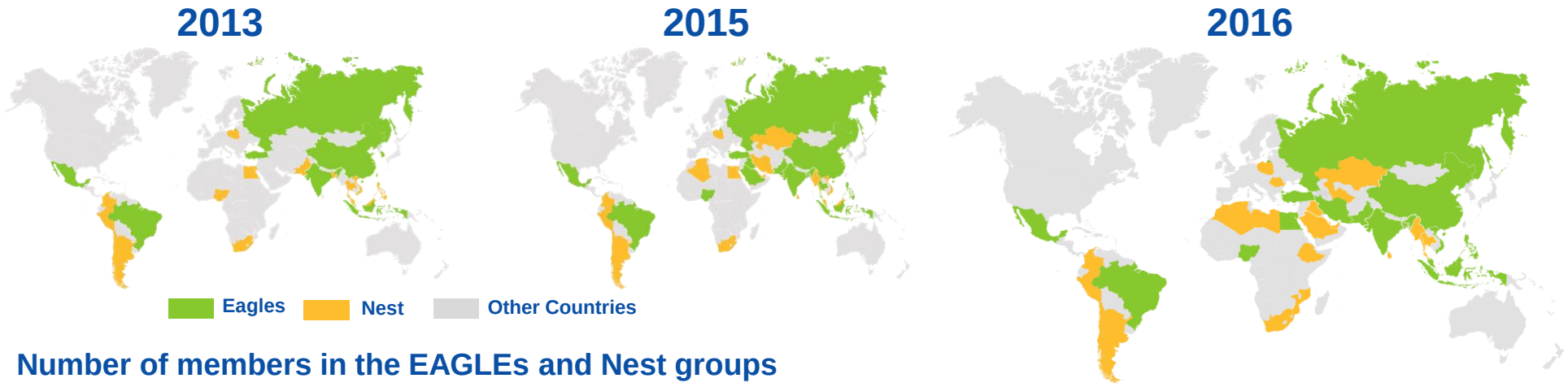
are balanced across the globe



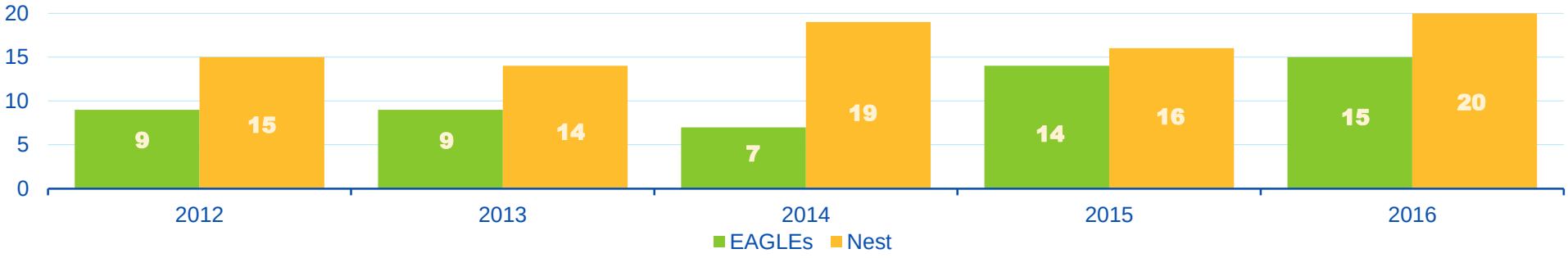
Emerging markets will account for 79% of global growth between 2015 and 2025, with **EAGLEs** contributing up to **64%**, the **Nest** group **10%** and other emerging countries another 5%.

BBVA EAGLEs and Nest 2016 membership

over time



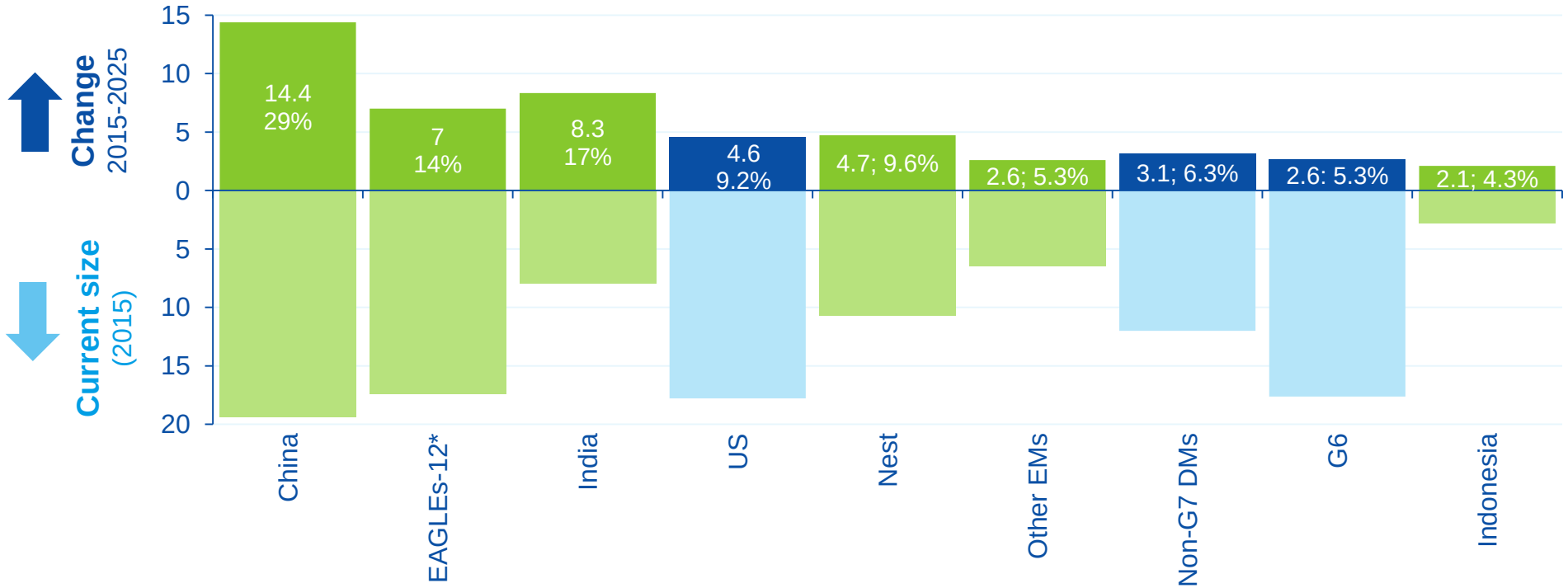
Number of members in the EAGLEs and Nest groups



The members of the EAGLEs and the Nest groups have been increasing over time.

Contribution to world growth 2015-25

PPP-adj. 2015 USD GDP (USD trn) % of world growth

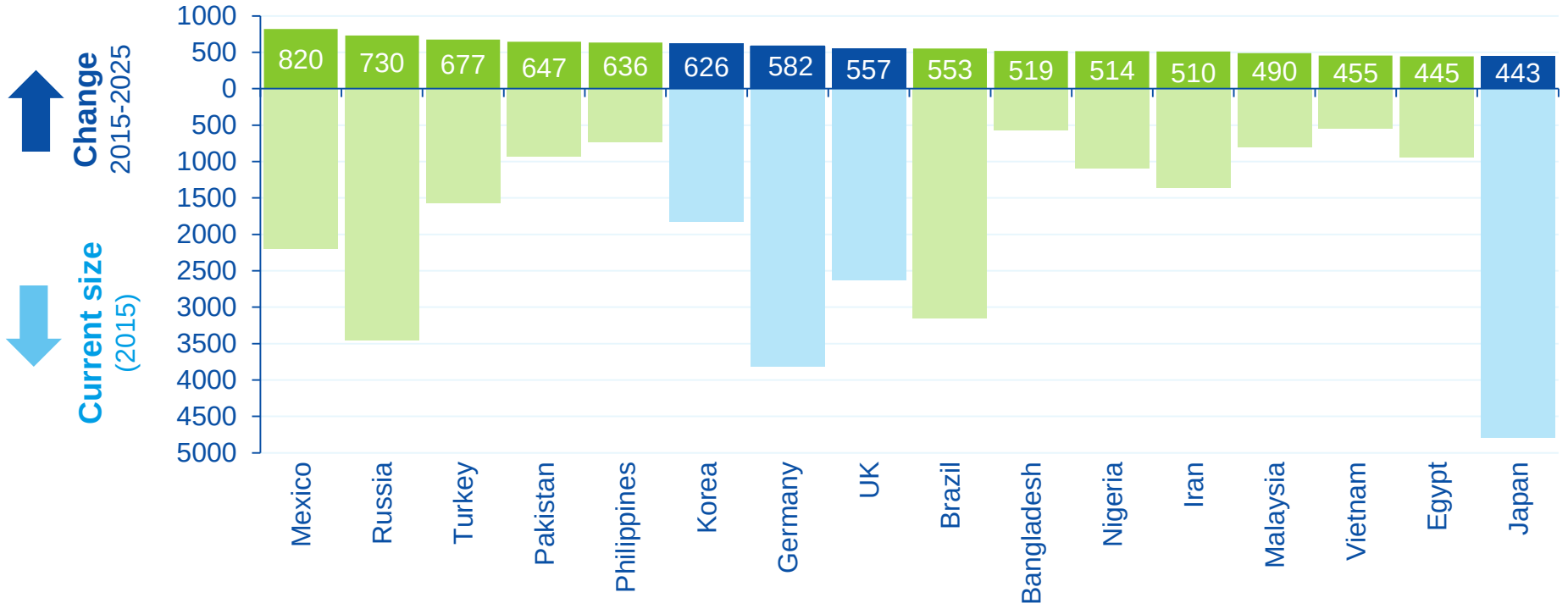


China and India will lead global growth contributing 29% and 17% respectively between 2015 and 2025**.** Their **rapid growth** is behind the **boom of the middle classes** in the emerging world.

NB: *EAGLEs ex China, India and Indonesia
Source: BBVA Research, IMF

Contribution to world growth 2015-25

PPP-adj. 2015 USD GDP (USD bn)

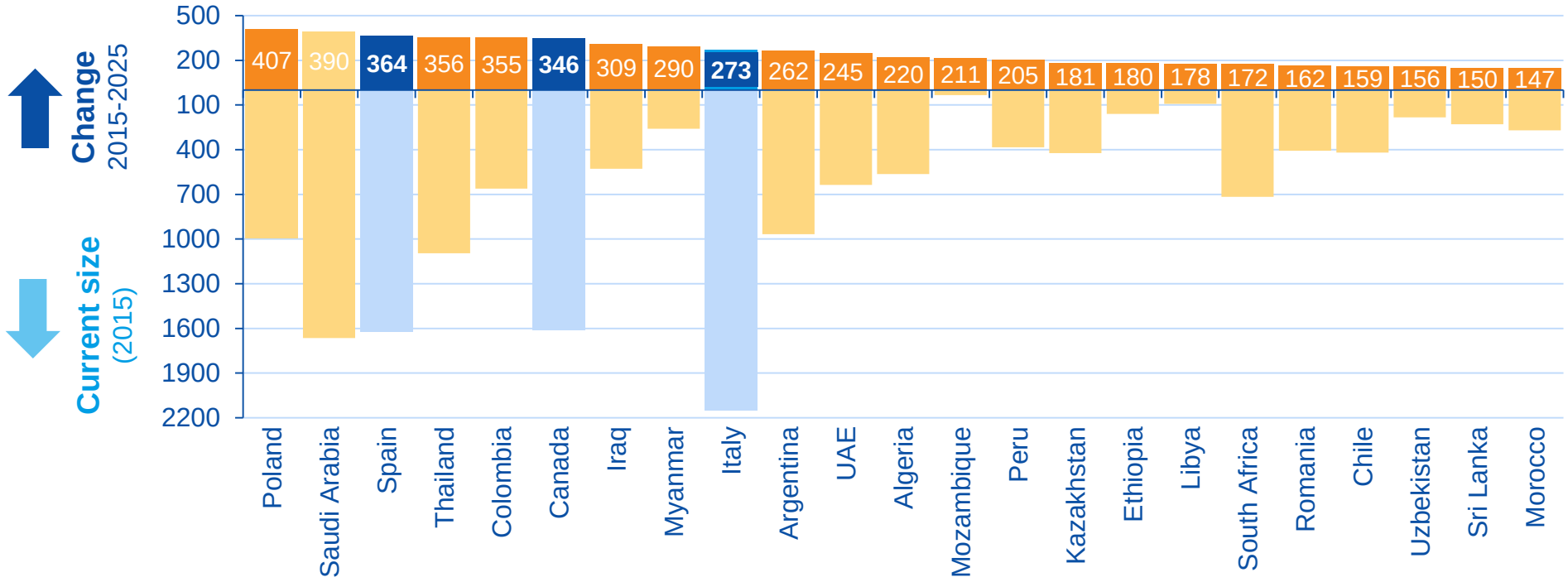


Mexico, Russia and Turkey will contribute more than Germany and UK. Saudi Arabia and Iraq left the EAGLE's group as consequence of the lower oil prices.

Source: BBVA Research, IMF

Contribution to world growth 2015-25

PPP-adj. 2015 USD GDP (USD bn)



Poland ranks at the top of the Nest group, followed by Saudi Arabia**. Malaysia and Vietnam have become EAGLEs members.**

Source: BBVA Research, IMF

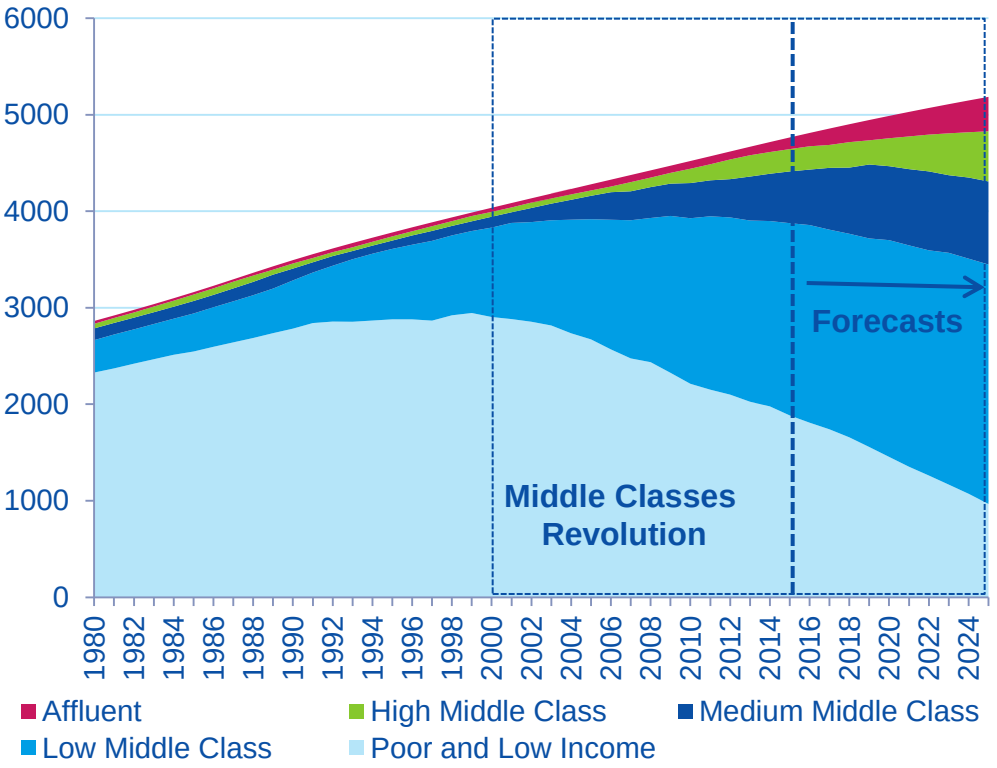
Update of

Middle Classes

projections

The Middle Classes Revolution in the emerging world will continue…

Emerging countries' middle classes (1980-2025)
(millions)



The reshaping of global income distribution started in 2000 in the emerging world and **will continue** in the coming years

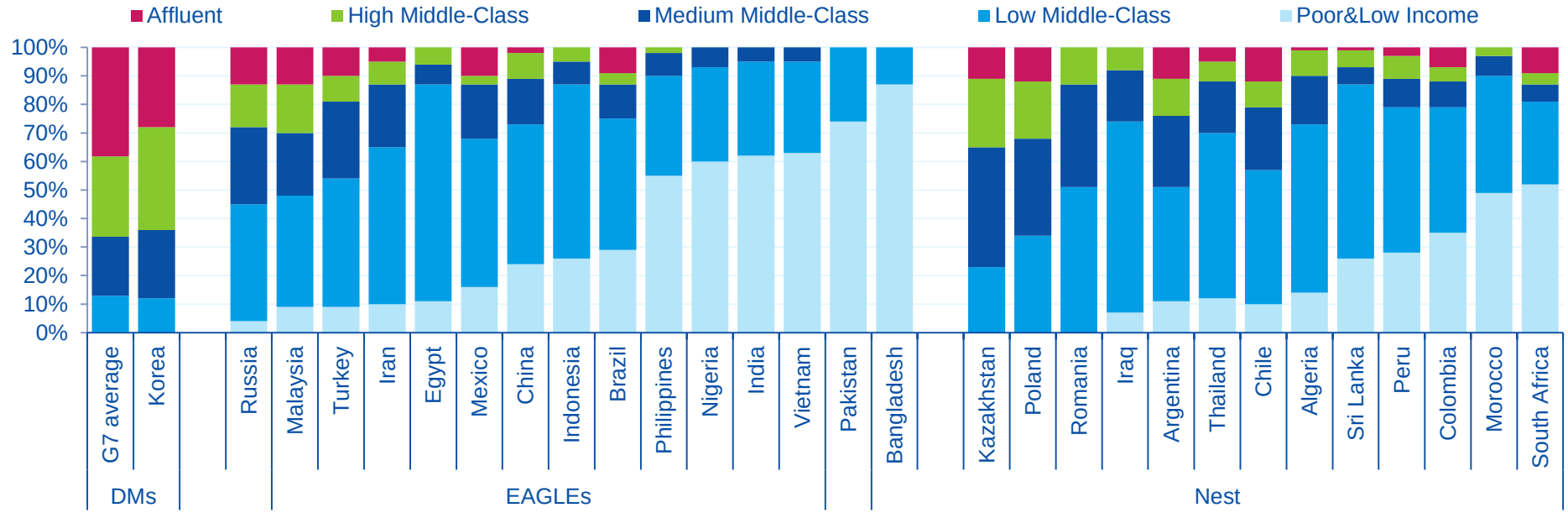
The share of the **wealthier segments** is **on the rise** in **Africa, Latin America and Emerging Europe**

We expect **emerging countries** to increase their **share of the global middle** classes from **58% in 2015 to 75% by 2025**

NB: Based on PPP-adjusted 2010 USD; Poor and Low Income (<USD5,000), Low Middle Class (USD5,000-15,000), Medium Middle Class (USD15,000-25,000), High Middle Class (USD25,000-40,000), Affluent (>USD40,000). See the annex for further information about the methodology.
Source: BBVA Research, UN, WB, IMF

…but with important differences among countries…

Middle classes distributions by GDP per capita 2015
(millions of people by country and group)

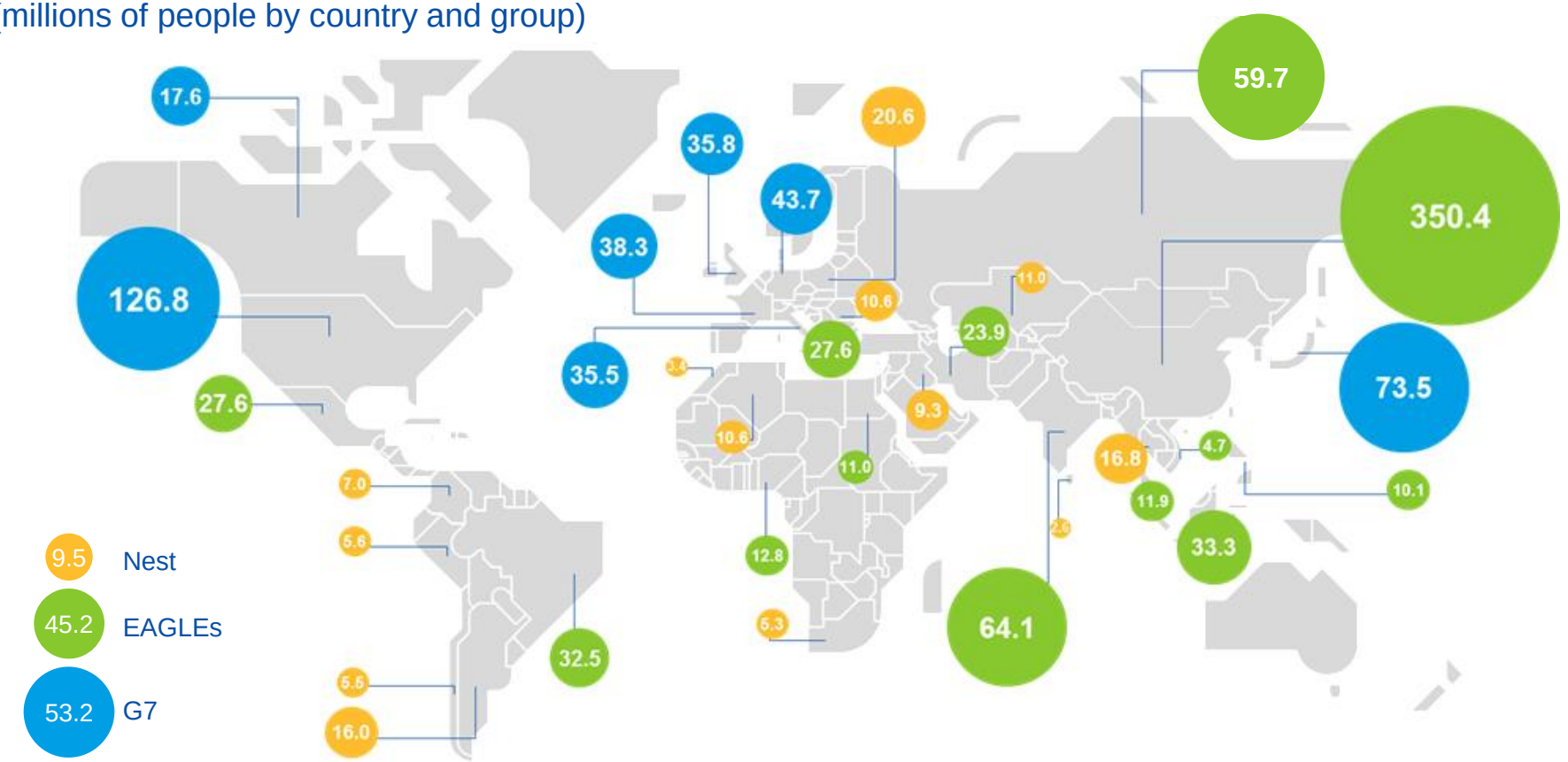


Differences among countries are more accentuated in the EAGLEs group than in the Nest with **Russia, Malaysia, Turkey and Iran** having **the highest proportion of medium-high middle classes** and affluent segments in the EAGLEs group.

DMs= Developed Markets
** No available data for Saudia Arabia,, UAE , Myanmar, Mozambique, Ethiopia, Lybia and Uzbequistan
Source: BBVA Research, UN, WB, IMF

…and with Asia leading the reshaping of global income distribution

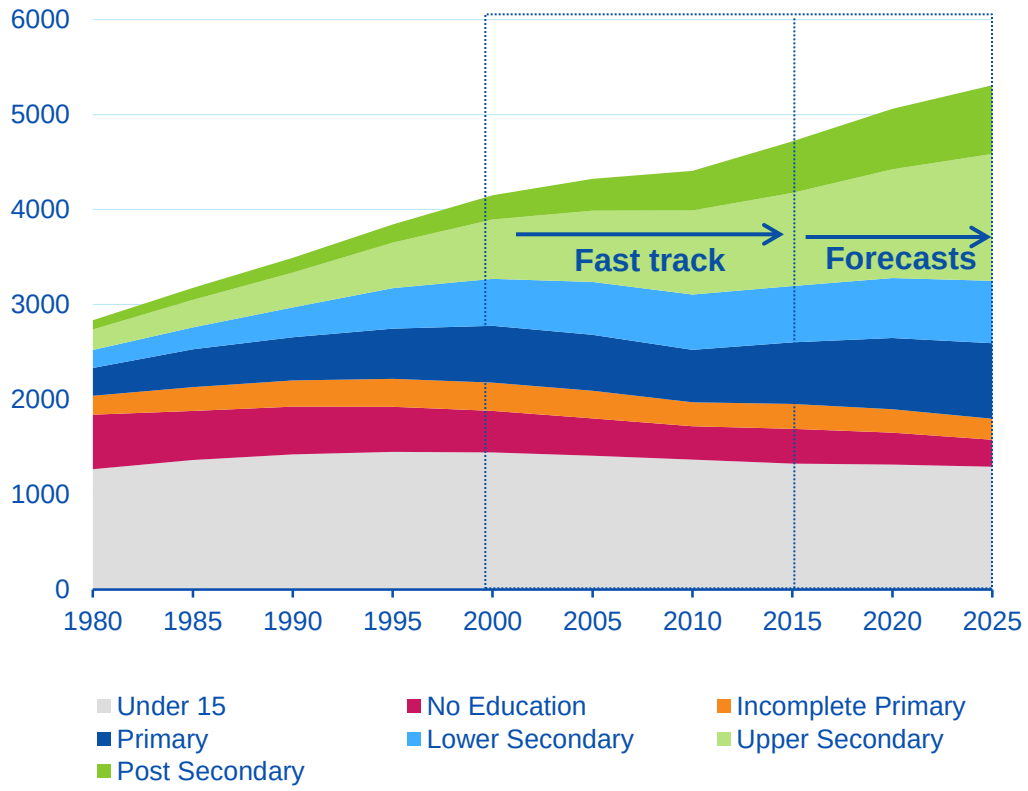
Middle classes distributions by GDP per capita in 2015
(millions of people by country and group)



Source: BBVA Research, UN, WB, IMF

Human capital will counterbalance the effect of slower growth of labor force…

Emerging countries' demographic transition by education (millions)



See the annex for further information about the methodology.
Source: BBVA Research, IIASA

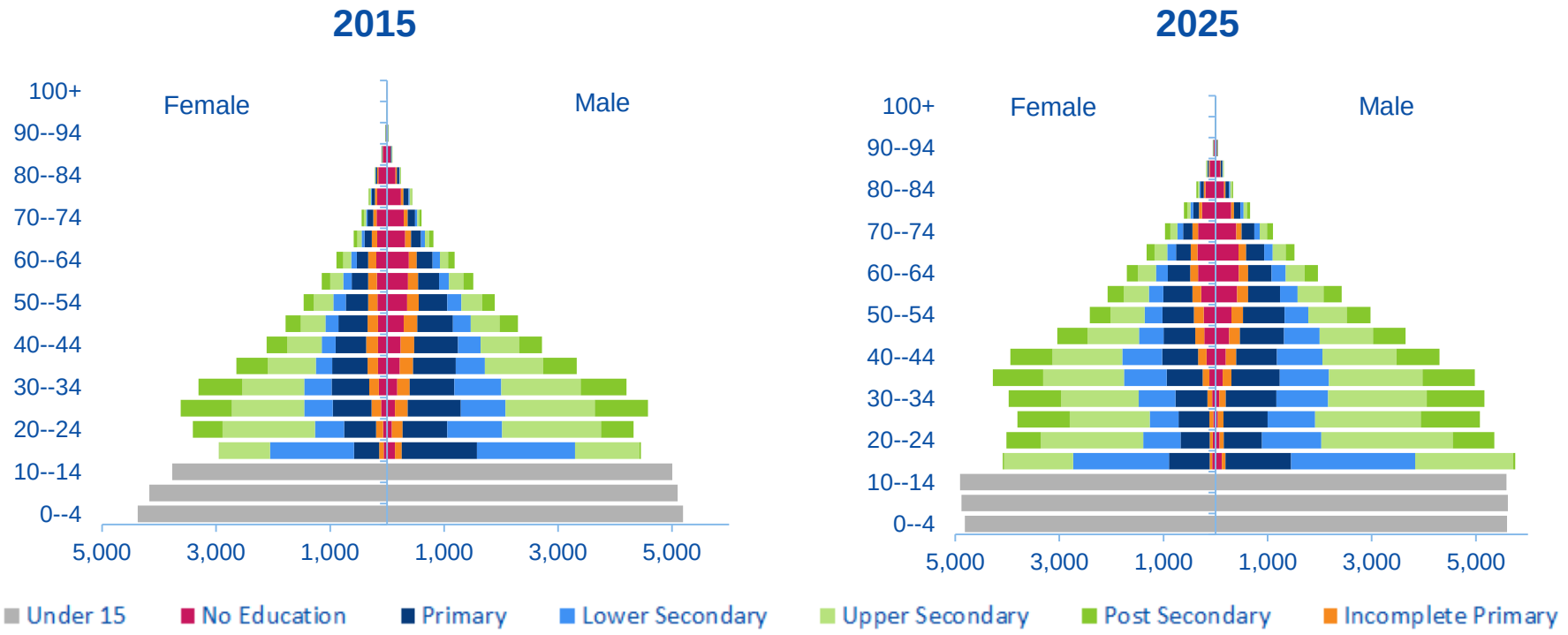
The educational sector will be both the motor and beneficiary of expanding middle classes

The education population dynamics has evolved positively during the last decades**, reshaping its population structure from a society where no education was prevailing during the 70s to a society dominated by people with secondary or higher studies**

People with secondary or higher studies moved from **less than one third in the 90s to 60%** of total population in **2015** and **it will be three quarters in the next ten years**

…offsetting the diminishing population premium in the emerging world…

Demographic transition in the EAGLEs: population pyramid by skills (total population 000's)

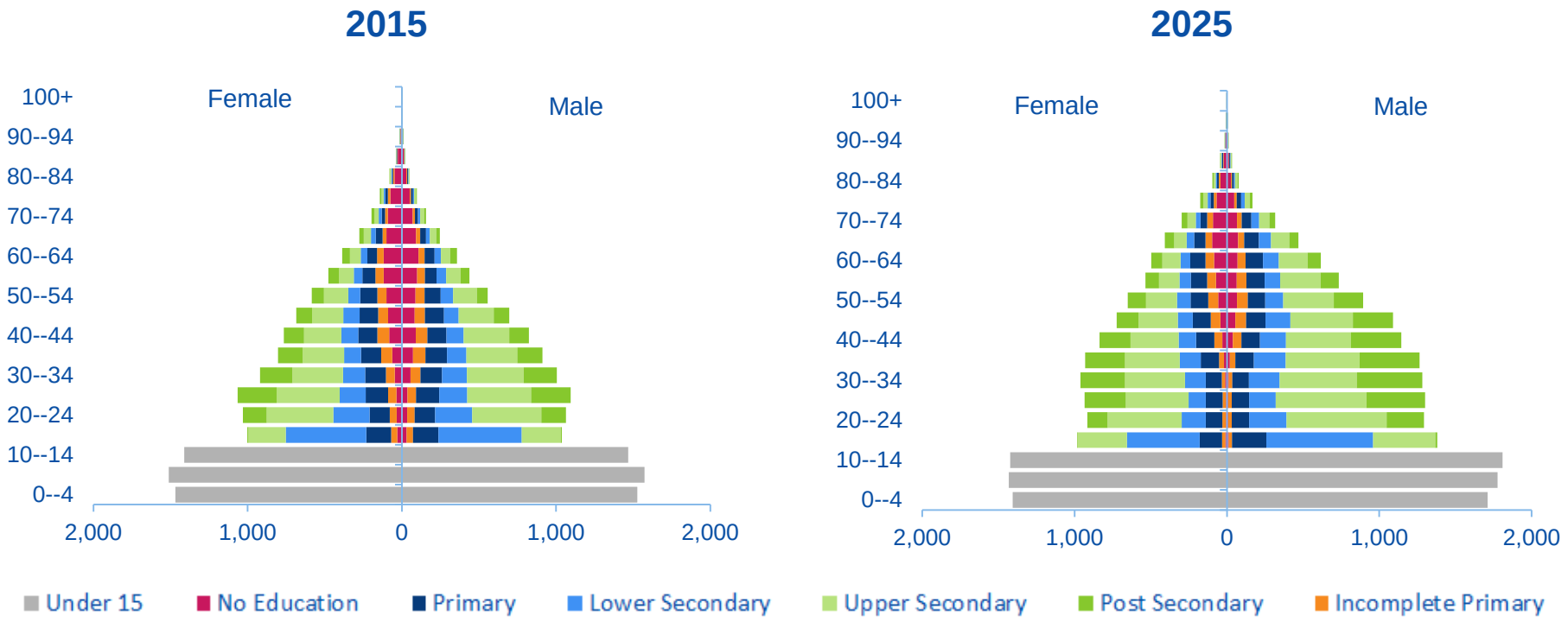


A substantial progress in educational attainment is expected in the EAGLEs countries, where people with at least secondary education would evolve from 59% in 2015 and 70% by 2025

Source: BBVA Research, IIASA

…guaranteeing equality of opportunities…

Demographic transition in the Nest: population pyramid by skills (total population 000's)

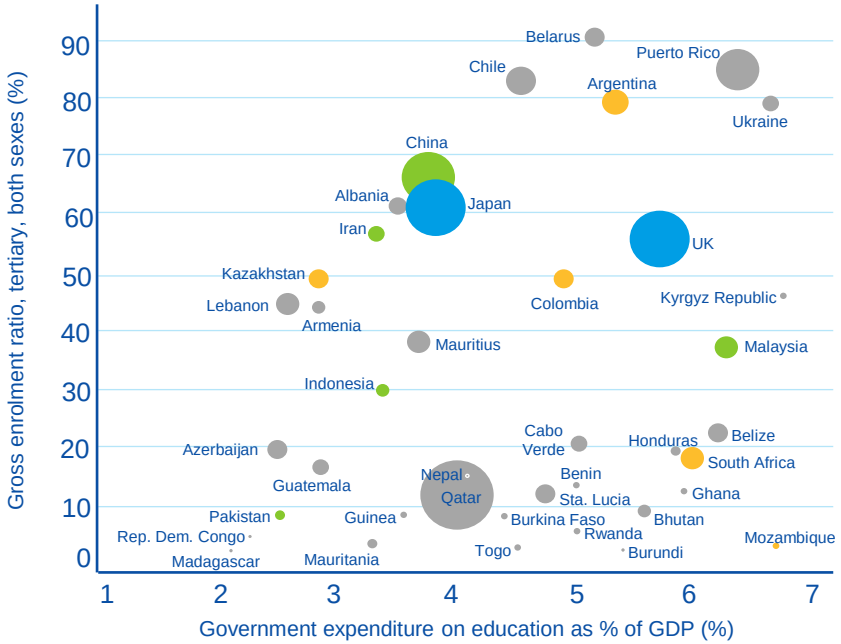


In the Nest group, the pace of convergence to high educated population would be even faster than in the EAGLEs group and three quarters of the total population will have secondary and/or tertiary studies in the next decade.

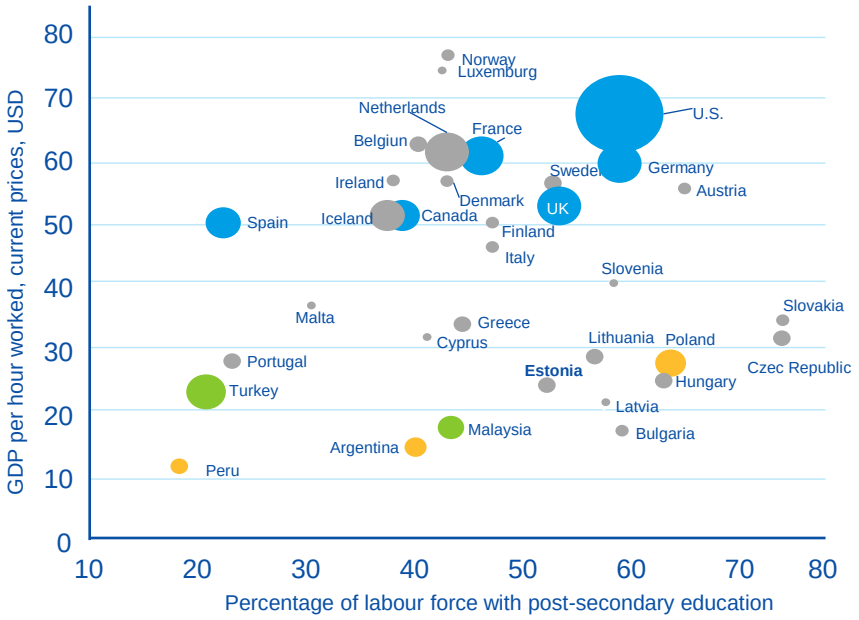
Source: BBVA Research, IIASA

…and having a positive impact on the labor market

Relationship between Government expenditure in education and the enrollment ratio in tertiary education



Relationship between labor productivity and the education level of the labor force



Eagles Nest Developed countries Other emerging countries

Public expenditure on education leads to high educational attainment, which also has a positive impact on the labor market.

Source: BBVA Research and WB

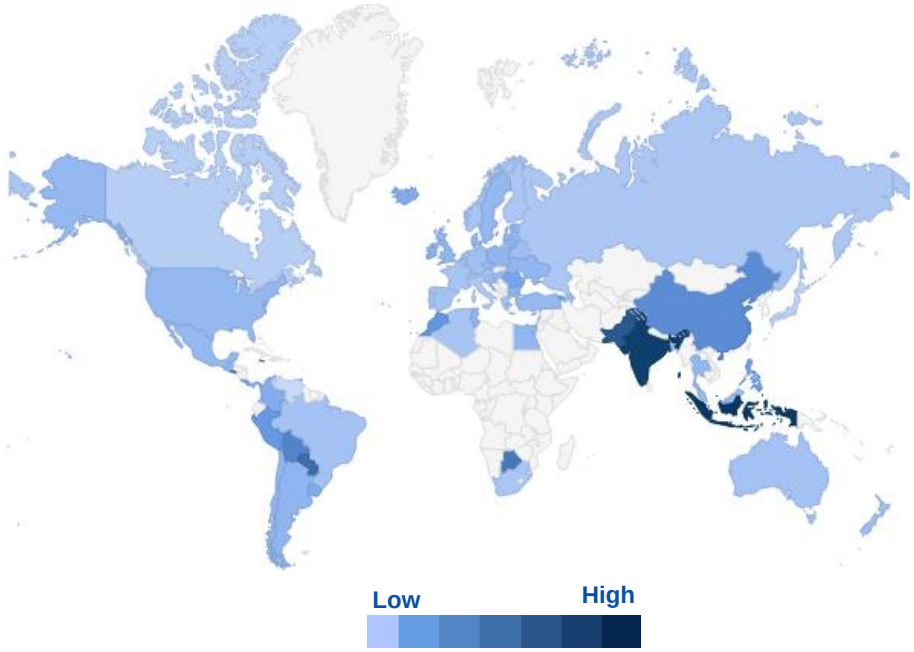
Source: BBVA Research, and ILO

Digital EAGLEs

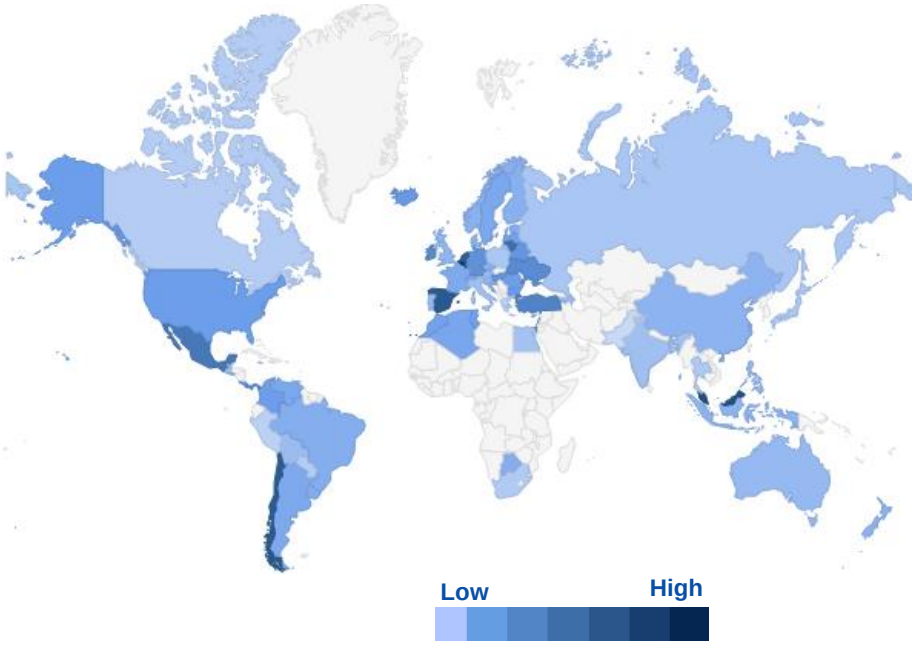
outlook and perspectives

Fixed and Mobile broadband adoption rates in the next decade

Changes in Fixed-Broadband penetration 2014-25



Changes in Mobile-Broadband penetration 2014-25

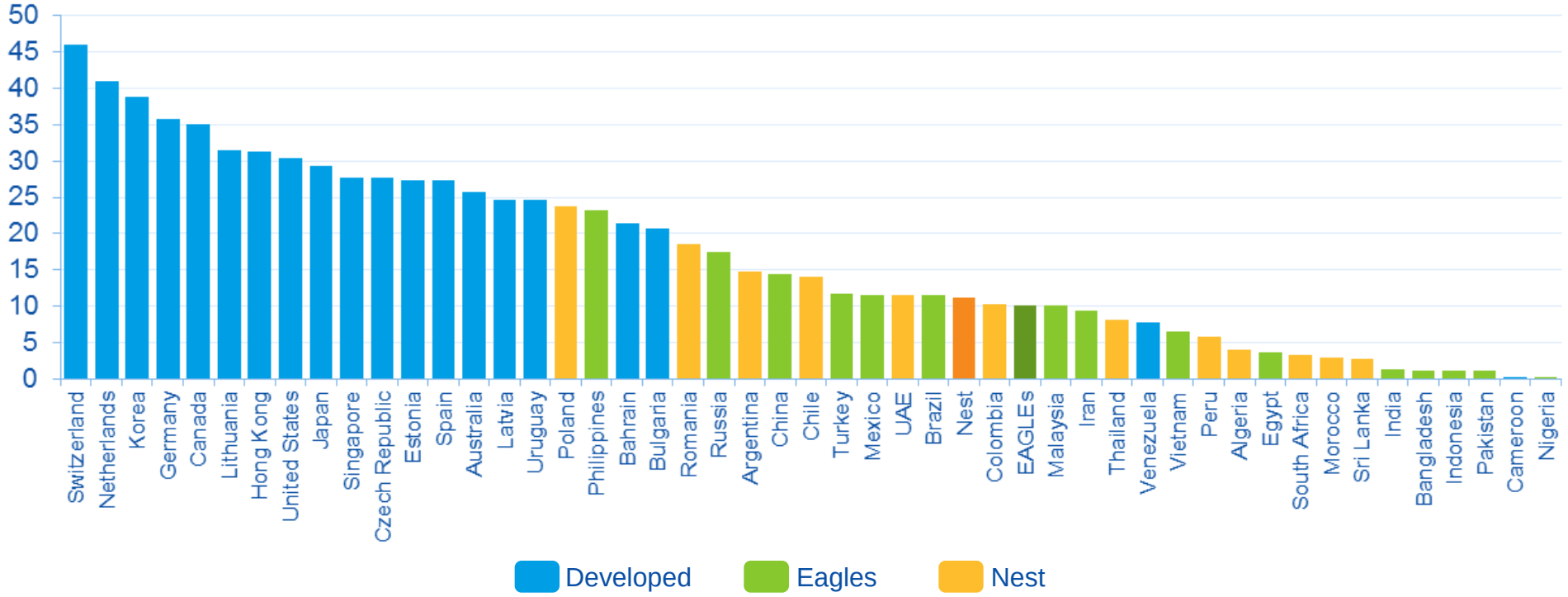


Indonesia, India, Pakistan and Paraguay will increase the most in fixed-broadband technology. In the mobile-broadband case will be Belgium, Malaysia, Spain and Chile.

See “Fixed and Mobile broadband adoption rates across the world: Present and Future “, BBVA Research for further information.

Current levels of fixed-broadband adoption rates across the world

Fixed broadband penetration rate in the World (2014)*

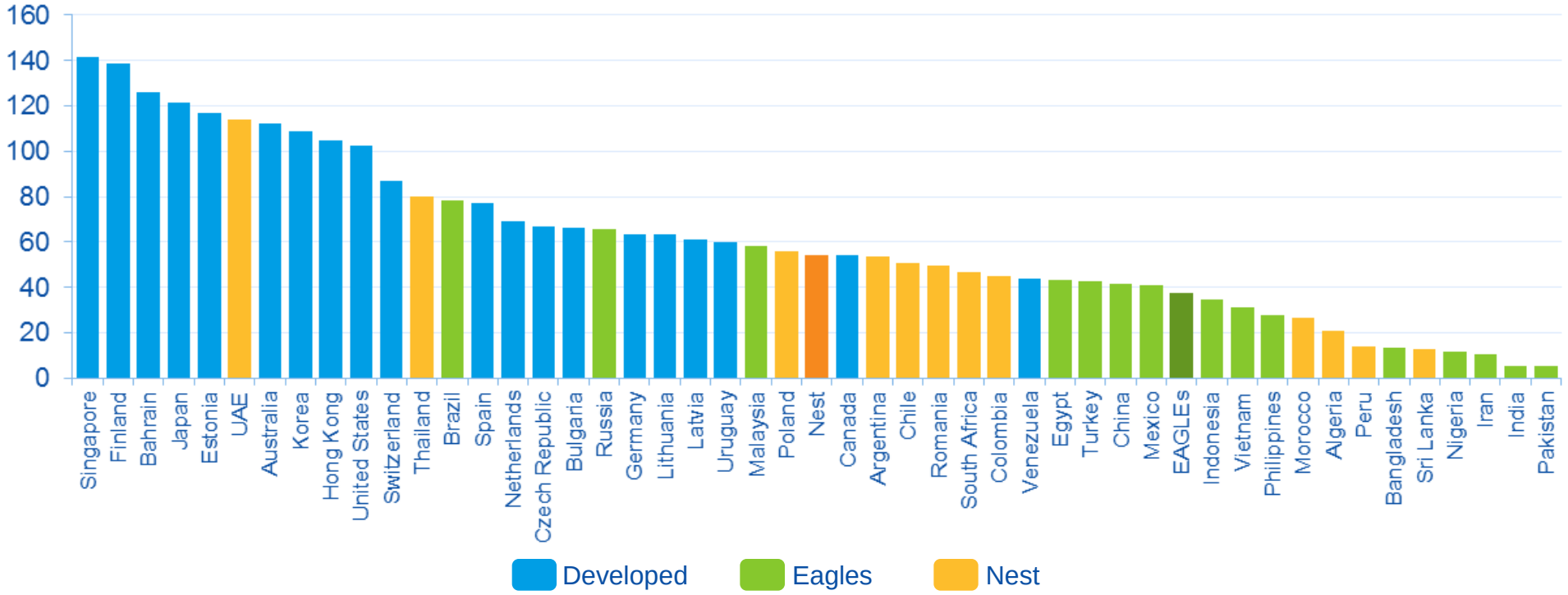


EAGLEs and Nest have currently a medium-low level of broadband penetration. EM Asia countries are particularly lagging behind, but they also have a large potential for future growth.

Source: BBVA Research, ITU, World Bank.
(*) EAGLEs and Nest values are GDP (PPP) weighted averages of each region
See “Fixed and Mobile broadband adoption rates across the world: Present and Future “, BBVA Research for further information.

Current levels of mobile-broadband adoption rates across the world

Mobile broadband penetration rate in the World (2014)*

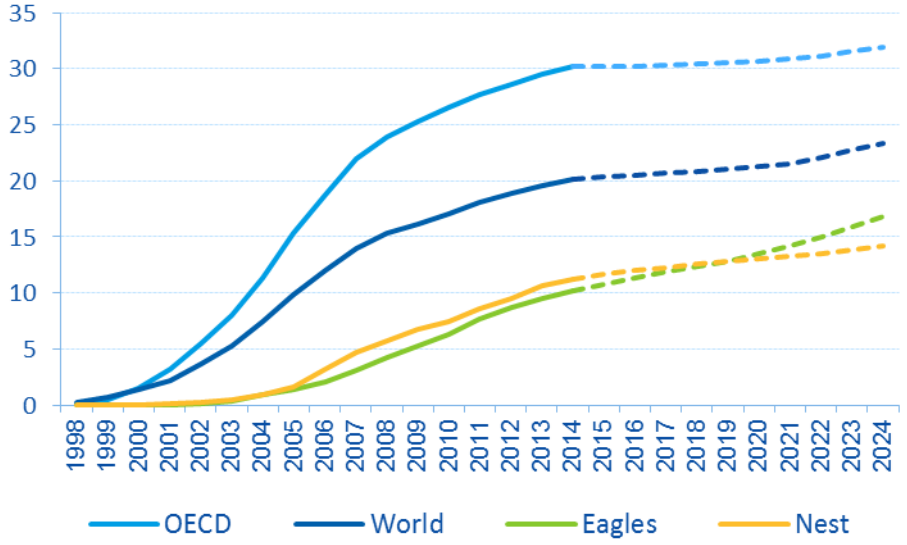


Some Nest countries have penetration levels comparable to the most advanced economies. EAGLEs countries are much less advanced than Nest ones. Again, the potential for growth is quite large in EM Asia.

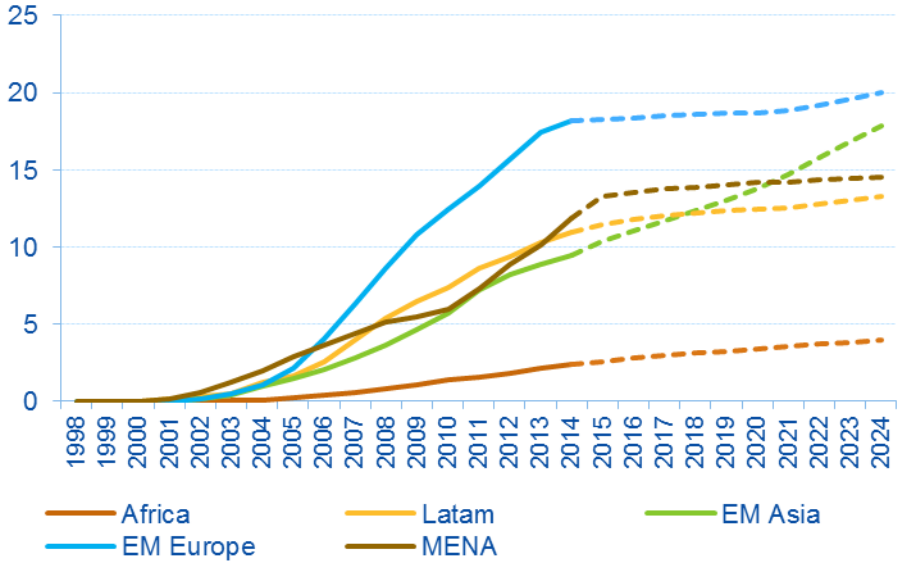
Source: BBVA Research, ITU, World Bank. (*) EAGLEs and Nest values are GDP (PPP) weighted averages of each region
See "Fixed and Mobile broadband adoption rates across the world: Present and Future ", BBVA Research for further information.

Fixed-broadband adoption rates across regions: Past and future evolution

Evolution of Fixed-Broadband penetration 1998-2024



Evolution of Fixed-Broadband penetration 1998-2024. Emerging regions.

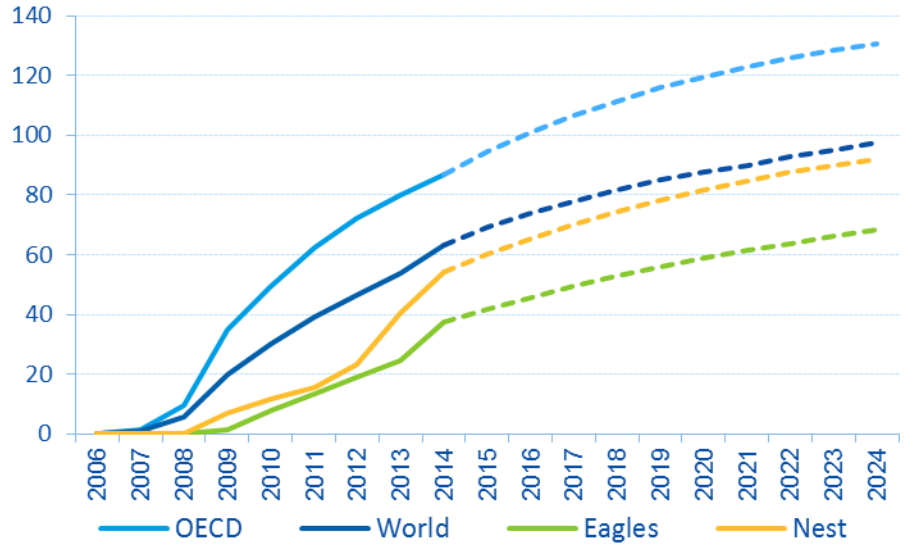


Fixed-broadband adoption is in most regions close to its saturation level. EAGLEs countries will be the ones converging faster to the most developed nations, thanks mostly to the growth in EM Asia. **The gap between DMs and EMs will remain.**

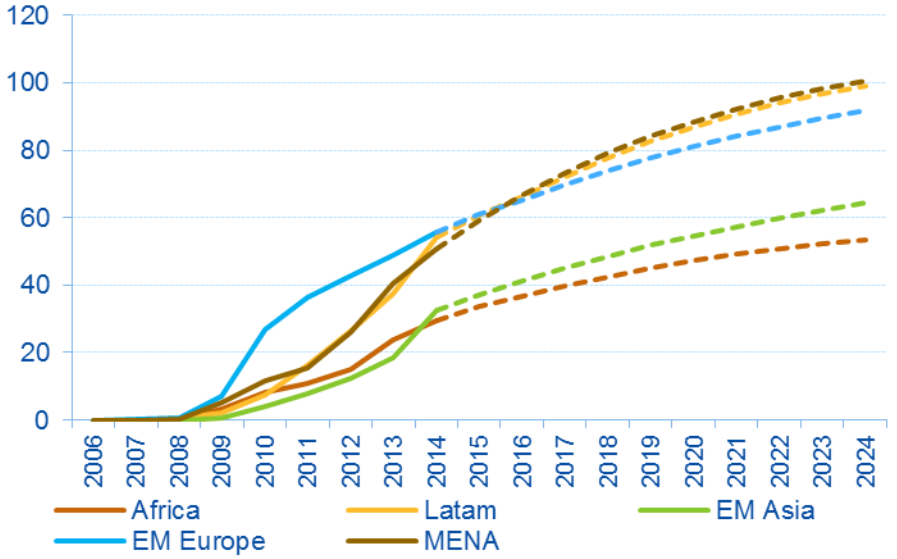
Source: BBVA Research
See "Fixed and Mobile broadband adoption rates across the world: Present and Future ", BBVA Research for further information.

Mobile broadband adoption rates across regions: Past and future evolution

Evolution of Mobile-Broadband penetration 1998-2024



Evolution of Mobile-Broadband penetration 1998-2024. Emerging regions

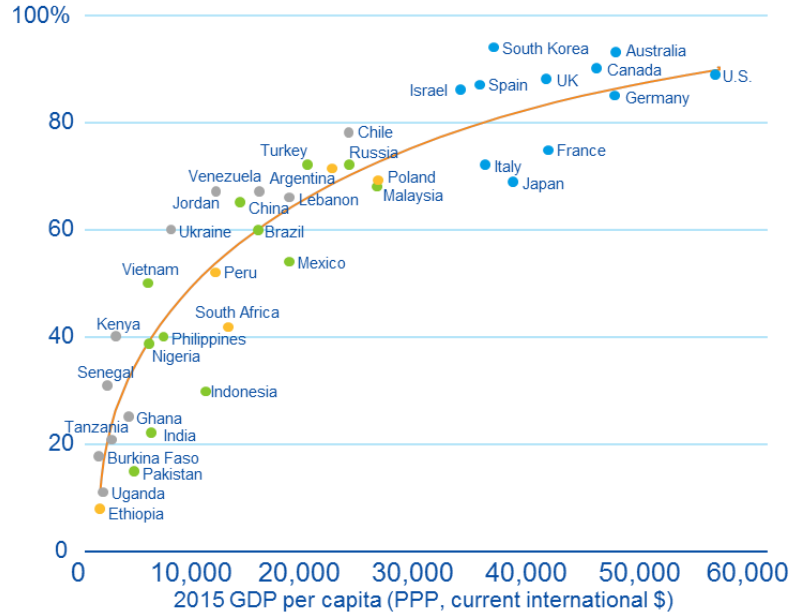


Mobile adoption rates will change largely in the next decade because globally the mobile adoption process is in a much earlier phase that in the fixed-broadband case. Nest countries will keep on growing faster than EAGLEs. LatAm countries will perform remarkably well.

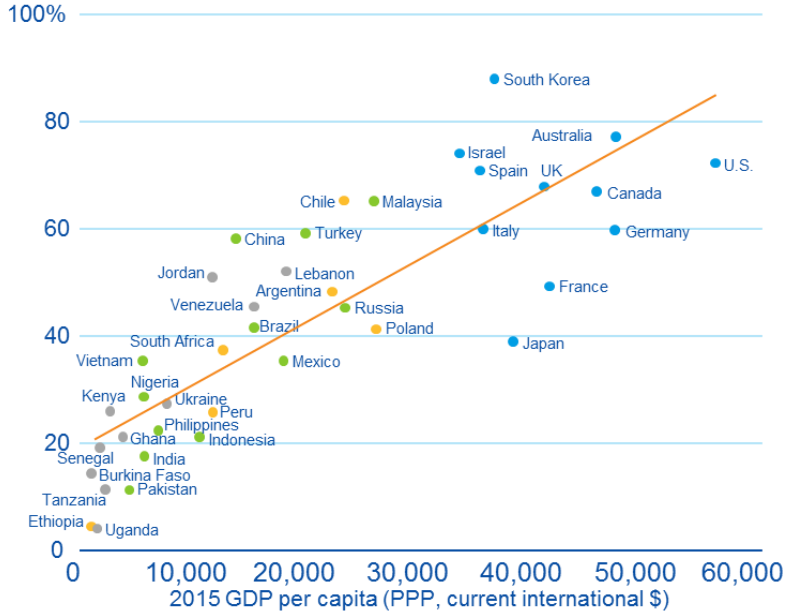
Source: BBVA Research
See "Fixed and Mobile broadband adoption rates across the world: Present and Future ", BBVA Research for further information.

The impact of digital economy on growth

Relationship between per capita income and internet access 2015
(Adults who use the internet at least occasionally)



Relationship between per capita income and Smartphone ownership in 2015
(Adults who report owning a smartphone)



Eagles Nest Developed countries Other emerging countries

There is a strong correlation between country wealth (measured by GDP per capita PPP) and internet access, as well as with the smartphone ownership

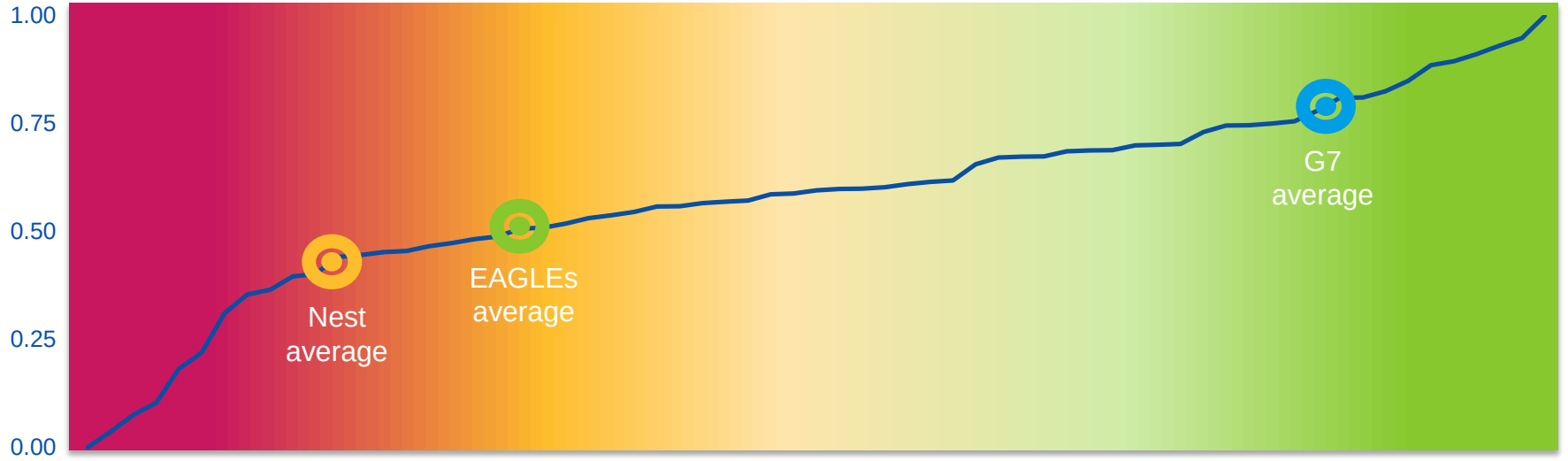
Source: BBVA Research and Pew Research Centre report on Smartphone Ownership and Internet Usage in Emerging Economies 2016

Source: BBVA Research and Pew Research Centre report on Smartphone Ownership and Internet Usage in Emerging Economies 2016

Macro perspective: Digitalization Index 2015

Cross country picture: Digitalization Index in 2015

(Composite index: ICT infrastructure, ICT usage, ICT cost, digital content, and ICT regulation)



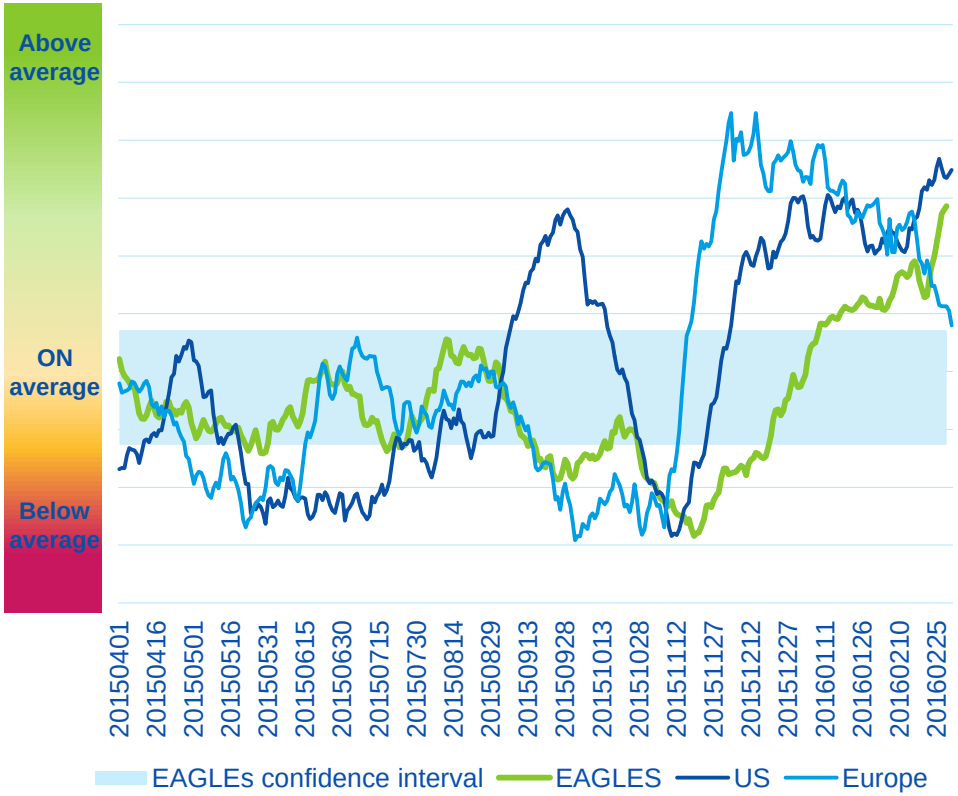
Algeria	Vietnam	Morocco	China	Hungary	Ireland	Germany	Sweden
Qatar	Peru	Thailand	Saudi Arabia	Turkey	Chile	Malaysia	Netherlands
Nigeria	Argentina	Mexico	Croatia	Romania	United Arab Emirates	Denmark	Finland
Pakistan	Egypt	Sri Lanka	Colombia	Uruguay	Belgium	Latvia	Lithuania
Bangladesh	Ukraine	Italy	Slovenia	Luxembourg	Spain	Canada	Korea, Rep.
Paraguay	Greece	Poland	Kazakhstan	Brazil	Singapore	Australia	Japan
India	Philippines	Bulgaria	Russian Federation	Czech Rep.	Austria	France	Estonia
Venezuela	Indonesia	Cyprus	Slovak Republic	South Africa	Portugal	United States	Hong Kong SAR
							United Kingdom

Source: BBVA Research, WEF, ITU and World Bank

See the annex for further information about the Digitalization Index.

EAGLEs Media Sentiment Digital Index: Significant improvement since late 2015…

Media sentiment digital index for EAGLEs countries, US and Europe 2015-16



The indices capture the average tone of digital related issues on the media on a daily basis

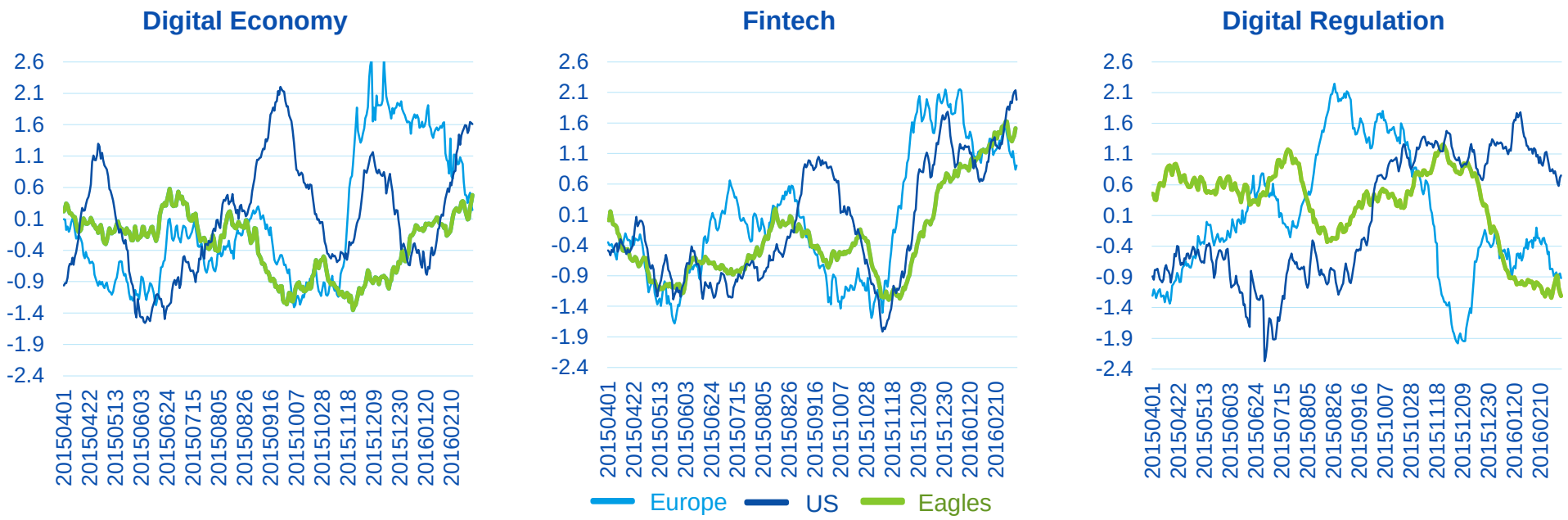
The **sentiment about digital related topics in the media in the EAGLEs countries has improved significantly** since November 2015, although at a slower pace than Europe and US countries and overtaking the G7 average since the beginning of 2016

The indices are composed by three main components: digital economy, digital banking transformation (fintech) and digital regulation

Source: BBVA Research, www.gdelt.org
See the annex for further information about the data and the used methodology to construct the index.

…mainly led by the banking digital transformation with regulation dragging potential

Media sentiment digital index for EAGLEs countries, US and Europe 2015-16 by components*



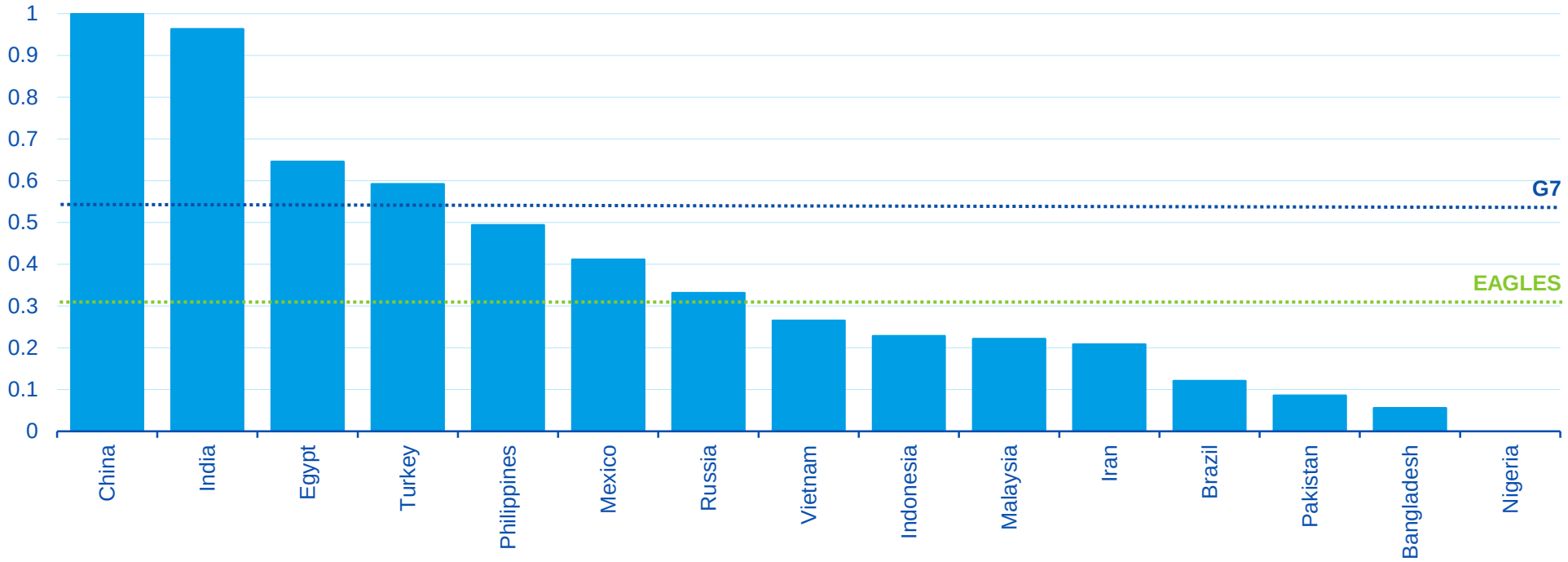
* The digital economy component collects the news' average tone in the media for the EAGLEs countries about topics related to the use of digital technologies in business, economic and social activities, digital infrastructures and digital innovation. The digital banking transformation (fintech) component includes news' coverage about topics related to the technological innovation in the financial sector and the digital regulation component comprises topics in the media related to regulatory policies on information and communication technologies, internet and data control.

The improvement in the EAGLEs media sentiment index was mainly due to the **better performance in the Fintech digital economy components** since last semester, respectively. On the contrary, **the digital regulation component recorded a sharp decline since late 2015**, attenuating the rise on the synthetic index.

Source: BBVA Research, www.gdelt.org
See the annex for further information about the methodology.

EAGLEs Media Sentiment Digital Index ranking 2016

Ranking of Media sentiment digital index by EAGLEs countries

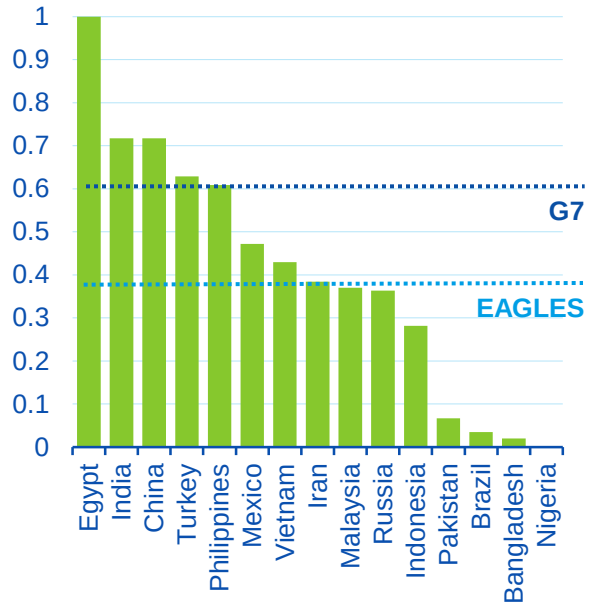


China leads the group as the better valuated country in the EAGLEs according to the media, followed **by India, Egypt and Turkey, all of them outperforming the G7 average**. On the other hand, Nigeria, Bangladesh and Pakistan rank as the worst performers in the EAGLEs group respectively

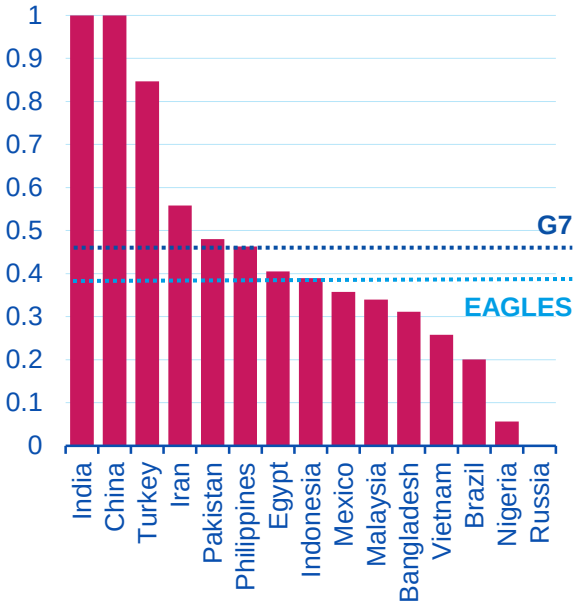
Source: BBVA Research, www.gdelt.org

EAGLEs Media Sentiment Digital Index ranking 2016

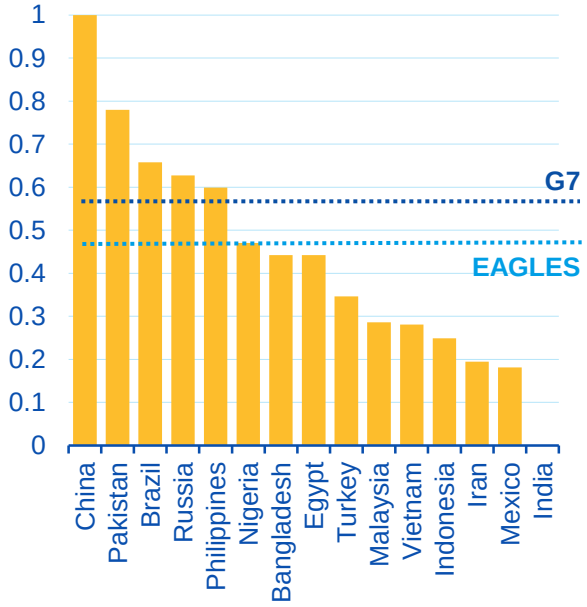
Ranking of Media sentiment digital economy index by EAGLEs countries



Ranking of Media sentiment digital fintech index by EAGLEs countries



Ranking of Media sentiment digital regulation index by EAGLEs countries

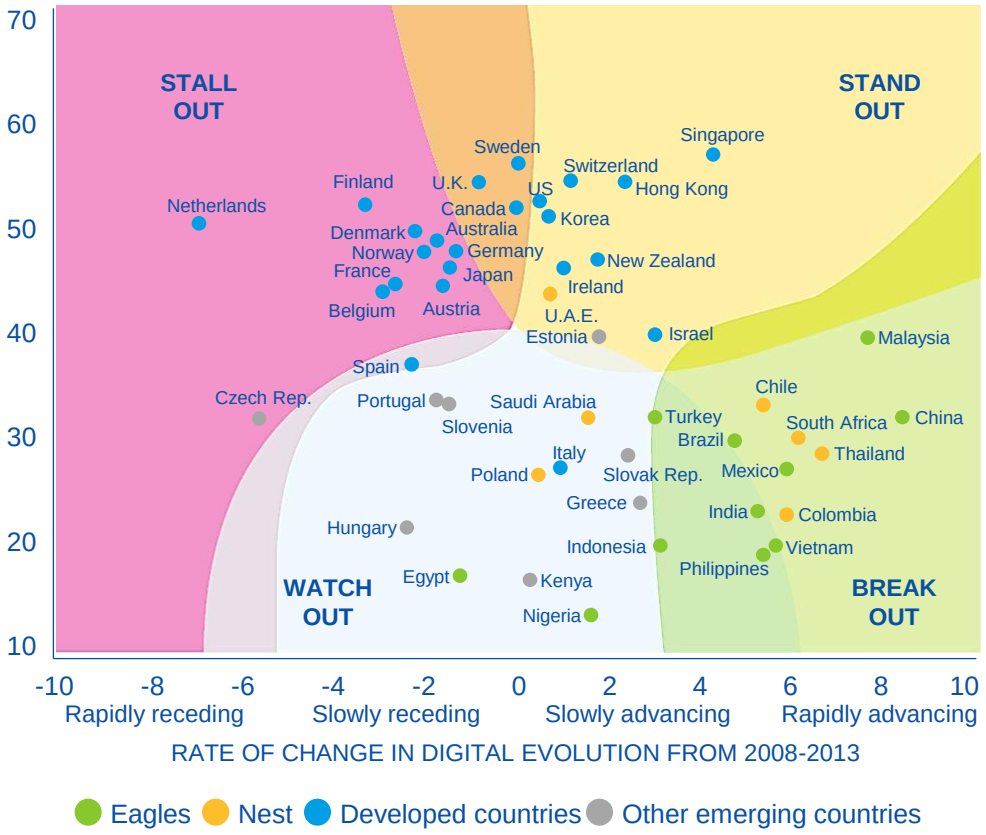


Considering the **digital economy component, Egypt comes to the top** of the ranking, followed by India, China and Turkey. According to **the fintech component, India is the better valuated**, followed by China, Turkey and Iran. Finally, taking into account the **digital regulation component, China records the best performance**, followed by Pakistan and Brazil, Russia and Philippines

Source: BBVA Research, www.gdelt.org

In line with the EAGLEs digital performance in the last years

Digital evolution index trajectory (out of 100)



Source: BBVA Research and Digital Evolution Index (the Fletcher school at TUFTS University)
See the annex for further information about the Digital Evolution Index.

The digital evolution index **points the EAGLEs and Nest group as countries with a strong potential to foster its digital development process** in the coming years

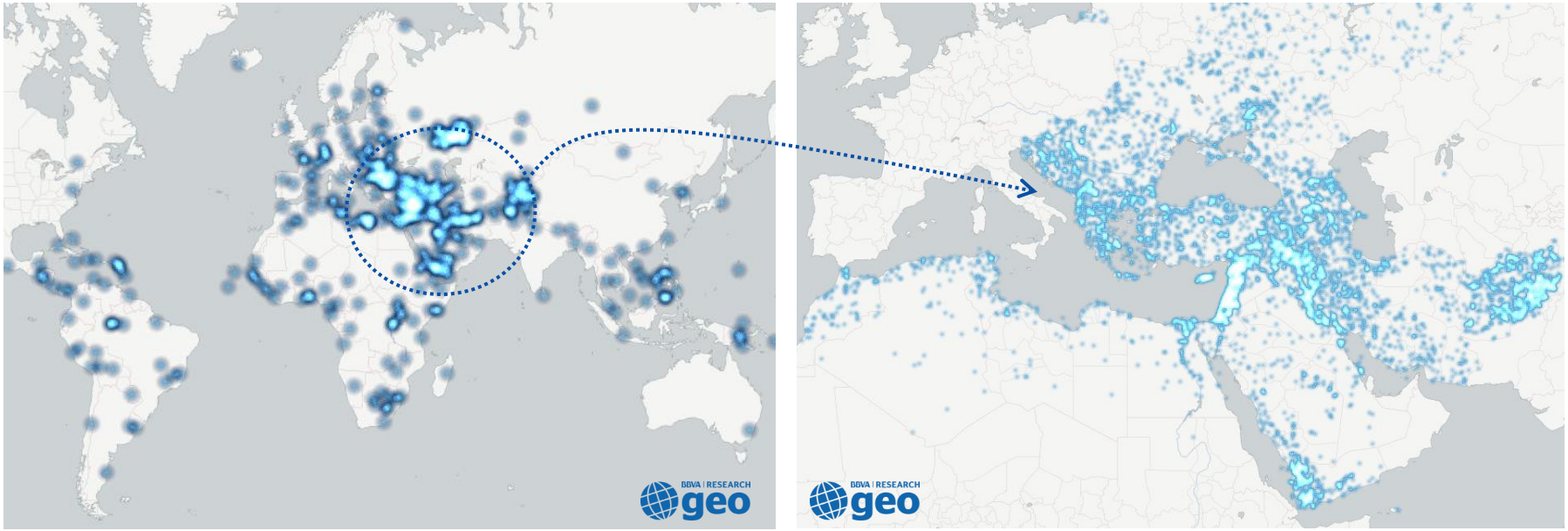
China, India, Mexico, Turkey, Philippines and Vietnam evolved rapidly in digital terms during last years with the potential to emerge as strong digital economies if their evolution rates continue

Challenges in the medium term lie in **improving supply infrastructure and in nurturing sophisticated domestic consumers**, favored by the middle classes revolution

Balance of risks

The Geopolitical situation continues challenging the emerging world

BBVA World Conflict Heatmap 2015-16 (Number of conflicts / Total events)

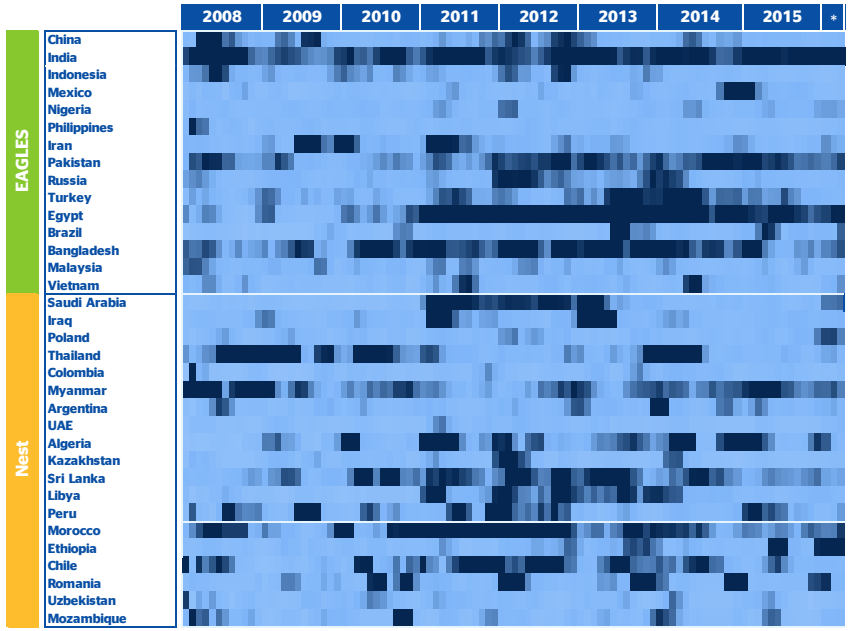


The key hot spots remain in the Middle East, North Africa, Afghanistan and Ukraine. The Syrian war remains complex with no transition plan and with important spillovers spiraling into Europe (refugees and terrorism). ISIS took advantage of fragilities in the neighborhood to expand in North Africa, Afghanistan and the Caucasus.

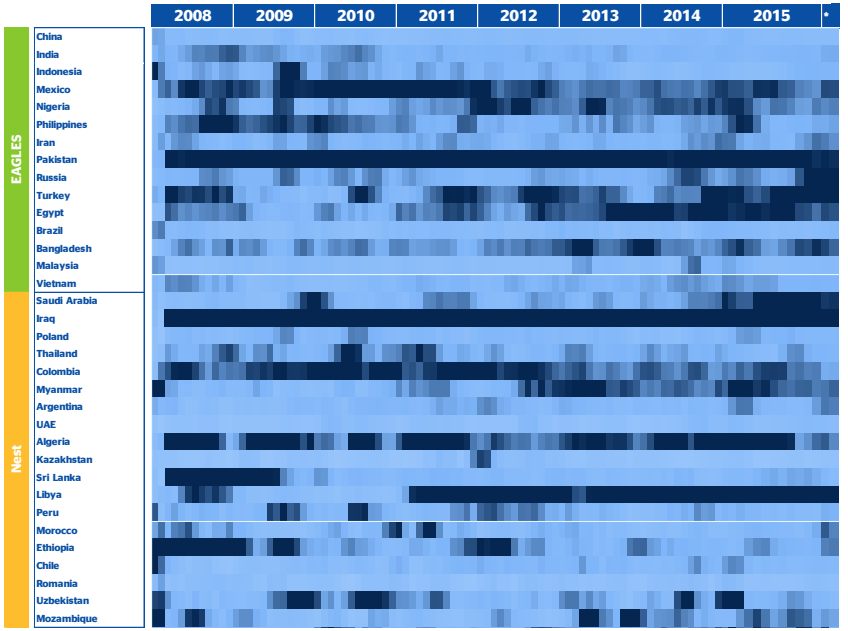
Source: www.gdelt.org & BBVA Research
See the annex for further information about the data and the used methodology to construct the index.

The Global Awakening has spiked after Years of calm

World Protest Intensity Map 2008–16
(Number of protests / Total events. Dark Blue: High Intensity)



World Conflict Intensity Map 2008–16
(Number of conflicts / Total events. Dark Blue: High Intensity)

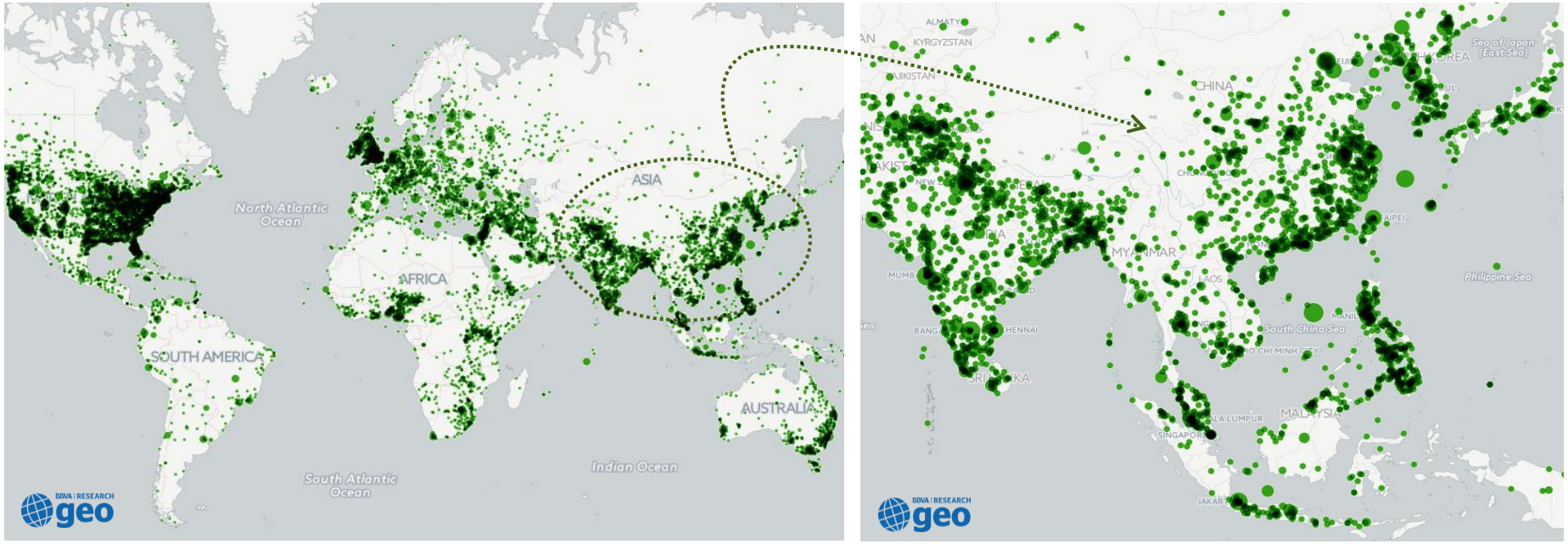


The Arab Spring marks a turning point in the dynamics of social unrest in the emerging world, particularly in MENA. Some frozen conflicts keep well alive in EAGLEs and Nest countries, achieving chronic levels of instability.

Source: www.gdelt.org & BBVA Research

Cyber-attacks have become one of the main threats in 2015 with dangerous risks

Cyber warfare, cyber-attacks, data breaches or another other issues relating to computer and online security around the world 2015-16



Cyber-attacks has risen exponentially, perpetrating against businesses from the US to the Pacific and East Asia and **becoming one of the main global risks with potentially impactful risks in the coming years.** A comprehensive strategy in the cyber ecosystem with well-defined roles and responsibilities for both governments and industry is necessary to combat the problem.

Source: www.gdelt.org & BBVA Research

Macroeconomic vulnerabilities still an important issue in the emerging countries

Macroeconomic vulnerabilities in 2015-16
(media coverage about macro vulnerabilities around the world)

China's transition to lower and more balanced economic growth rates has introduced important challenges in the emerging world

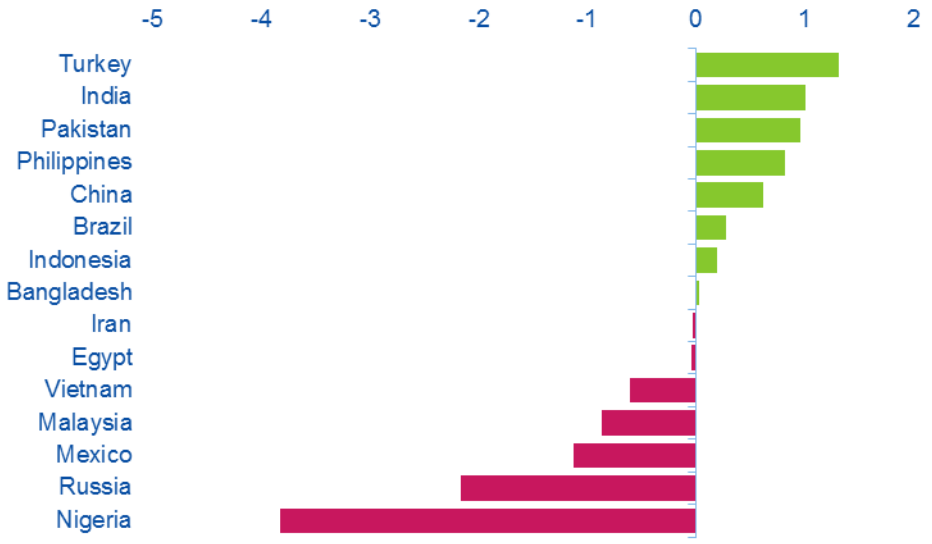
The normalization of US monetary policy will lead to less investor appetite for emerging markets

The fall in commodities prices also had a significant impact on the emerging economies, but with asymmetric effects

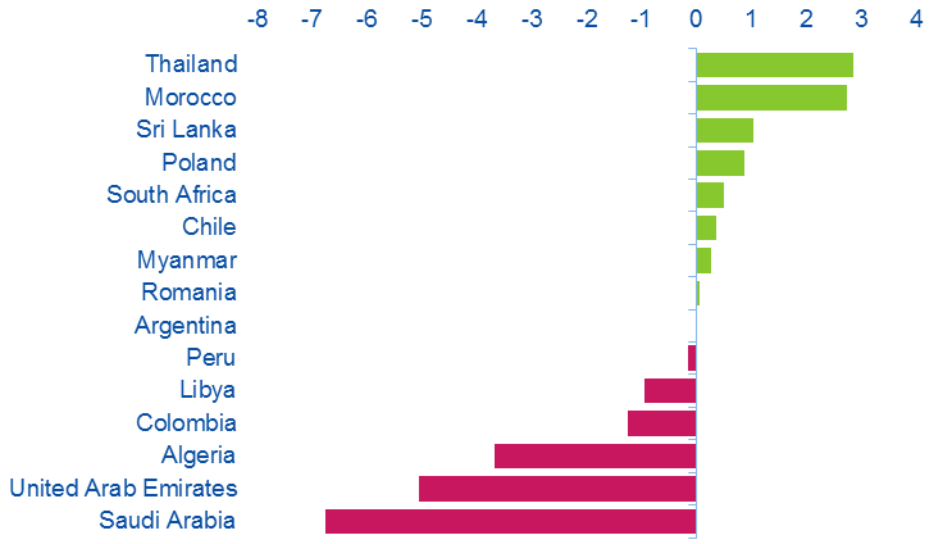
Source: www.gdelt.org & BBVA Research

The current account balance (CAB) and the oil price shock: EAGLEs and NEST cases

EAGLEs: Cyclical effect (2016) of the oil price decline on the CAB (in % of GDP)



NEST: Cyclical effect (2016) of the oil price decline on the CAB (in % of GDP)

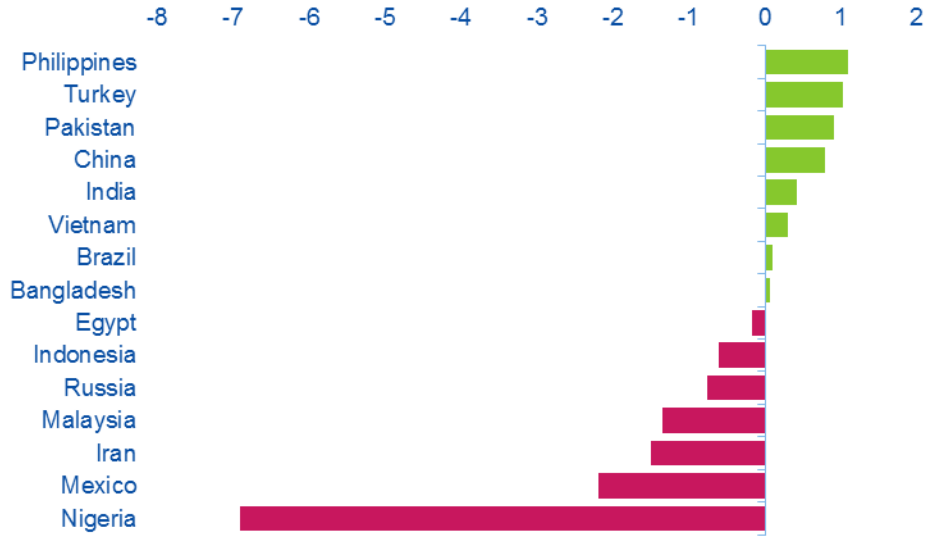


The oil price decline has impacted differently on the current account balances of EAGLEs and Nest groups. The cyclical impact has been more acute in some NEST countries such as Saudi Arabia, UAE and Algeria. Nigeria and Russia in the EAGLEs group are also suffering large cyclical shocks. Mexico is a special case, its oil balance is decreasing more intensely due to a reduction in its oil production rather than to the oil price.

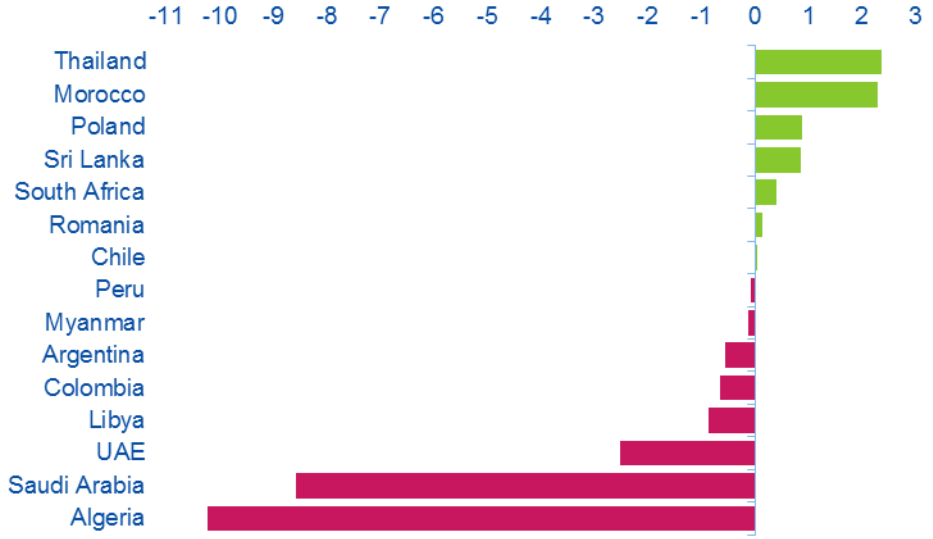
Source: BBVA Research
See "The current account balance and the oil price shock", BBVA Research for further information.

The current account balance and the oil price shock: EAGLEs and NEST cases

EAGLEs: Structural winners/losers from the oil price decline (structural change between 2012-2020 in % of GDP)



NEST: Structural winners/losers from the oil price decline (structural change between 2012-2020 in % of GDP)

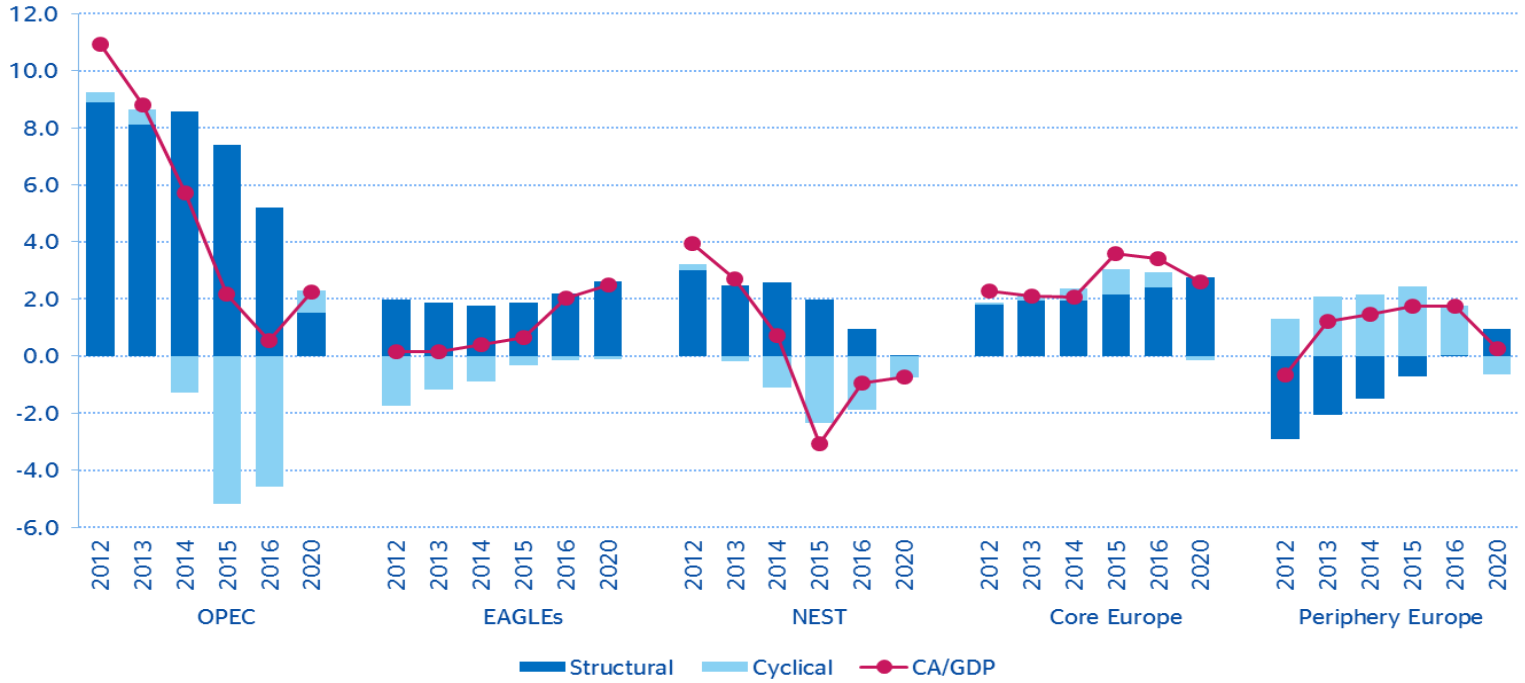


The oil price decline will have permanent effects on the structural CAB. Nigeria from EAGLEs and Saudi Arabia from NEST are the most negatively impacted on structural terms. Philippines and Turkey (EAGLEs) and Thailand and Morocco (NEST) are the most benefited in the long-term.

Source: BBVA Research
See "The current account balance and the oil price shock", BBVA Research for further information.

The current account balance and the oil price shock: EAGLEs and NEST cases

Decomposition of current account balance into structural and cyclical components (% of GDP)*

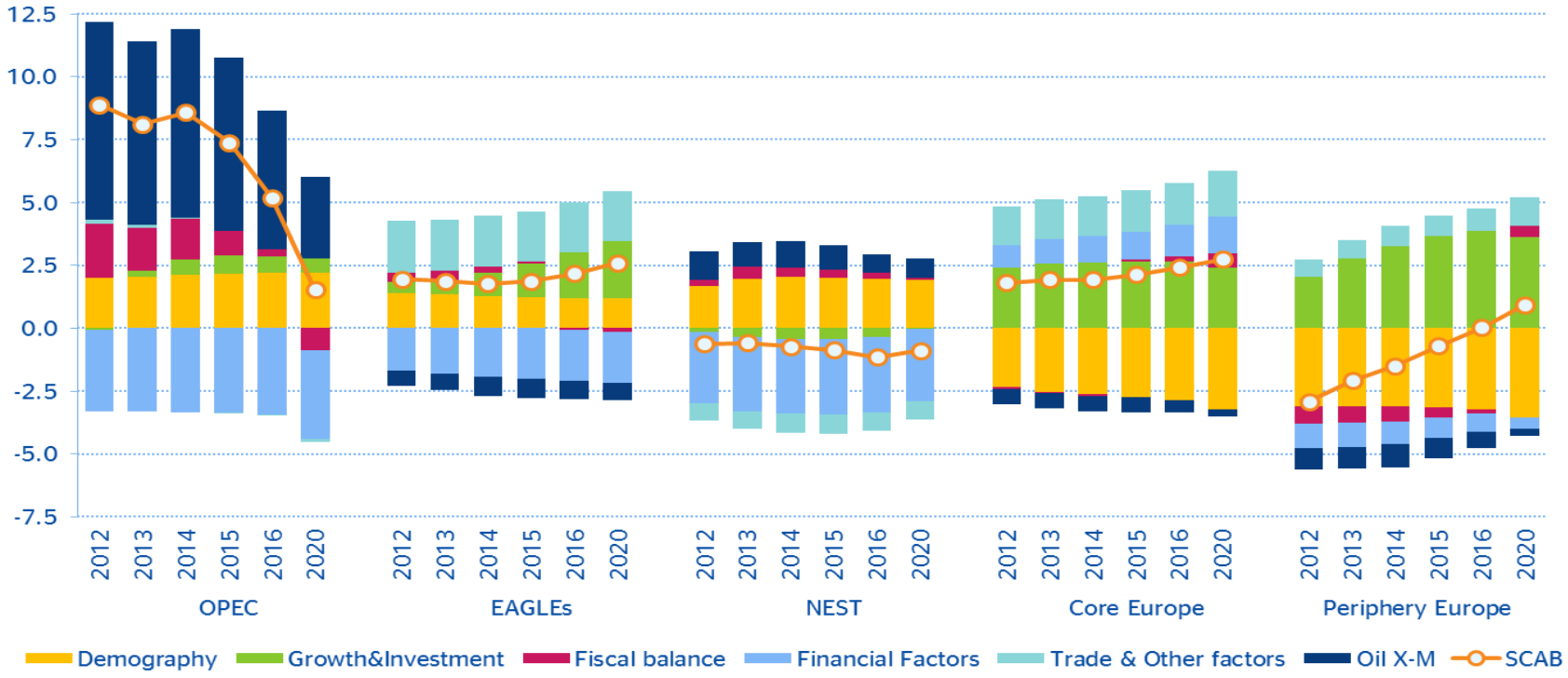


The impact of the oil price decline have impacted the current account balances of EAGLEs and Nest group differently. Although both groups include oil exporters and importers, the second group is more prevalent in the Nest group.

Source: BBVA Research. Note: (*) Values are weighted averages within each region. Notice that years 2017 to 2019 are not depicted in the Graph. The values are weighted averages within each region
See "The current account balance and the oil price shock", BBVA Research for further information.

The current account balance and the oil price shock: EAGLEs and NEST cases

Decomposition of structural current account balance into large economic factors (% of GDP)*

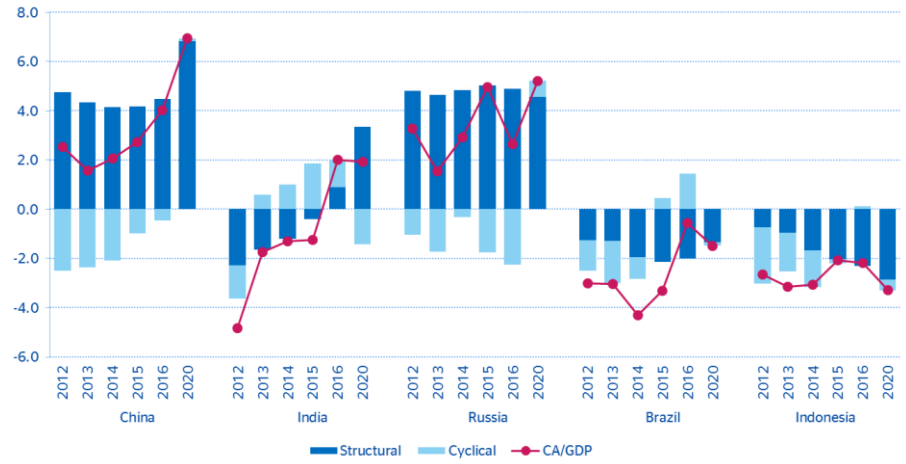


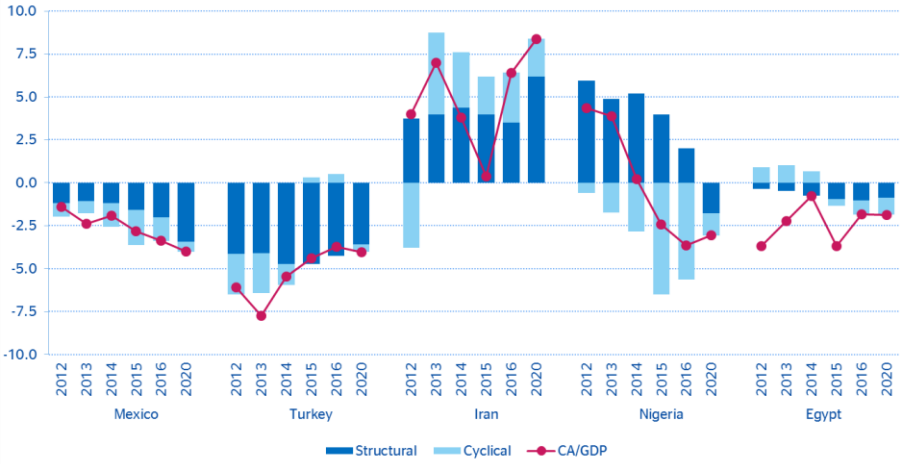
The prevalence of EM-Asia countries in the EAGLEs group makes the structural effect of the oil price very similar in these two groups of countries..

Source: BBVA Research. Note: (*) Values are weighted averages within each region. Notice that years 2017 to 2019 are not depicted in the Graph. The values are weighted averages within each region
See “The current account balance and the oil price shock“, BBVA Research for further information.

The current account balance and the oil price shock: EAGLEs and NEST cases

Decomposition of current account balance into structural and cyclical components (% of GDP)*



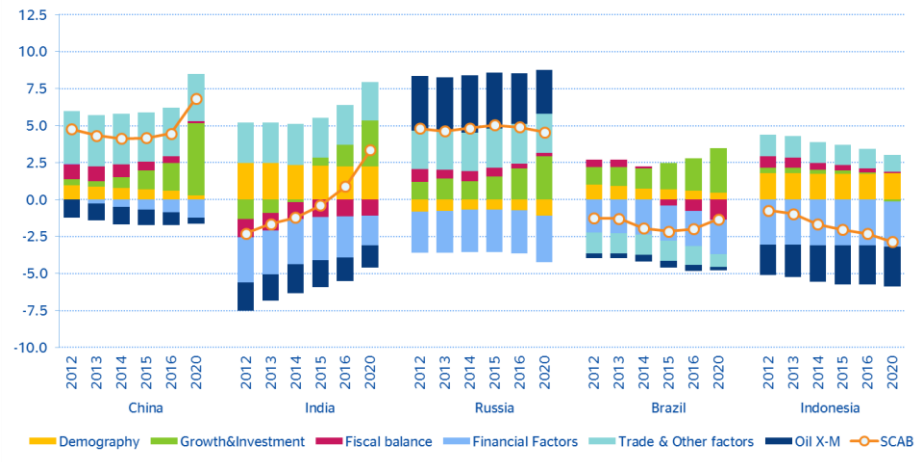


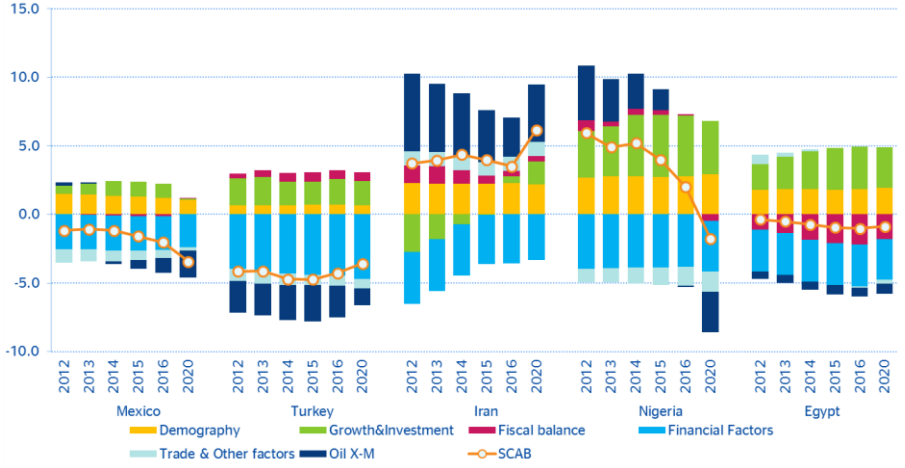
The EAGLEs group is very diverse in terms of the current account balance evolution (CAB). In the near future, we expect the structural CAB of China, India and Turkey to greatly improve and the one from Indonesia, Mexico, Nigeria and Egypt to worsen, in both cases due to a combination of different factors.

Source: BBVA Research. Note: (*) Values are weighted averages within each region. Notice that years 2017 to 2019 are not depicted in the Graph. The values are weighted averages within each region
See “The current account balance and the oil price shock“, BBVA Research for further information.

The current account balance and the oil price shock: EAGLEs and NEST cases

Decomposition of structural current account balance into large economic factors (% of GDP)*



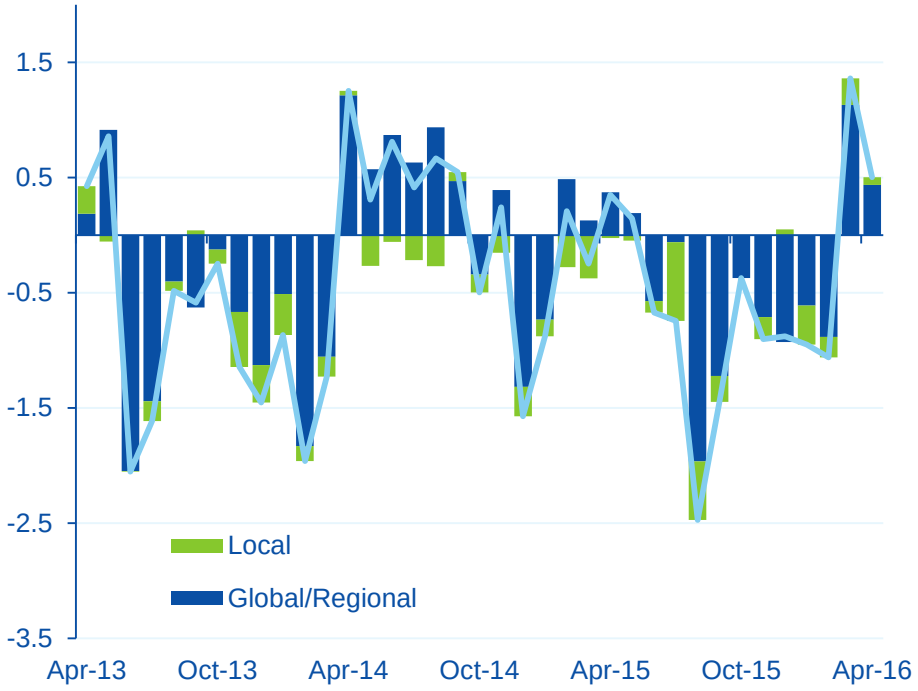


The oil trade balance will be the dominant factor driving the evolution of the structural CAB of Indonesia, Mexico, Turkey and Nigeria. In other countries such as China, India, Russia and Iran, the main factor will be their investment levels.

Source: BBVA Research. Note: (*) Values are weighted averages within each region. Notice that years 2017 to 2019 are not depicted in the Graph. The values are weighted averages within each region
See "The current account balance and the oil price shock", BBVA Research for further information.

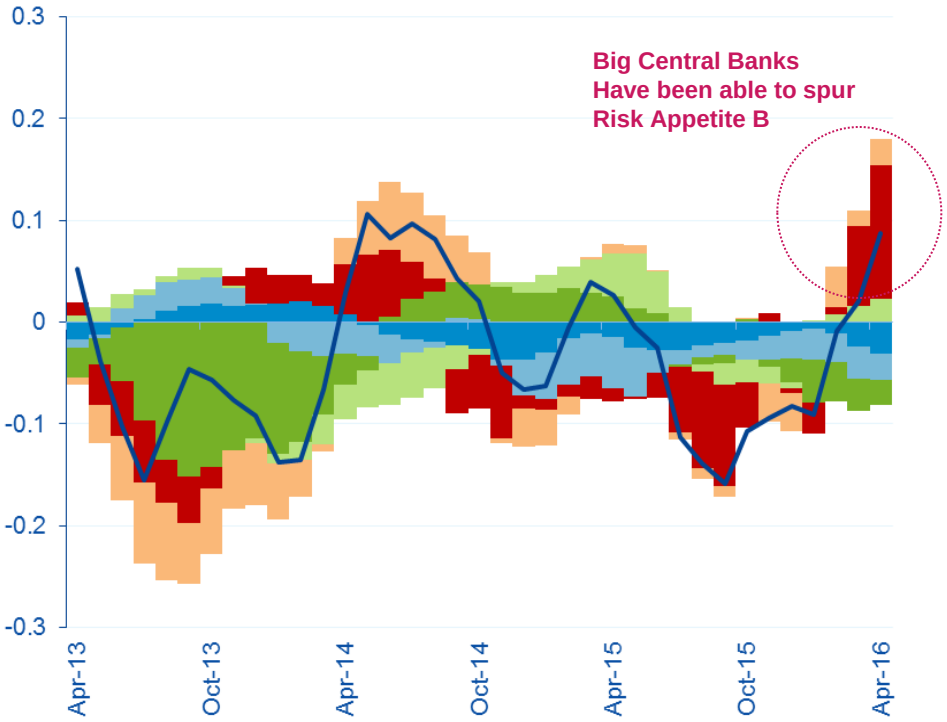
Global factors dominates so far… but highly dependent on Risk Appetite, not fundamentals

Emerging Markets flows
(Median Emerging Market portfolio flow breakdown as per BoP, monthly change in %)



Source: IMF, IFS Data , BBVA Research
See "Flows & Assets Report: The Big Emerging Markets Short. First Quarter 2016", BBVA Research for further information.

EM Flows Flows: Global Component Drivers
(DFM/FAVAR MODEL)

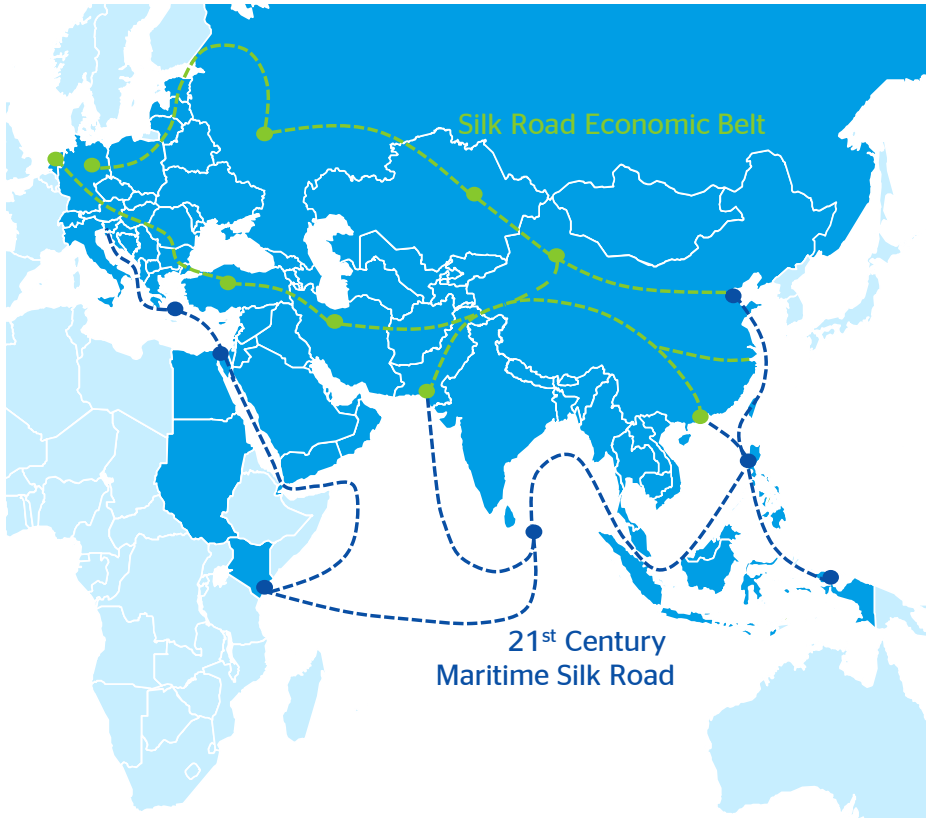


Source: BBVA Research

“One-Belt, One Road” initiative

potential benefits

China's "One-Belt, One Road" (OBOR) Initiative



Focus on **connectivity** and **cooperation** amongst Eurasian economies

Featuring **infrastructure investments** across a number of economic corridors

Institutions already in place:

AIIB: $100Bn
BRICS Bank: $100Bn
Silk Road Fund: $40Bn

"OBOR" will benefit EAGLEs and NEST

EAGLEs

EAGLEs under OBOR:

- China, India, Indonesia, Philippines, Iran, Pakistan, Russia, Turkey, Egypt, Bangladesh, Malaysia and Vietnam

Nest

Nest economies under OBOR:

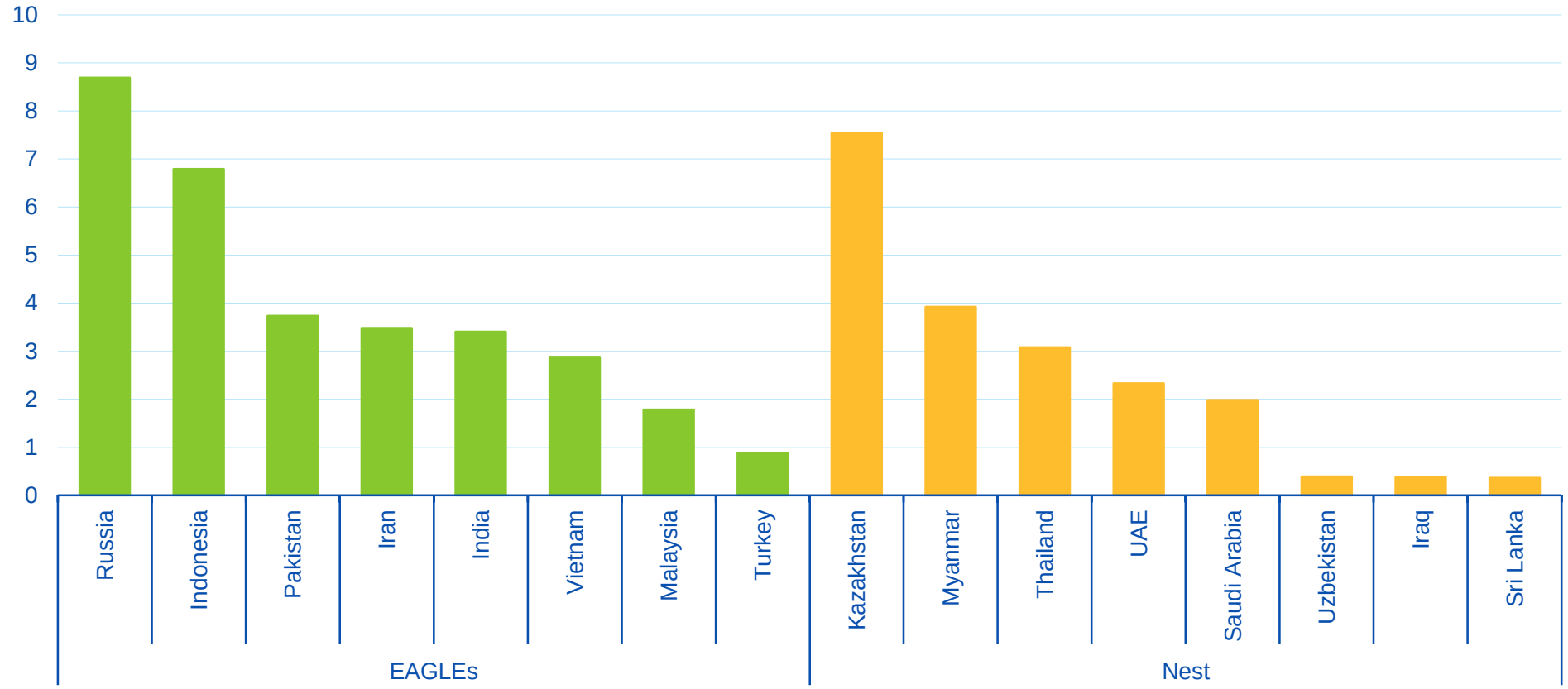
- Saudi Arabia, Iraq, Poland, Thailand, Myanmar, UAE, Kazakhstan, Sri Lanka, Romania, Uzbekistan

What are the main benefits of OBOR?

- Boost regional integration through trade and commerce
- Expedite the need for urban and transportation infrastructure
- Reduce exposure to external demand
- Enhance regional stability through better and more inclusive growth
- Mitigate negative spillovers from social unrest

Chinese investments in “OBOR”

Main recipients of Chinese outbound direct investment under OBOR (2014, billions of US$)



Source: CEIC and BBVA Research

Main takeaways

The Emerging World will account for almost four fifths of global growth in the next ten years. New members are included in the EAGLEs and Nest group, coming mainly from Asia and the Middle East.

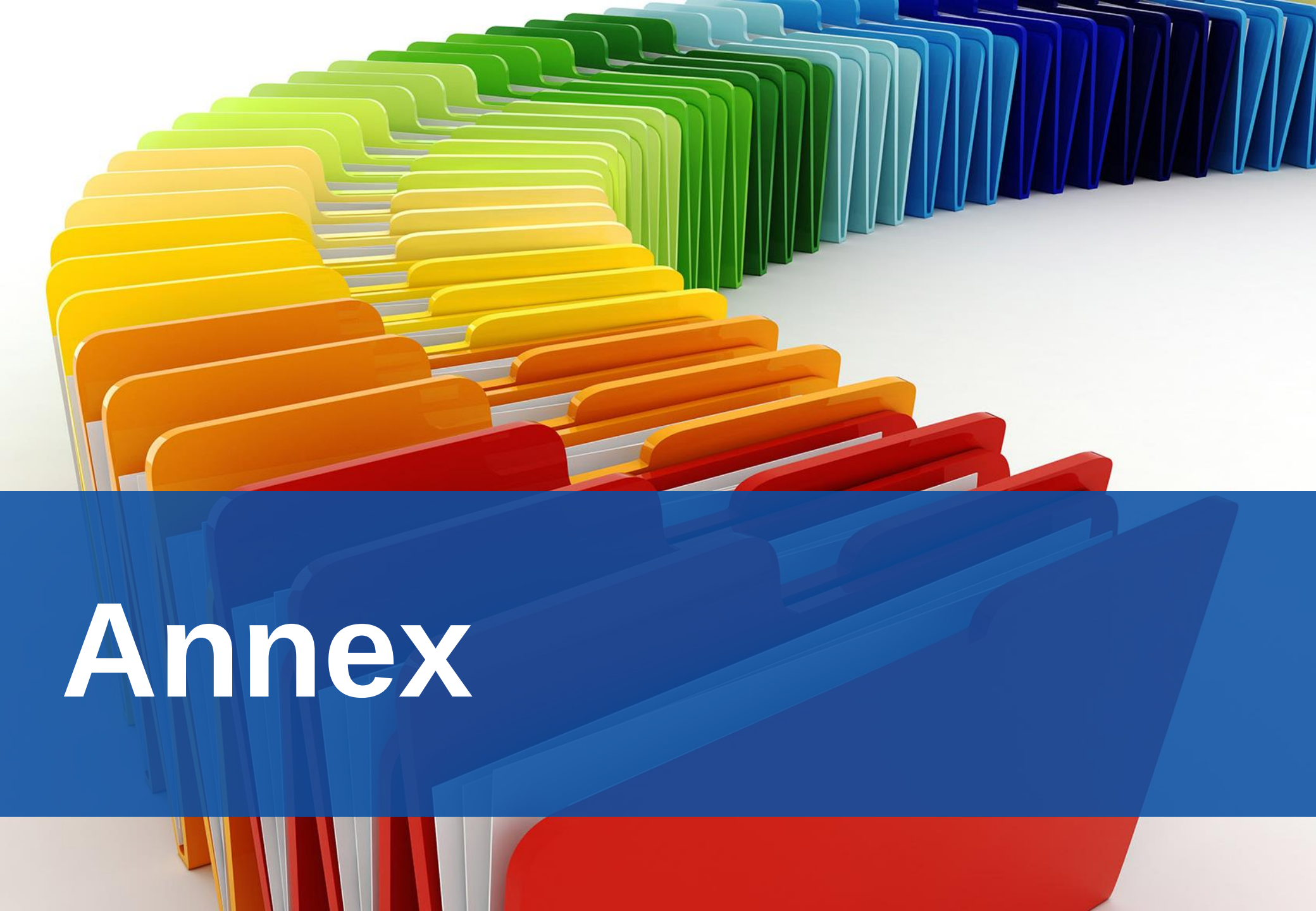
The middle classes will continue reshaping the world's income distribution with Emerging Asia as the largest contributor.

The educational sector will be both the motor and beneficiary of expanding middle classes, counterbalancing the effect of slower growth of labor force.

The future of the fixed broadband adoption will be driven by the Emerging Markets with EAGLEs countries as the ones converging faster to the most developed nations, thanks mostly to the growth in Emerging Asia.

The Media Sentiment Digital Index for the EAGLEs countries has improved significantly since late 2015, converging to the G7 levels with China, India, Egypt and Turkey leading the group. Geopolitical risks, cyber-attacks and macroeconomic vulnerabilities became the main risks of 2015 and the coming years.

Asymmetric impact of the oil price decline on current account balances of EAGLEs and Nest countries.



Annex

Methodological issues: BBVA EAGLEs and Nest membership definition

The **reference variable** in our calculations is the **incremental GDP**, i.e. the increase of real GDP in PPP-adjusted terms during the following ten years. To compute it, we add growth forecasts to the estimate of PPP-adjusted for the starting year provided by the IMF. Our approach is therefore a mixture of size and growth.

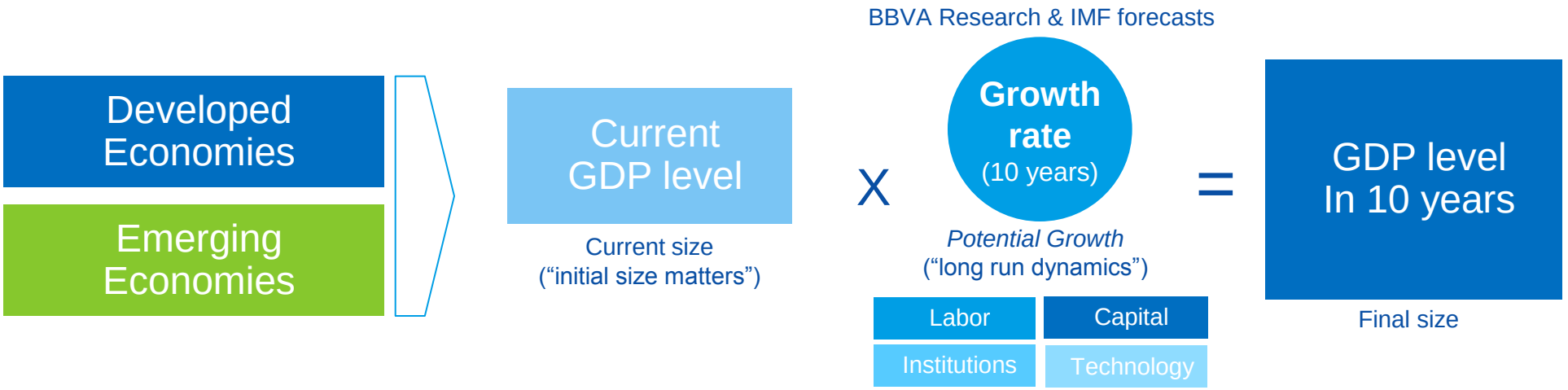
We update growth forecasts for the following ten years on an annual basis. We use BBVA Research projections for those countries that we cover in depth, and IMF projections in the latest World Economic Outlook (and updates) for the remainder. In the latter case, we extend the available forecast horizon by assuming as constant the growth rate available for the last year.

After updating the growth forecasts we compute the incremental GDP for all countries in the world and then rank them from largest GDP to smallest, defining membership of BBVA EAGLEs and Nest as follows:

- The **BBVA EAGLEs** are defined as those emerging economies contributing to world growth more than the average of the G6 countries in the next ten years.
- The **BBVA Nest** is formed of those emerging economies contributing to world growth more than the average of the non-G7 developed economies, which have a PPP-adjusted GDP of over USD100bn but below the EAGLEs threshold.

Global factors dominates so far… but highly dependent on Risk Appetite, not fundamentals

Step 1: Estimating GDP level in the next decade



Step 2: Calculating incremental GDP

See the annex for further information.

Methodological issues: population projections

We use PPP-adjusted real GDP per capita measured in 2010 dollars. GDP values and projections correspond to the October 2014 edition of the IMF/WEO database, while population estimates and forecasts are from the 2012 revision of the UN World Population Prospects. Regarding income distributions, our starting point is the information available in the WDI/World Bank, which includes the two top and bottom deciles and all quintiles. As data are not continuous we interpolate missing data. Projections until 2025 keep distributions constant from the latest observation.

We group population according to the following five income ranges: 1/ poor and low-income (up to USD5,000), 2/ low middle class (USD5,000-15,000), 3/ medium middle class (USD15,000-25,000), 4/ high middle class (USD25,000-40,000), and 5/ affluent (over USD40,000).

The number of countries included has been extended to 90 and the current coverage accounts for over 90% of the world population:

- **Developed economies**: United States, Japan, Germany, France, United, Kingdom, Italy, Korea, Spain, Canada, Australia, Netherlands, Belgium, Greece, Czech Republic, Portugal, Sweden, Austria, Denmark, Finland, Slovak Republic, Ireland, Slovenia, Estonia and Luxembourg.
- **Emerging economies**: China, India, Indonesia, Brazil, Pakistan, Nigeria, Bangladesh, Russia, Mexico, Philippines, Ethiopia, Vietnam, Egypt, Iran, Turkey, DR Congo, Thailand, South Africa, Tanzania, Colombia, Kenya, Ukraine, Argentina, Algeria, Uganda, Poland, Iraq, Sudan, Morocco, Afghanistan, Venezuela, Peru, Malaysia, Uzbekistan, Nepal, Mozambique, Ghana, Yemen, Angola, Madagascar, Cameroon, Syria, Sri Lanka, Romania, Côte d'Ivoire, Niger, Chile, Burkina Faso, Malawi, Paraguay, Mali, Kazakhstan, Guatemala, Ecuador, Cambodia, Zambia, Zimbabwe, Senegal, Hungary, Bulgaria, Croatia, Panama, Qatar, Uruguay, Lithuania and Latvia.

Methodological issues: population proyections by skills

The multi-dimensional cohort-component projections we presented here for the period 2015-2025 by age, sex and educational levels correspond to Wittgenstein Centre projections. They are based on the multi-dimensional demographic model presented in Lutz (2013). It models the dynamics of changing composition of the population over time focusing on educational attainment distributions and using a multi-stage model that describe movements of people that can go back and forth between more than two states. The population is sub-divided according to their demographic characteristics and it allows to model how societies change over time according to the shifting relative sizes of these sub-groups.

While internationally consistent data on populations by age and sex are readily available for most countries, data on educational attainment distributions required additional harmonization efforts due to discrepancies across countries, age and time. Due to the variety of nationally distinct educational systems, we use UNESCO's International Standard Classification of Education (ISCED) to make education statistics comparable across countries. Thus, according to ISCED 1997, the level of education is divided in six categories, which will correspond to different sub-groups in the model: ISCED 0 - pre-primary education; ISCED 1 - primary (elementary/basic) education; ISCED 2 - lower secondary education; ISCED 3 - upper secondary education; ISCED 4 - post-secondary non-postsecondary courses; ISCED 5 - first stage of post-secondary education; ISCED 6 - second stage of post-secondary education (postgraduate).

Methodological issues: Digitalization Index components

Infrastructure

- Fixed (wired)-broadband speed, in Mbit/s.
- International Internet bandwidth. It is measured in bits per second per internet users.
- Percentage of total population covered by a mobile network signal.
- International Internet bandwidth in megabits per second (Mbit/s).

Users adoption

- Active mobile-broadband subscriptions.
- Fixed (wired)-broadband subscriptions.
- Mobile telephone subscriptions
- Percentage of households with Internet access at home.
- Proportion of individuals that used the Internet in the last 12 months.
- how widely used are virtual social networks in the country.

Firms adoption

- What extent do businesses use ICTs for transactions with other businesses in the country?
- What extent do businesses use Internet for selling their goods and services to consumers in the country?
- What extent do businesses adopt new technology in the country?

[1 = not at all; 7 = to a great extent]

Cost

- Monthly subscription charge for fixed (wired) broadband Internet service (PPP $)Fixed (wired) broadband is considered any dedicated connection to the Internet at downstream speeds equal to, or greater than, 256 kilobits per second, using DSL.

Regulation

- How developed are your country's laws relating to the use of ICTs (e.g., electronic commerce, digital signatures, consumer protection)?

[1 = not developed at all; 7 = extremely well-developed]

Content

- The Government Online Service Index assesses the quality of government's delivery of online services on a 0-to-1 (best) scale. There are four stages of service delivery: Emerging, Enhanced, Transactional and Connected. In each country, the performance of the government in each of the four stages is measured as the number of services provided as a percentage of the maximum services in the corresponding stage.

Methodological issues: Media Digital Climate Index

Media Digital Climate Index

Digital Economy	Fintech (Banking Digital Transformation)	Digital Regulation
Principal Components Analysis on each component		
digital government, ICT security, software as a service, social media, big data, innovation driven inclusive growth, technology extension services, human capital for innovation and entrepreneurship, funding innovation , innovation and technology policy, firm innovation productivity and growth, innovation technology and entrepreneurship, sector specific ICT applications, telecommunications and broadband access, ICT industry and services, cloud computing, big data, ICT and financial sector, sensorization, d printing, digital manufacturing, internet of things, ICT innovation and transformation, e government applications, e commerce applications, mobile applications e government, digital economy strategy, ICT strategy, national e government strategy, national broadband strategy, innovation collaboration, technology transfer offices, information and communication technologies	electronic payments, mobile money, financial management information systems, electronic identity, e money payment and market infrastructure, ICT and financial sector, application programming interfaces, financial sector development, payment systems standards, internet banking, mobile banking, commercial banking	internet censorship, financial management information systems, electronic identity open data policy, ICT security, e money, payment and market infrastructure telecommunications law and regulation, telecommunications sector policy and regulation, ICT law, ICT policy regulatory framework and institutions, ICT strategy policy and regulation, data security, data privacy, e commerce legislation, ICT licensing, electronic commerce law, consumer protection law, international standards and technical regulations, personal data protection

Methodological issues: Digital Evolution Index

The Digital Evolution Index analyzes the key underlying drivers that govern a country's evolution into a digital economy: Demand Conditions, Supply Conditions, Institutional Environment and Innovation and Change. To gain a comprehensive view of digital readiness across countries, these drivers are further divided into 12 components, measured using a total of 83 indicators.

1º

Supply Conditions

Access Infrastructure
Bandwidth, servers, security and accessibility of digital content.

Transaction Infrastructure
Depth of consumer financial services, business use of ICT.

Fulfillment Infrastructure
Quality of transportation networks, logistics performance.

2º

Demand Conditions

Consumer Profile
Consumer income, consumption, demographics.

Financial Savviness
Consumer use of financial services and digital payment Technology.

Internet & Social Media Savviness
Broadband and mobile Internet use, use of informational websites, social media usage.

3º

Institutional Environment

Gov't Effectiveness
Political stability, rule of law, governance quality, corruption.

Gov't & Business Environment
Investment inflows, competitive marketplace facilitation, ease of business in-country.

Gov't & Digital Ecosystem
e-Governance, government facilitation of ICT and digital ecosystem creation

4º

Innovation and Change

Ecosystem Attractiveness & Competitive Landscape
Private equity investment, business focus on customers.

Extent of Disruption
User adoption of new technology and services, advertising.

Startup Culture
Venture capital availability, ease of registration of new Businesses.

Methodological issues: GDELT database

1º

What is GDELT?

"Global Database of Events, Language and Tone" is an innovative open access database containing a comprehensive and high resolution catalogue of geo-referenced socio-political events from 1979 to the present.

GDELT processes news in broadcast, print and web media globally in over 100 languages, containing over 250 million records.

2º

What language does it use?

Social events are coded using the "Conflict and Mediation Event Observations (CAMEO)" event coding system and a numeric score is assigned from the Goldstein Scale, which captures the intensity of the events.

Moreover, it includes more that 10000 themes about society, economy, politics, technology,… and the entire World Bank's taxonomy

3º

How is information processed?

The information is extracted from the media and systematized using the "Textual Analysis by Augmented Replacement Instructions (TABARI)" algorithm, a machine coding procedure of events that uses pattern recognition to find "Dyadic Relations" and track Events of Interest.

It contains a real-time streaming news machine translation, monitoring English media and more than 98.4% of daily non-English media volume.

4º

How do we extract it?

To exploit GDELT, we take advantage of Big-Query, a platform that allows us to handle large data sets in near-real time based on standard SQL query language.

Moreover, we use additional Software (R and Python) to manipulate the database and to make further analysis like modeling social dynamics.

Methodological issues: Tracking Protests and Conflicts

We have developed a tracking of protest and conflict indexes for every country in the world since 1 January 1979 through present day with daily, monthly, quarterly and annual frequencies. To construct this, we use a rich 'big database' of international events (GDELT at www.gdelt.org) which monitors the world's events covered by the news media from nearly every corner of the world in print, broadcast, and web formats, in over 100 languages, every moment of every day updated every 15 minutes.

- **BBVA Protest Intensity Index:** We collect every registered protest in the world for a particular time which are separately collated under the various headings of the **CAMEO taxonomy** as: demonstrate or rally, demonstrate for leadership change, demonstrate for policy change, demonstrate for rights, demonstrate for change in institutions and regime, conduct hunger strike for leadership change, conduct hunger strike for policy change, conduct hunger strike for rights, conduct hunger strike for change in institutions and regime, conduct hunger strike not specified before, conduct strike or boycott for leadership change, conduct strike or boycott for policy change, conduct strike or boycott for rights, conduct strike or boycott for change in institutions and regime, conduct strike or boycott not specified before, obstruct passage or block, obstruct passage to demand leadership change, obstruct passage to demand policy change, obstruct passage to demand rights, obstruct passage to demand change in institutions and regime, protest violently or riot, engage in violent protest for leadership change, engage in violent protest for policy change, engage in violent protest for rights, engage in violent protest for change in institutions and regime, engage in political dissent not specified before.

- **BBVA Conflict Intensity index:** In the same way, we collect every registered conflict in the world for a particular time considering a **wide variety of conflicts under the CAMEO taxonomy headings** as: impose restrictions on political freedoms, ban political parties or politicians, impose curfew, impose state of emergency or martial law, conduct suicide, carry out suicide bombing, carry out car bombing, carry out roadside bombing, car or other non-military bombing not specified below, use as human shield, use conventional military force not specified before, impose blockade, restrict movement, occupy territory, fight with artillery and tanks, employ aerial weapons, violate ceasefire, engage in mass expulsion, engage in mass killings, engage in ethnic cleansing, use unconventional mass violence not specified before, use chemical, biological, or radiological weapons, detonate nuclear weapons, use weapons of mass destruction not specified before.

Using this information, we construct an intensity index for both events. **The number of protests and conflicts each day/month/quarter/year are divided by the total number of all events recorded by GDELT for that day/month/quarter/year to create a protest and conflict intensity score** that tracks just how prevalent protest and conflict activity has been over the last quarter-century, correcting thus for the exponential rise in media coverage over the last 30 years and the imperfect nature of computer processing of the news.

Methodological issues: emotional indicator and coding system in GDELT

The GDELT database offers several mechanisms for assessing the “importance” or “impact” of a particular event. The most common measures are:

Goldstein Scale. This is a widely used scale in geopolitics that maps WEIS event codes onto a number representing level of conflict or cooperation. Each **CAMEO event code** is assigned a **numeric score from -10 to +10**, capturing the theoretical potential impact that type of event will have **on the stability** of a country. This is known as the Goldstein Scale. This field specifies the Goldstein score for each event type. NOTE: this score is based on the type of event, not the specifics of the actual event record being recorded. Thus two riots, one with 10 people and one with 10,000, will both receive the same Goldstein score. This can be aggregated to various levels of time resolution to yield an approximation of the stability of a location over time.

Average Tone. This is the average “tone” of all documents containing one or more mentions of this event. The score ranges from -100 (extremely negative) to +100 (extremely positive). **Common values range between -10 and +10,** with 0 indicating neutral. This can be used as a method of filtering **the “context” of events** as a subtle measure of the importance of an event and as a proxy for the “impact” of that event. For example, a riot event with a slightly negative average tone is likely to have been a minor occurrence, whereas if it had an extremely negative average tone, it suggests a far more serious occurrence. A riot with a positive score probably suggests a very minor occurrence described in the context of a more positive narrative (such as a report of an attack occurring in a discussion of improving conditions on the ground in a country and how the number of attacks per day has been greatly reduced). To measure the emotional connotation in which the event appears, GDELT uses the tonal dictionary from Shook et al (2012). This scale goes beyond CAMEO event codes and is the measure that we use in the report.

To extract all this information from the text, the data are coded using the **open-source Petrach system** for events and additional software for location and tone. This coding engine identifies all named entities through noun phrases: alll nouns, verbs, adjectives, adverbs,.. in the text. Unidentified cases can be separately processed with named-entity-resolution software. The speed of the algorithm is achieved through the use of shallow parsing algorithms and parallel processing.

Methodological issues: effect of the oil price on the current account

- In order to estimate the effect of the oil price changes in the current account we first have to estimate the effect of the oil price on the oil trade balance: the oil trade balance of a country is defined as the difference between the value of oil exports and of oil imports as a percentage of its GDP. In order to estimate the effect of the oil price in the oil trade balance we estimate a set of models in which the dependent variable is the oil balance (%GDP) and the explanatory variables are: i) the lagged oil trade balance; ii) the real price of oil; and iii) the relative real income per capita. The relative income per capita is calculated as each country's deviation from the World's average income. GDP per capita is measured in PPP terms, and in real US dollars (See "The current account balance and the oil price shock", BBVA Research for further information). We then include the oil trade balance as one of the key factors that determine the current account balance.

- The methodology used for estimating the structural and cyclical current account balance and its determinants is fully explained in the Economic Watch "An analysis of the performance and the determinants of the current account in Spain". In our Current Account Model, each explanatory variable is broken-down into three components depending on their frequency of oscillation, i.e. long-term, medium-term and short-term, and further, we allow each of them has its own estimated effect on the observed current account to GDP ratio.

- The model is estimated in a panel data of 92 countries for the period 1980-2014 containing 1,973 observations. The database is constructed using IMF-WEO, World Bank, UN, OECD, Darvas (2012) and BBVA Research data. All the variables are expressed in terms of deviations from its respective global average, except for the dependent variable, the initial NIIP, the oil trade balance and variations in the exchange rate, as in these cases the global average would be zero.

- The estimation is made using feasible generalised least squares (FGLS) and the variance-covariance matrix is adjusted to correct for heteroskedasticity and autocorrelation of residuals. Subsequently, the estimation of the short- and medium-term coefficients resulting from the panel data approach is adapted to the each one of the 92 countries. Specifically, these coefficients are re-estimated using a Bayesian time-series model designed for each country. In particular, the Bayesian model uses the short- and medium-term coefficients obtained from the panel data model, as well as their distribution, as priors for the Bayesian estimation. The long-term coefficients estimated through the panel data model remain unchanged.

This report has been produced by Emerging Markets Unit, Cross-Country Analysis Team

Chief Economist,
Cross-Country Emerging Markets Analysis
Álvaro Ortiz Vidal-Abarca
+34 630 144 485
alvaro.ortiz@bbva.com

Gonzalo de Cadenas
+34 606 001 949
gonzalo.decadenas@bbva.com

Tomasa Rodrigo
+3491 537 8840
tomasa.rodrigo@bbva.com

Alfonso Ugarte Ruiz
+ 34 91 537 37 35
alfonso.ugarte@bbva.com

In collaboration with:

Alvaro Martin Enríquez
+34 91 537 36 75
alvaro.martin@bbva.com

David Tuesta
+34 91 374 3331
david.tuesta@bbva.com

Noelia Cámara Muela
+34 629 779391
noelia.camara@bbva.com

Carlos Casanova
+852 5173 6490
c.casanova@bbva.com.hk

BBVA Research

Group Chief Economist
Jorge Sicilia

Cross Country Emerging Economies

Cross-Country Emerging Markets Analysis
Álvaro Ortiz Vidal-Abarca
alvaro.ortiz@bbva.com

Asia
Le Xia
le.xia@bbva.com

Mexico
Carlos Serrano
carlos.serrano@bbva.com

Latam Coordination
Juan Ruiz
juan.ruiz@bbva.com

Argentina
Gloria Sorensen
gsorensen@bbva.com

Chile
Jorge Selaive
jselaive@bbva.com

Colombia
Juana Téllez
juana.tellez@bbva.com

Peru
Hugo Perea
hperea@bbva.com

Venezuela
Oswaldo López
oswaldo.lopez@bbva.com

Developed Economies:

Rafael Doménech
r.domenech@bbva.com

Spain
Miguel Cardoso
miguel.cardoso@bbva.com

Europe
Miguel Jiménez
mjimenezg@bbva.com

US
Nathaniel Karp
nathaniel.karp@bbvacompass.com

Global Areas:

Financial Scenarios
Sonsoles Castillo
s.castillo@bbva.com

Economic Scenarios
Julián Cubero
juan.cubero@bbva.com

Innovation & Processes
Oscar de las Peñas
oscar.delaspenas@bbva.com

Financial Systems & Regulation:

Santiago Fernández de Lis
sfernandezdelis@grupobbva.com

Financial Systems
Ana Rubio
arubiog@bbva.com

Financial Inclusion
David Tuesta
david.tuesta@bbva.com

Regulation and Public Policies
María Abascal
maria.abascal@bbva.com

Recovery and Resolution Policy
José Carlos Pardo
josecarlos.pardo@bbva.com

Contact details:
BBVA Research
Ciudad BBVA
28046 Madrid (Spain)
Tel. + 34 91 374 60 00 and + 34 91 537 70 00
Fax. +34 91 374 30 25
bbvaresearch@bbva.com
www.bbvaresearch.com

BBVA Research Asia
43/F Two International Finance Centre
8 Finance Street Central
Hong Kong
Tel: +852 2582 3111
E-mail: research.emergingmarkets@bbva.com.hk

Disclaimer

This document has been prepared by BBVA Research Department, it is provided for information purposes only and expresses data, opinions or estimations regarding the date of issue of the report, prepared by BBVA or obtained from or based on sources we consider to be reliable, and have not been independently verified by BBVA. Therefore, BBVA offers no warranty, either express or implicit, regarding its accuracy, integrity or correctness.

Estimations this document may contain have been undertaken according to generally accepted methodologies and should be considered as forecasts or projections. Results obtained in the past, either positive or negative, are no guarantee of future performance.

This document and its contents are subject to changes without prior notice depending on variables such as the economic context or market fluctuations. BBVA is not responsible for updating these contents or for giving notice of such changes.

BBVA accepts no liability for any loss, direct or indirect, that may result from the use of this document or its contents.

This document and its contents do not constitute an offer, invitation or solicitation to purchase, divest or enter into any interest in financial assets or instruments. Neither shall this document nor its contents form the basis of any contract, commitment or decision of any kind.

In regard to investment in financial assets related to economic variables this document may cover, readers should be aware that under no circumstances should they base their investment decisions in the information contained in this document. Those persons or entities offering investment products to these potential investors are legally required to provide the information needed for them to take an appropriate investment decision.