BBVA | RESEARCH

A QUARTERLY GUIDE TO COUNTRY RISKS

June

2017

(Data as of 20th of May 2017)

Country Risk Report

Summary

Country Risk

Ratings agencies

- China and Hong Kong were downgraded by Moody's. Italy was downgraded by Fitch and South Africa by S&P. Argentina and Indonesia were upgraded by S&P

Financial Markets

- **Financial tensions, Global Risk Aversion (GRA) and sovereign markets spreads have been decreasing for over a year**, reaching lows not seen since the spring of 2014 or 2007. Most of the large sovereign spread's increases seen during the turmoil in 2015 and 2016 in EMs has vanished
- The overall decrease in sovereign spreads has lead this quarter to be one of the few times when we have seen more countries with upgrade rather than downgrade pressure
- Increase in upgrade pressures were especially noticeable in India, Thailand, and Spain
- China and Portugal are the countries facing the largest downgrade pressure. Italy is the only one to see an increase in downward pressure

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- **Overall, the net aggregate of vulnerabilities seem to be improving in EMs and seem stable in DMs when analyzed by regions**
- Core EU and EU Periphery see a continuation of high public debt levels, increasing fiscal vulnerability even further, but **risks related to private leverage have improved in most countries. Fiscal and external vulnerabilities continue to be worrisome in LatAm**, meanwhile external vulnerabilities remain high in EM Europe
- **We observe signs of deceleration for a consecutive quarter in China's excessive private leveraging process, and in housing prices, although annual growth levels remain excessive**. An accumulation of excess leverage is found in some advanced economies such as Canada, Australia, Norway and some North-European countries

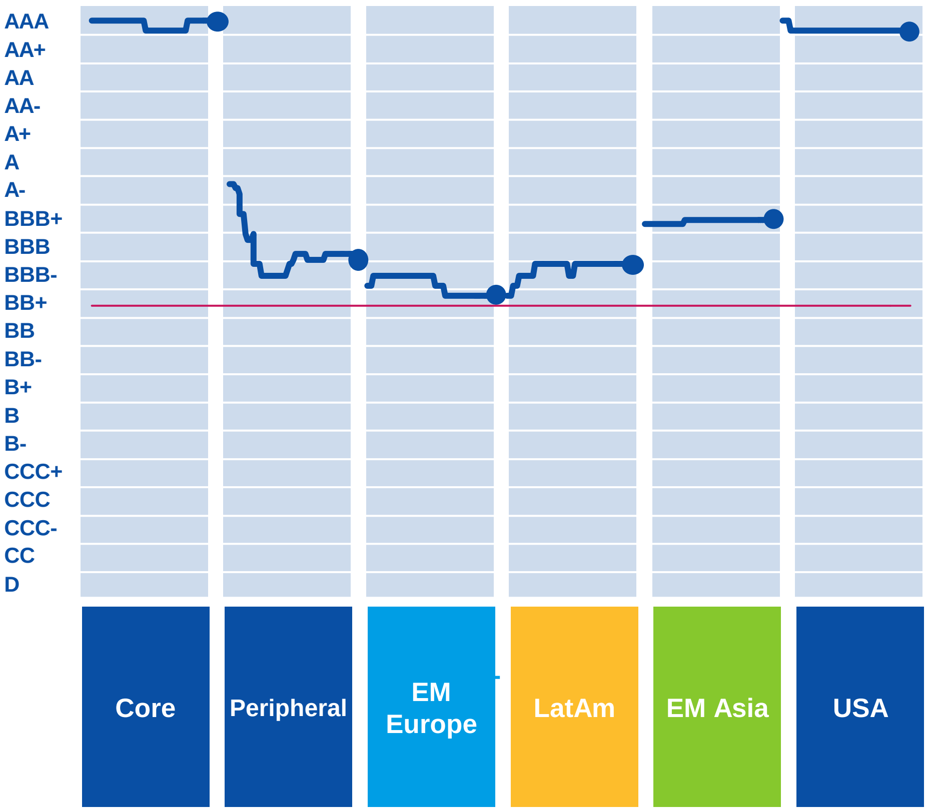
Index

1 Sovereign markets and ratings update

Evolution of sovereign CDS by country
Evolution of sovereign ratings
Market downgrade/upgrade pressure

Sovereign markets and rating agencies update

Sovereign Rating Index 2011-17



Source: BBVA Research by using S&P, Moody's and Fitch data

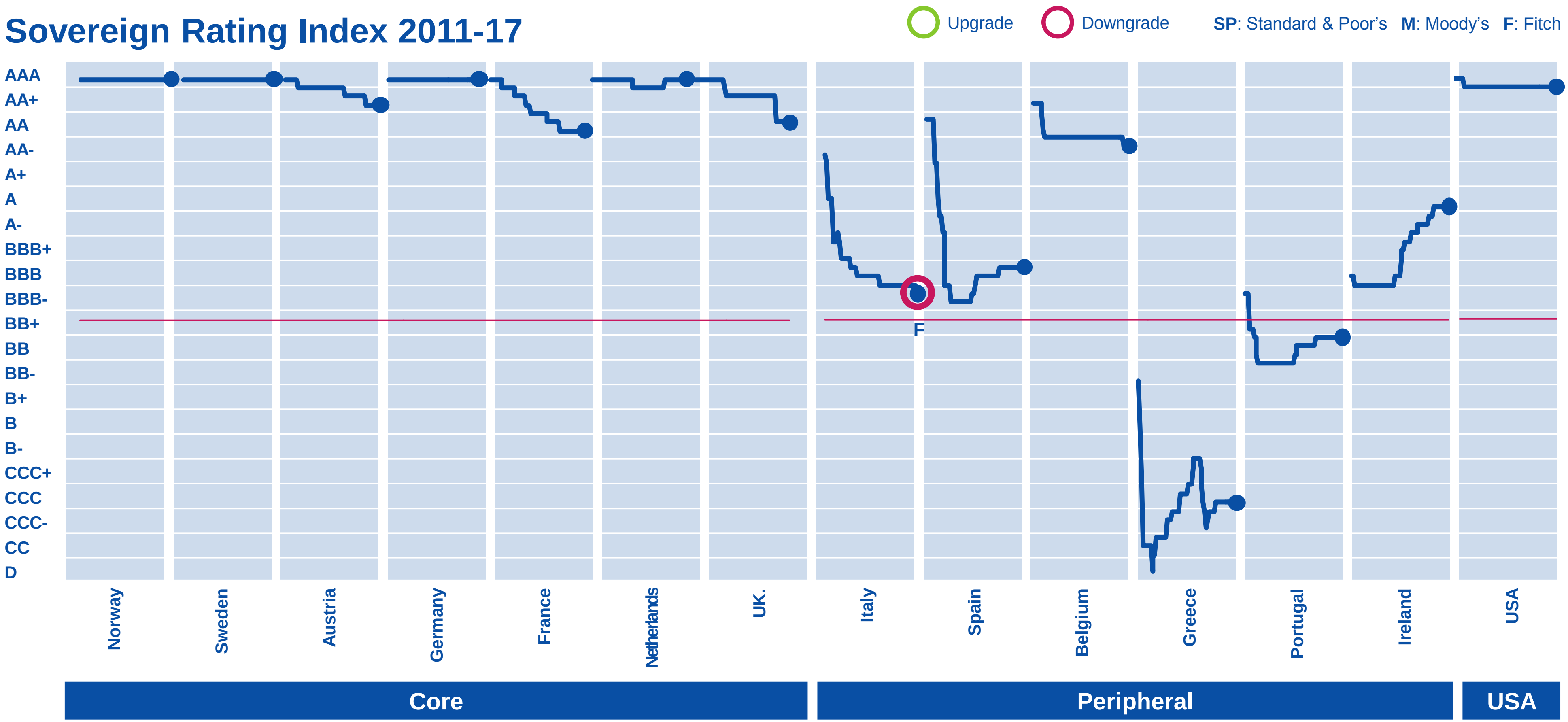
Sovereign Rating Index: An index that translates the three important rating agencies ratings letters codes (Moody's, Standard & Poors and Fitch) to numerical positions from 20 (AAA) to default (0). The index shows the average of the three rescaled numerical ratings.

- **China** was downgraded by Moody's, and **Italy** was downgraded by Fitch. On the other hand, **Argentina** and **Indonesia** were upgraded by S&P.
- South Africa was downgraded by S&P and Fitch and Hong Kong by Moody's.

DEVELOPED COUNTRIES

Sovereign markets and rating agencies update

Sovereign Rating Index 2011-17

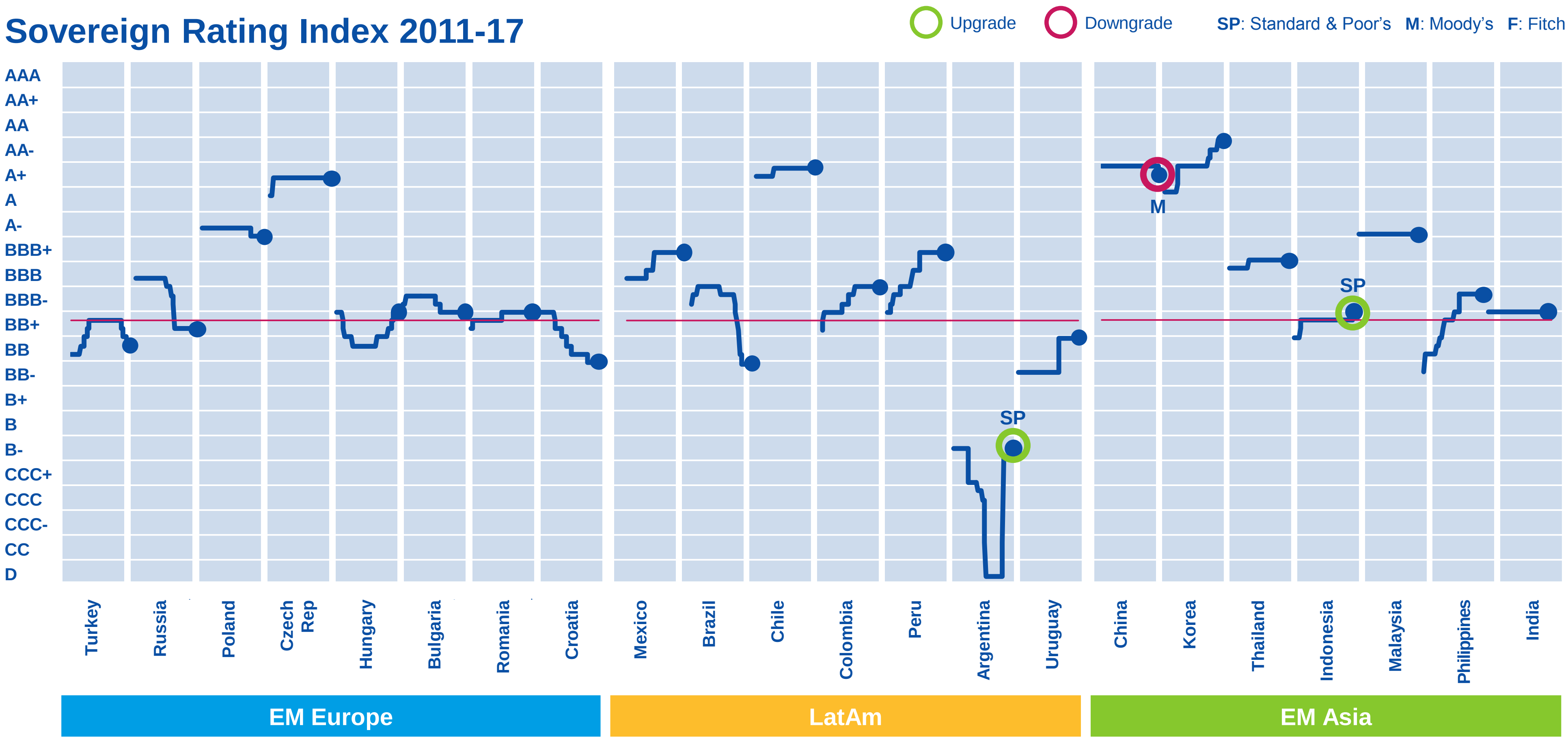


Source: BBVA Research

EMERGING COUNTRIES

Sovereign markets and rating agencies update

Sovereign Rating Index 2011-17

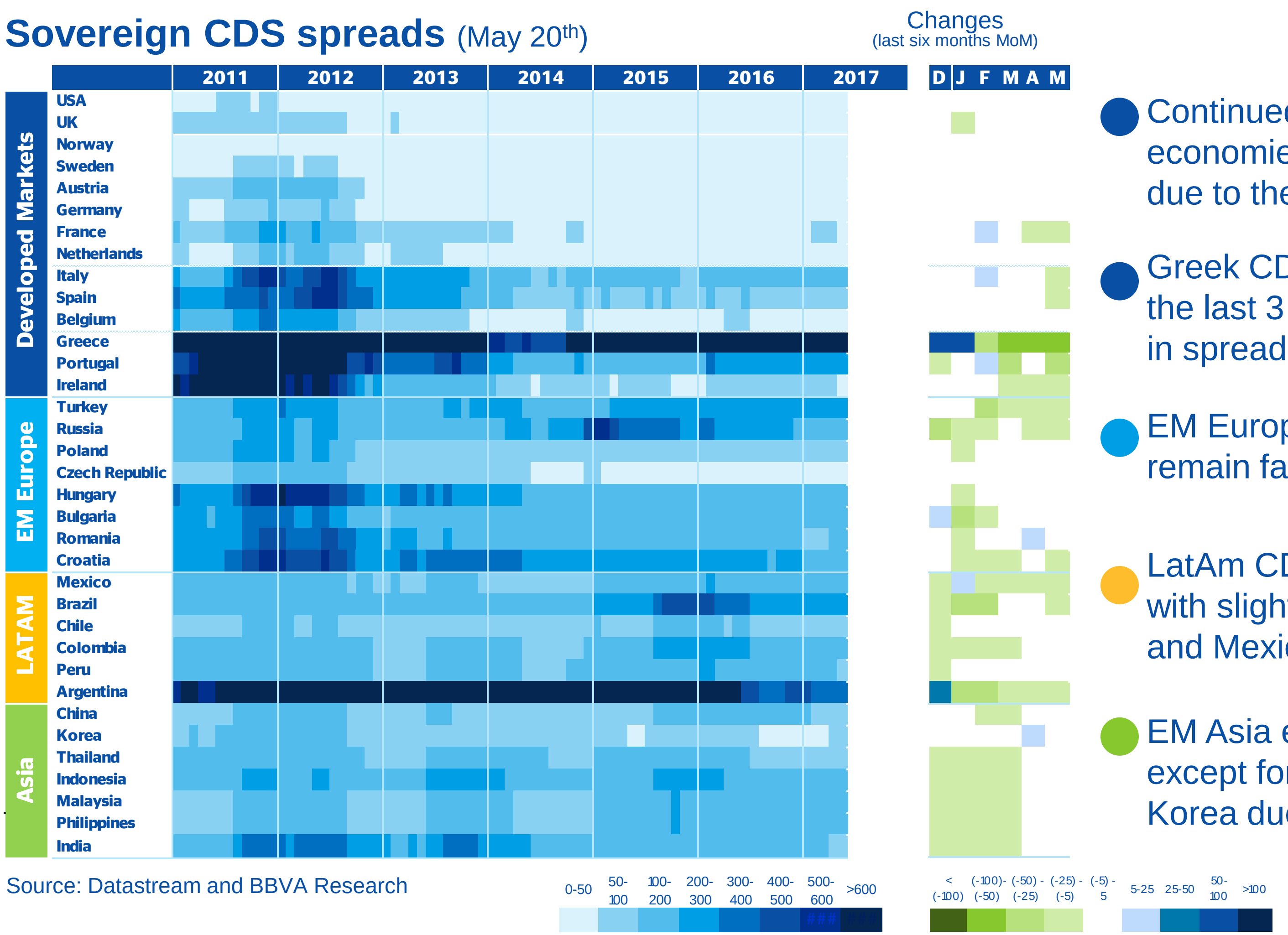


Source: BBVA Research

Sovereign markets and rating agencies update

Extremely calmed quarter in CDS sovereign markets. Most countries are close to their minimum levels post-Lehman. Most of the large spread's increases seen during the turmoil in 2015 and 2016 in EMs have vanished

Sovereign CDS spreads (May 20th)



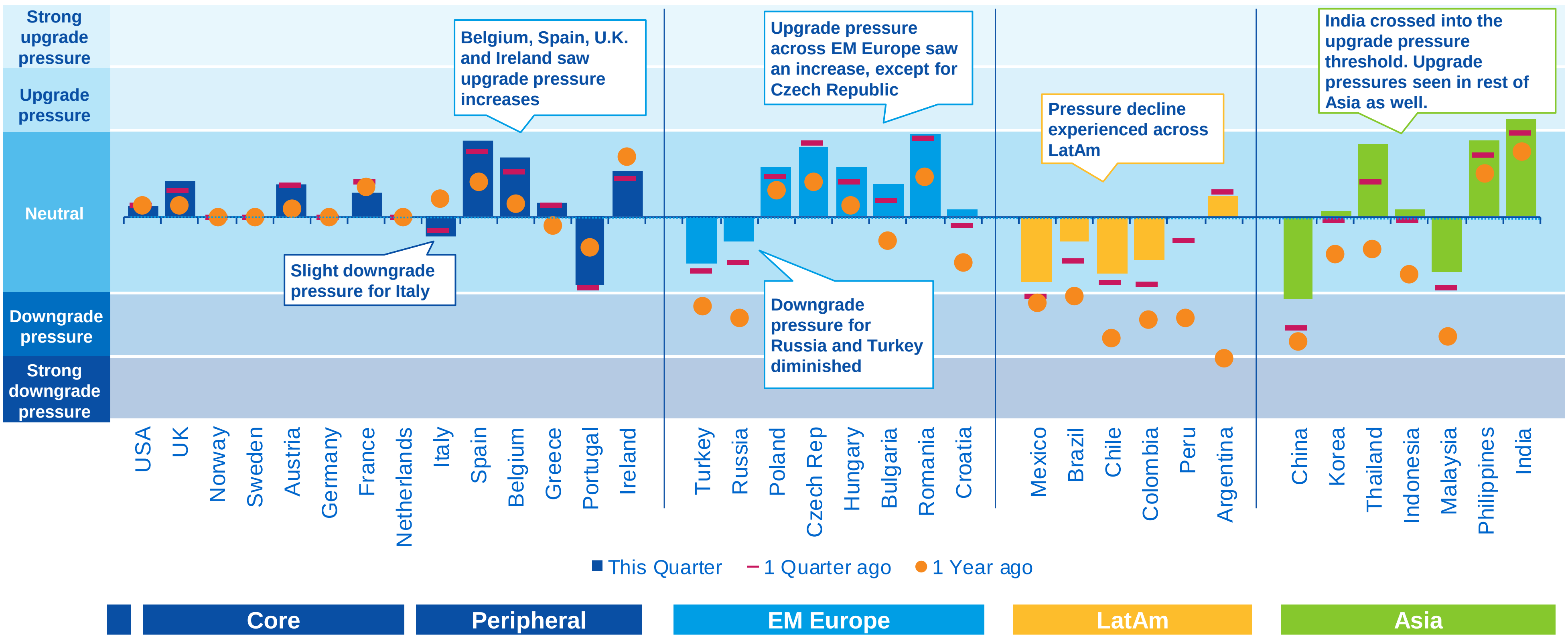
Source: Datastream and BBVA Research

- Continued stability in advanced economies. France saw some volatility due to the presidential elections.
- Greek CDS experienced less volatility in the last 3 months, and a slow decrease in spread levels.
- EM Europe CDS saw a reduction or remain fairly stable
- LatAm CDS have seen relative stability with slight decreases in Argentina, Brazil and Mexico.
- EM Asia experienced stability as well, except for a recent increase in South Korea due to Geopolitical tensions.

Sovereign markets and agency ratings update

Downgrade pressure declined across the board, whereas upgrade pressure increased specially in EM Europe and Asia. This is one of the few times we have seen more countries with upgrade rather than downgrade pressure

Agencies' rating downgrade pressure gap (20th of May 2017)
(difference between CDS-implied rating and actual sovereign rating, in notches)



Source: BBVA Research

2 Financial tensions and global risk aversion

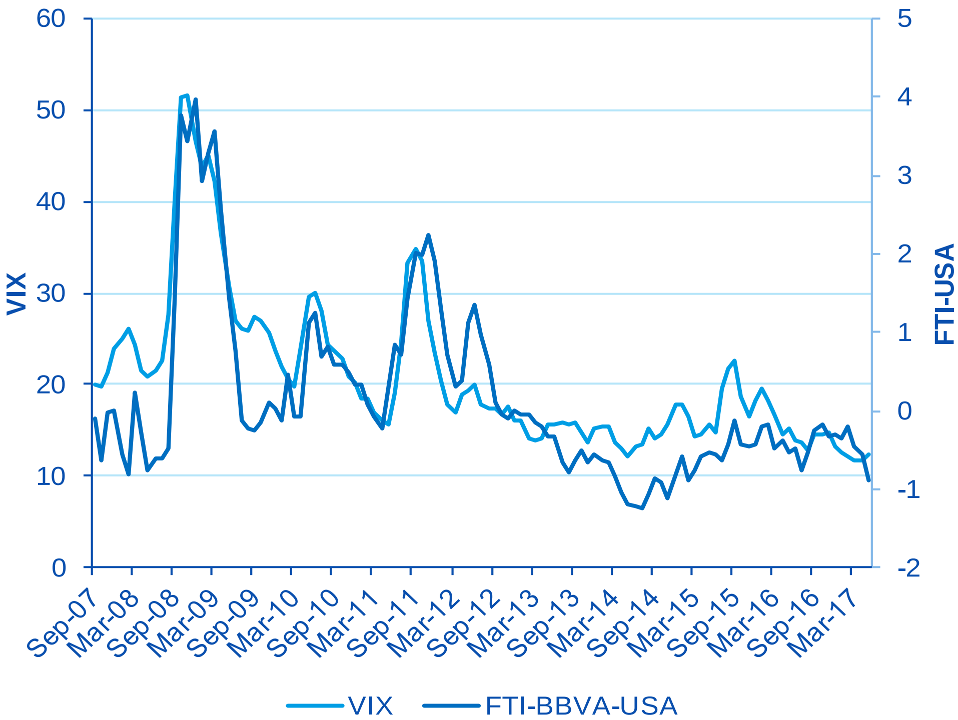
Financial tensions
Global Risk Aversion evolution according to different measures

International financial markets, global risk aversion and capital flows

Global risk aversion has been decreasing for over a year, and continued to do so through Q2 2017. Slight increases are noticed during 2017, reflecting concerns about European elections and Trump's policy agenda.

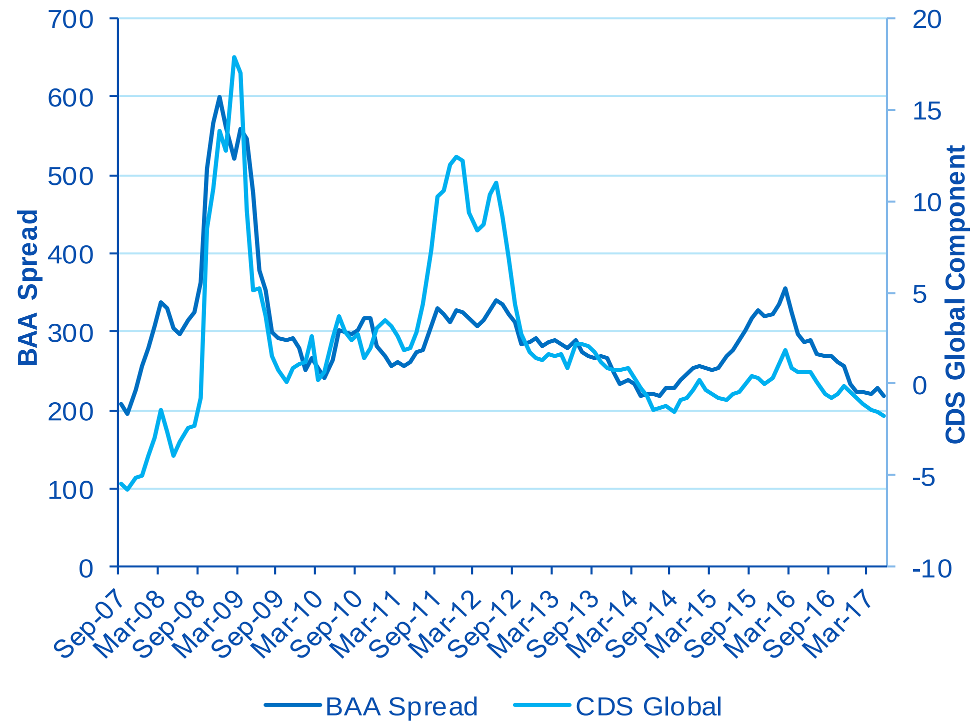
Global risk aversion indicators: VIX & FTI

(Monthly average)



Global risk aversion indicators: BAA Spread & Global component in sovereign CDS

(Monthly average)



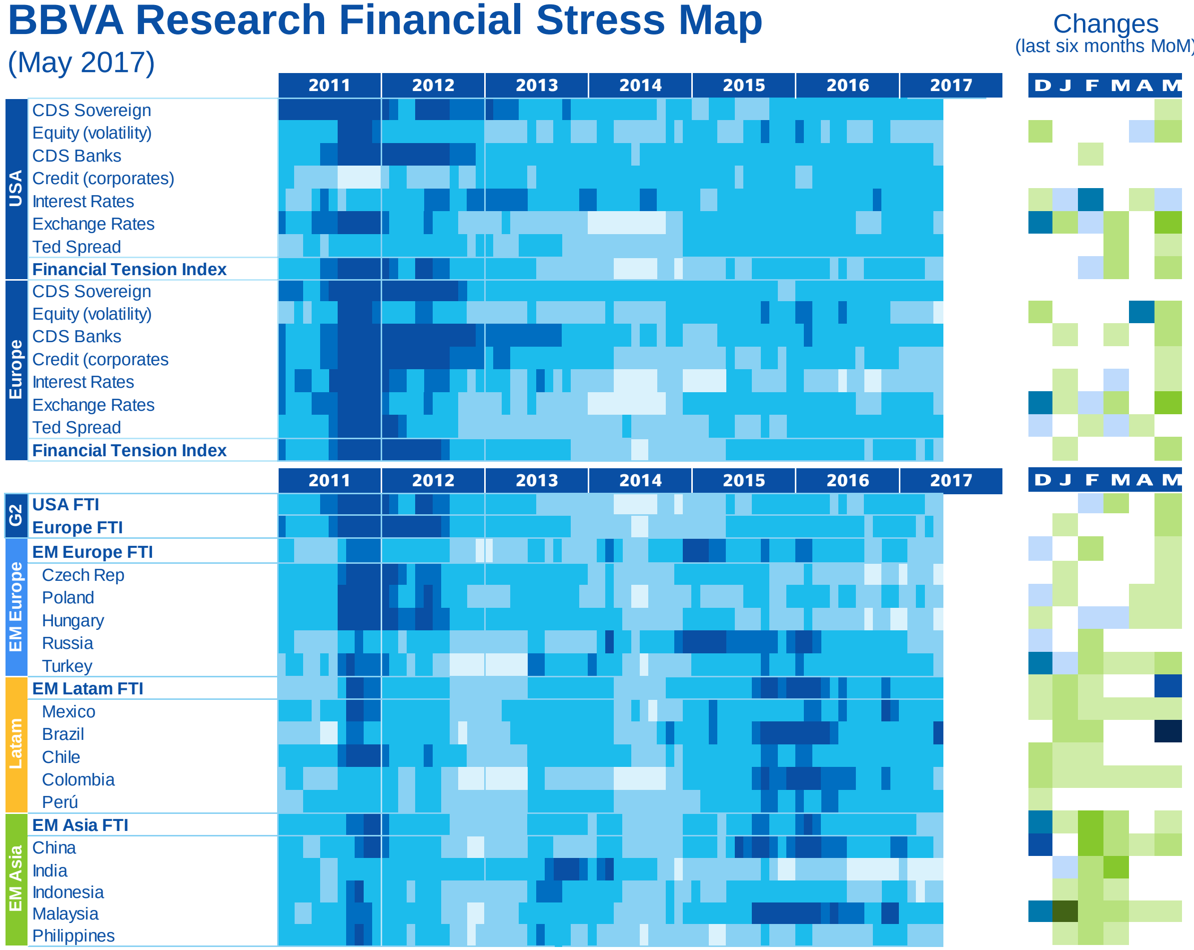
Source: BBVA Research

International financial markets, global risk aversion and capital flows

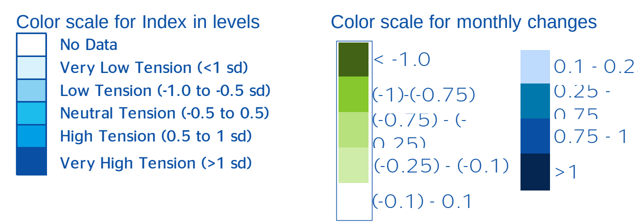
Financial tensions (FT) are currently at remarkable low levels, with the exception of Brazil in May. Q2 2017 saw a further lowering and overall stability across the board, following a decrease in Q1 after U.S. elections.

BBVA Research Financial Stress Map

(May 2017)



- U.S. and Europe saw stable and slight decreases in FT. This was most noticeable in exchange rates, while equity in Europe saw slight volatility during April.
- EM Europe also displayed remarkable stability, with a slight FT decrease during May.
- FT in LatAm, like other regions, displays stability and gradual lowering with the exception of Brazil, that has escalated in May due to political tensions.
- EM Asia saw overall FT mild to decreasing since February, driven by China, Malaysia, and India.



Source: BBVA Research

3 Macroeconomic vulnerability and in-house Regional country risk assessment

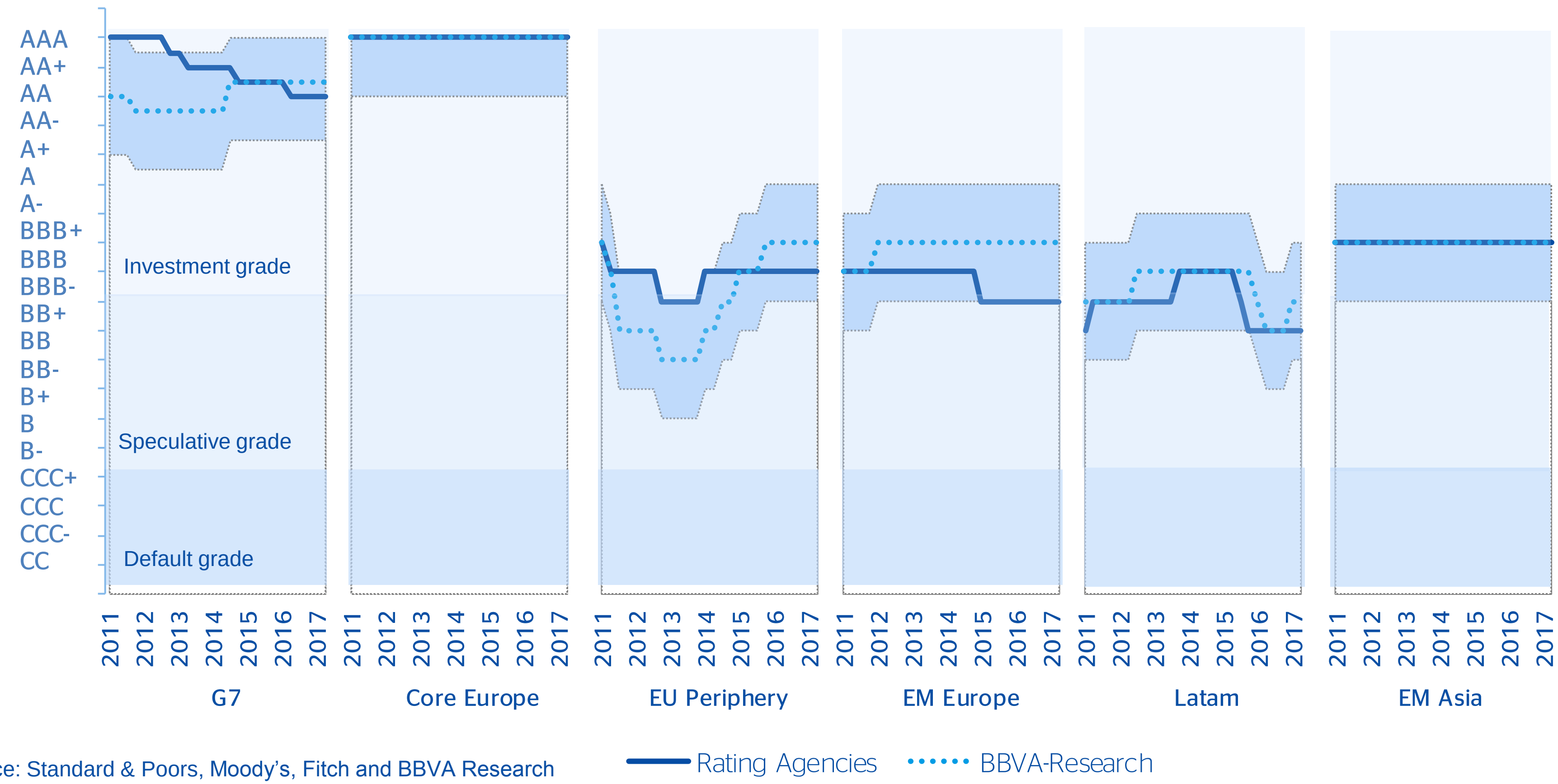
BBVA-Research sovereign ratings by regions
Equilibrium CDS by regions
Vulnerability Radars by regions
Public and private debt levels

Macroeconomic vulnerability and risk assessment

LatAm's agencies average rating continues below investment grade threshold, now below our BBVA Research rating. EU Periphery and EM Europe average rating still below fundamentals, in line with sovereign markets' upgrade pressure

Agencies' Sovereign rating vs. BBVA Research

(Agencies' Rating and BBVA scores +/-1 std dev)



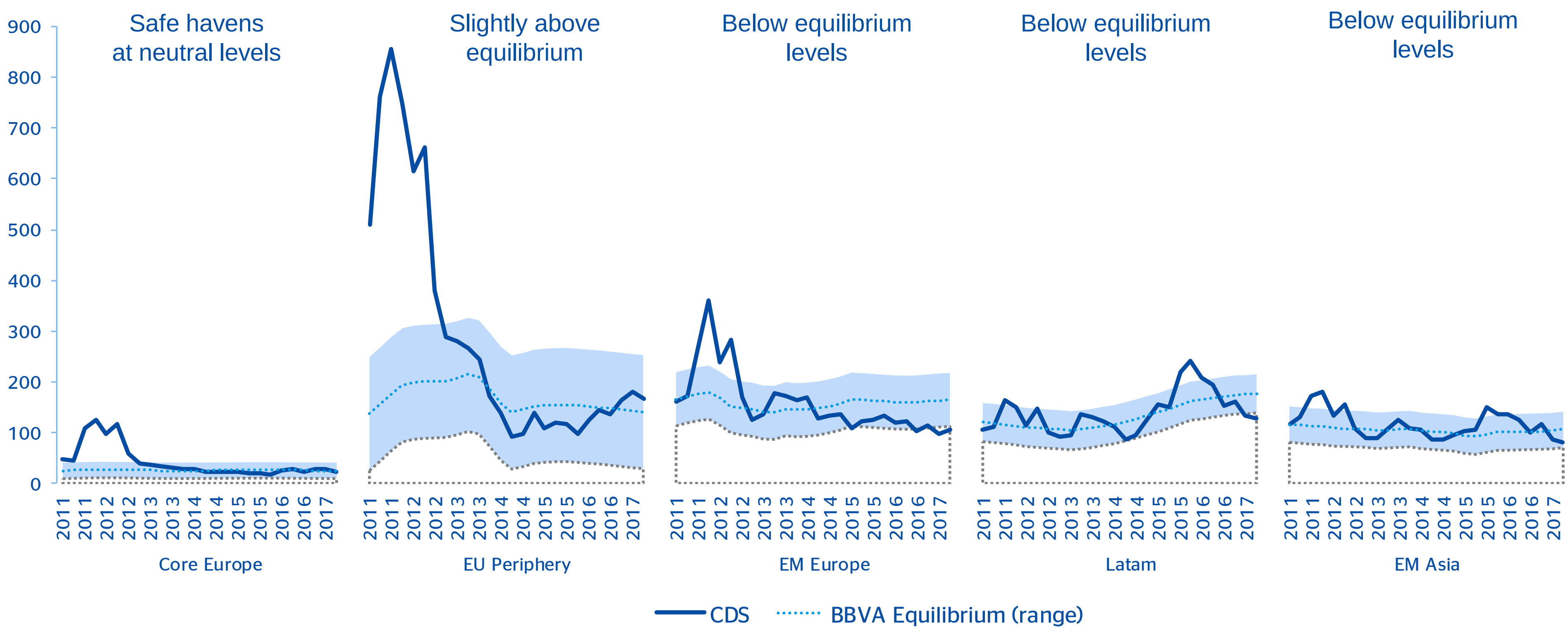
Source: Standard & Poors, Moody's, Fitch and BBVA Research

Macroeconomic vulnerability and risk assessment

EM Europe and LatAm experience higher deviations (on average) from equilibrium levels. Asia has also fallen below its equilibrium level in Q2 2017. Core Europe and EU Periphery keep maintaining levels near equilibrium.

CDS and equilibrium risk premium May 2017

(equilibrium: average of four alternative models + 0.5 standard deviation)



*EU Periphery excludes Greece

Source: BBVA Research and Datastream

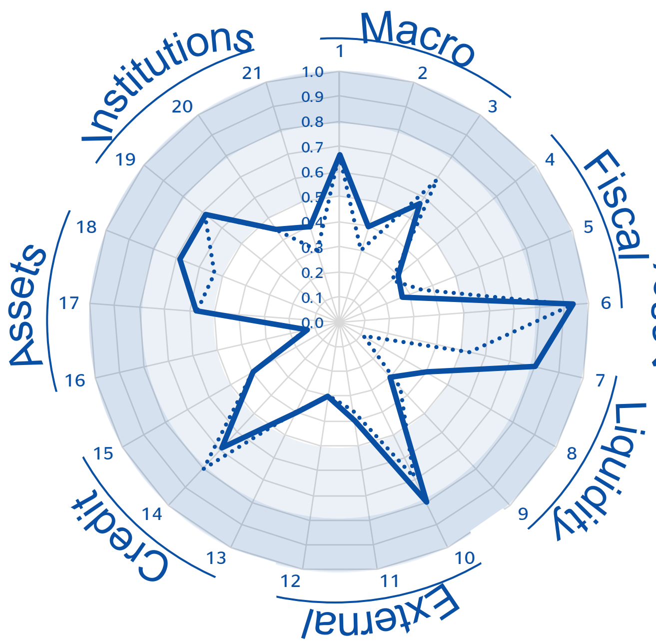
Macroeconomic vulnerability and risk assessment

Public and external debt levels have kept worsening in several developed economies. Equity valuations risks and political instability also see a significant rise in vulnerability.

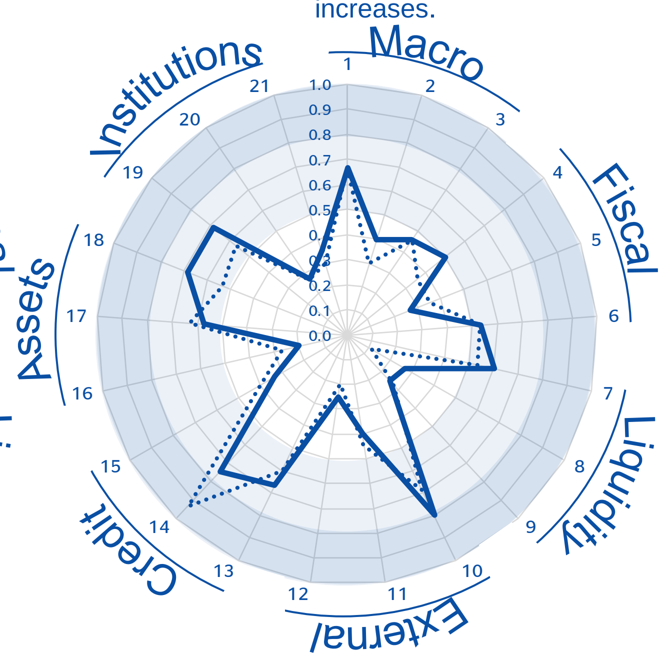
Developed countries: vulnerability radar 2017

Relative position for the emerging developed countries. Max risk=1, Min risk=0. Previous year data is shown as a dotted line.

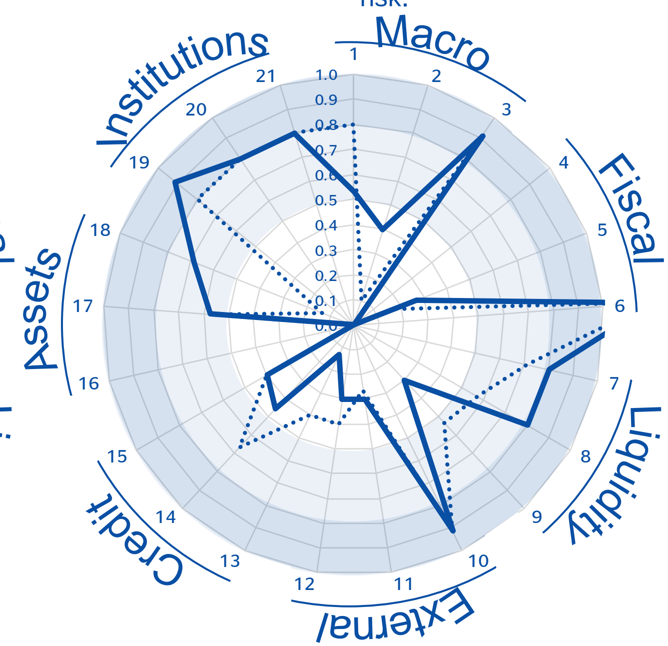
G7: Public and external debt levels remain high. Debt held by non-residents rises, while equity risk rises significantly.



Core Europe: Corporate leverage continues to see a slight decline while political instability sees a rise. External debt and equity vulnerability increases.



Periphery EU: Public and external debt levels have kept fiscal vulnerability at a high, while financial needs and unemployment are also estimated as high risk.



High risk | Risk to monitor | Safe

Macro: (1) GDP (% YoY) (2) Prices (% YoY) (3) Unemployment (% LF)
Fiscal: (4) Structural balance (%) (5) Interest rate – GDP %YoY (6) Public debt (% GDP)
Liquidity: (7) Debt by non-residents (%total) (8) Financial needs (%GDP) (9) Financial pressure (% GDP)
External: (10) External debt (%GDP) (11) RER appreciation (%YoY) (12) CAC balance (%GDP)

Credit: (13) Household (%GDP) (14) Corporate (%GDP) (15) Credit-to-deposit (%)
Assets: (16) Private credit to GDP (%YoY) (17) Housing Prices (%YoY) (18) Equity (%)
Institutional: (19) Political stability (20) Corruption (21) Rule of law

Macroeconomic vulnerability and risk assessment

Overall, vulnerabilities seem to be improving in EMs. However, external vulnerabilities and equity valuations risks are at high levels in EM Europe and LatAm. Public debt is to be monitored in LatAm and EM Asia.

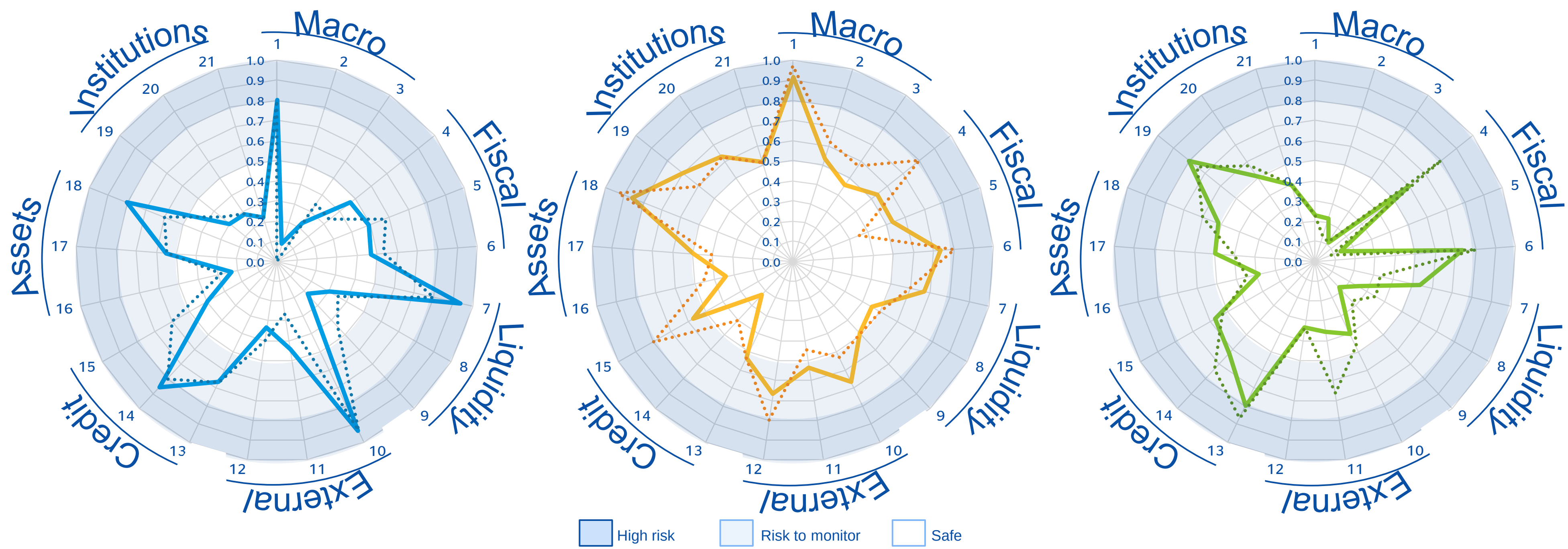
Emerging countries: vulnerability radar 2017

Relative position for the emerging developed countries. Max risk=1, Min risk=0. Previous year data is shown as a dotted line.

EM Europe: Significant increase in equity risk, debt-held by non residents and corporate leverage.

LatAm: Overall, most vulnerabilities are at a medium level of risk, and improving in most of the cases.

EM Asia: Political instability and household credit continue to be high risks. REER sees significant depreciation and risk lowering.



Macro: (1) GDP (% YoY) (2) Prices (% YoY) (3) Unemployment (% LF)
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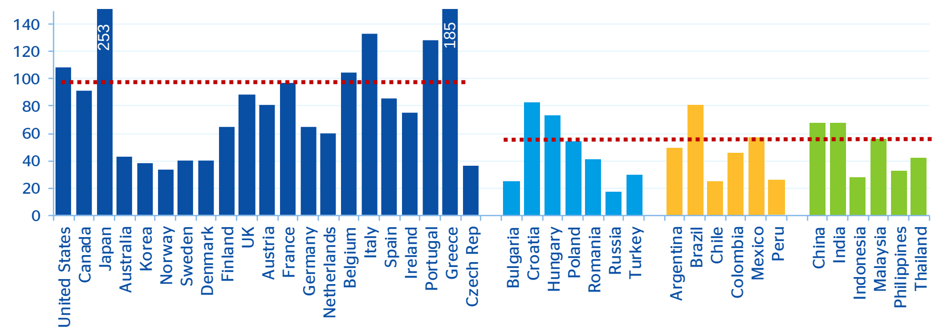
Macroeconomic vulnerability and risk assessment

Public and private debt ratios still high in some developed countries

Gross Public Debt 2017

(% GDP)

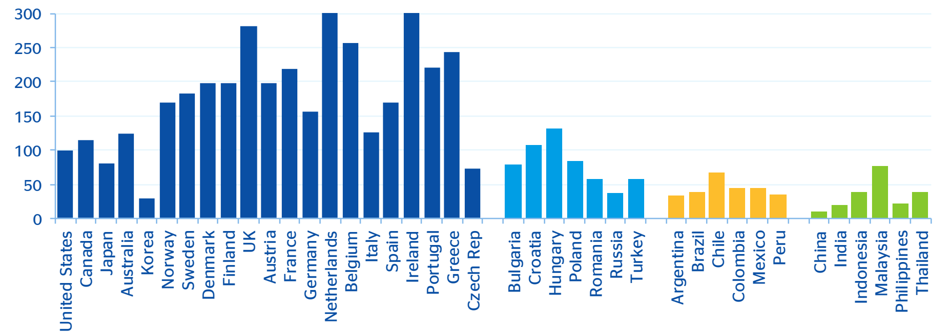


Source: BBVA Research and IMF

External Debt 2017

(% GDP)

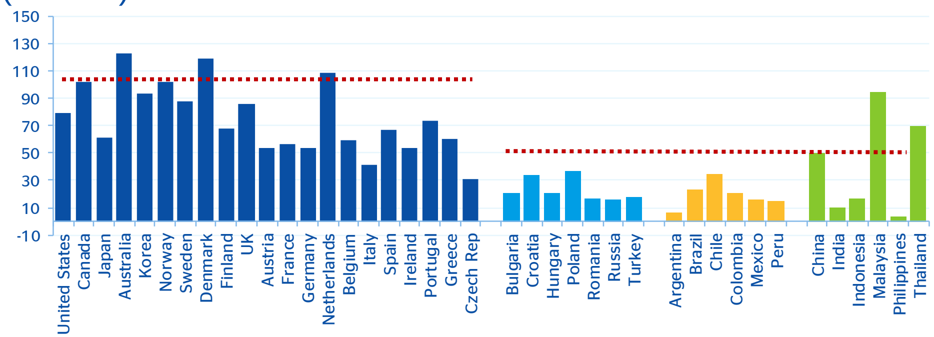
Source: BBVA Research and IMF



Source: BBVA Research and IMF

Household Debt 2017

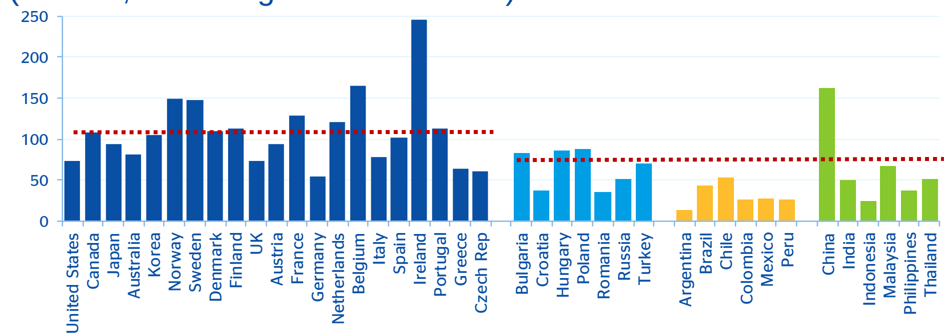
(% GDP)



Source: BBVA Research and BIS

Corporate Sector Debt 2017

(% GDP, excluding bond issuances)



Source: BBVA Research and BIS

4 Assessment of financial and external disequilibria

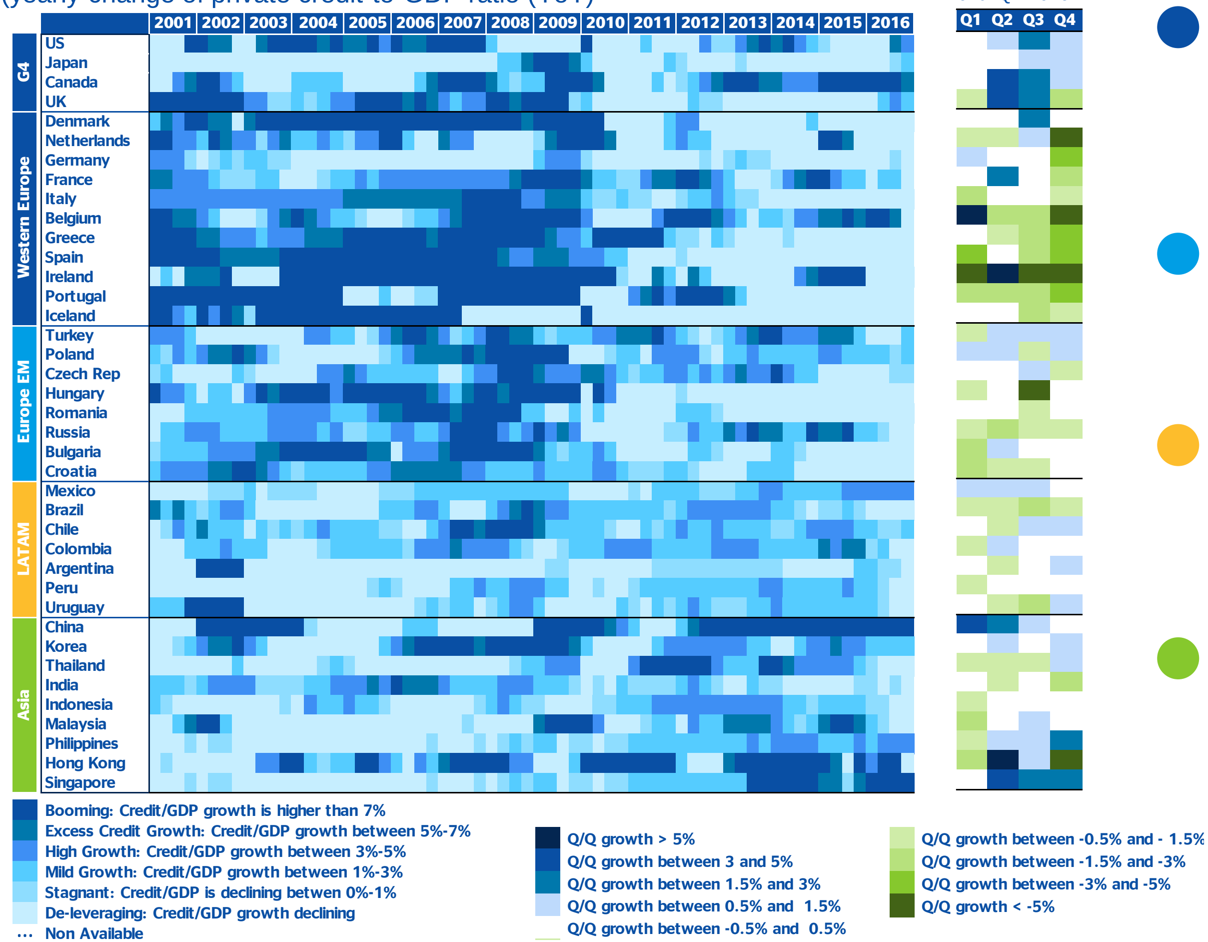
Private credit growth by country
Housing prices growth by country
Early warning system of banking crises by regions
Early warning system of currency crises by regions

Assessment of financial and external disequilibria

Leverage growth in China decelerated but it remains high in YoY terms. Every country in Western Europe was deleveraging in Q4-2016. Leverage growth in Canada slowed slightly after two years of booming growth.

Private credit color map (2001-2016 Q4)

(yearly change of private credit-to-GDP ratio (YoY)



Source: BBVA Research, IFS and BIS

- Canadian credit growth slowed, but still at excess levels. In YoY terms, all countries in Western Europe were deleveraging during Q4-2016.
- Credit growth is peaking up again in Turkey. Throughout EM Europe credit growth remained weak or negative overall.
- Credit growth in LatAm continued to decelerate. Meanwhile, Mexico saw high growth, while Chile experienced mild levels.
- Credit growth in China keeps on decelerating, although is still high YoY. Growth in Philippines remained high, and low in the rest of Asia.

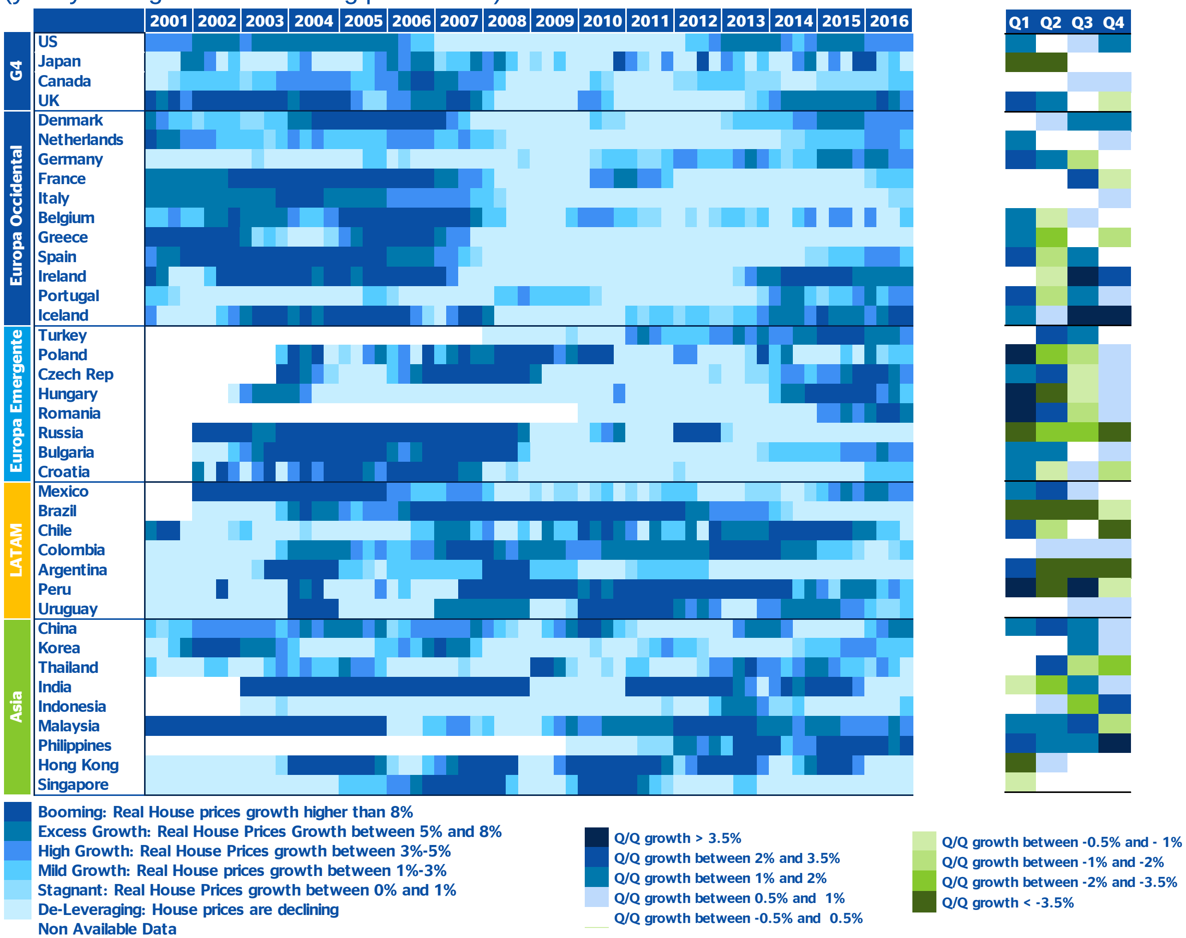
Assessment of financial and external disequilibria

Deceleration in housing price growth was seen in several countries in the last quarter, most noticeably China, Spain, Colombia and Brazil. Meanwhile, Iceland, Ireland and the Philippines continued to exhibit strong price growth.

Real housing prices color map (2001-2016 Q4)

(yearly change of real housing prices YoY)

QoQ growth
Last four qarters up until Q4-2016



Source: BBVA Research, BIS, Haver and Oxford Economics.

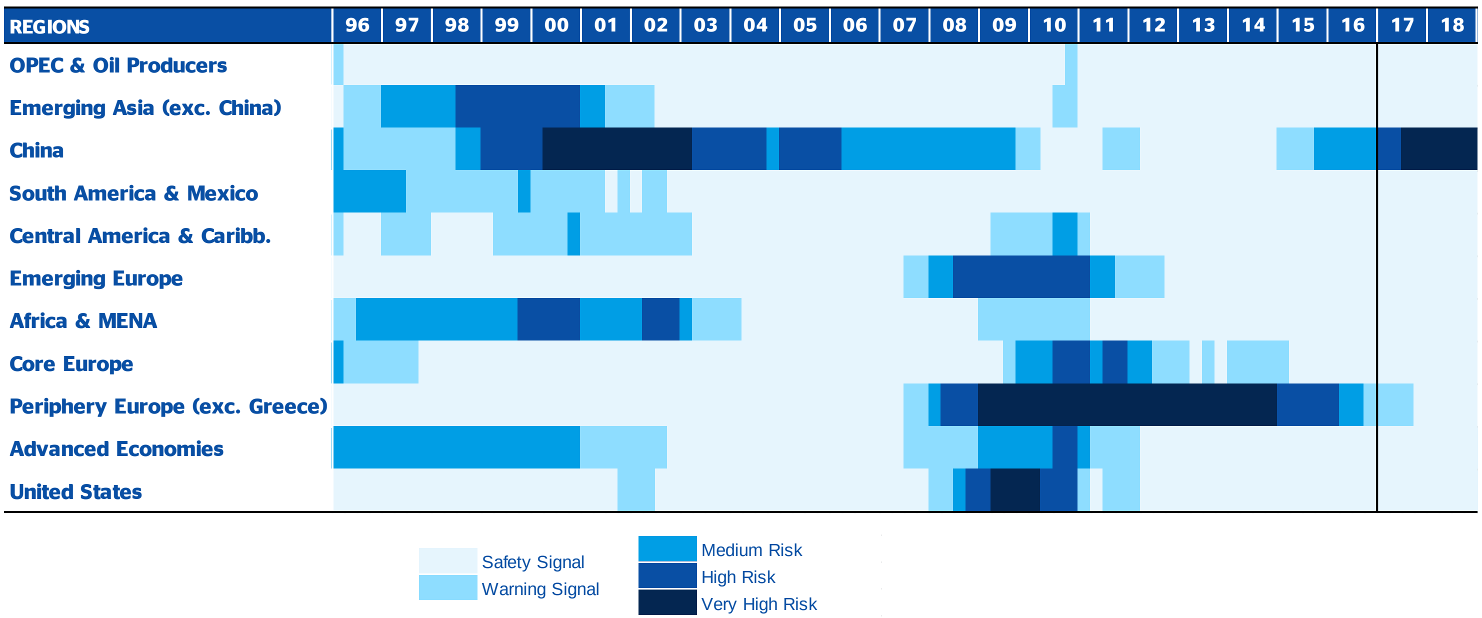
- Price growth was high in the U.S., Denmark, Ireland, and Portugal. Iceland experienced booming price growth.
- Mixed quarterly data from EM Europe. Romania, Turkey, Czech Republic and Bulgaria maintained high to excessive levels of price growth.
- Mexican growth continued to decelerate. Colombia and Brazil saw a decline in prices while Peru experienced volatility.
- Chinese housing prices growth showed signs of slowing for the first time in a year, as well as Malaysia. Mild growth was seen in other countries except for Philippines.

Assessment of financial and external disequilibria

China remains as the main region/country with a significant probability of a banking crisis. The warning signal for some countries in the EU periphery remains.

Early warning system (EWS) of Banking Crises (1996Q1-2018Q4)

Probability of Systemic Banking Crisis (based on 8-quarters lagged data*):



- The probability of banking crises in OPEC & Oil producers has diminished
- China's unbounded credit growth could likely cause a banking crisis during 2017-18
- Some countries in Europe's periphery (ex. Greece) continue to show signs of banking stress.

- A banking crisis in a given country follows the definition by Laeven and Valencia (2012), which is shown in the Appendix.
- The complete description of the methodology can be found at https://goo.gl/r0BLbl and at https://goo.gl/VA8xXv.
- The probabilities shown are the simple average of the estimated individual countries probabilities for each region. The definition of each region is shown in the Appendix.

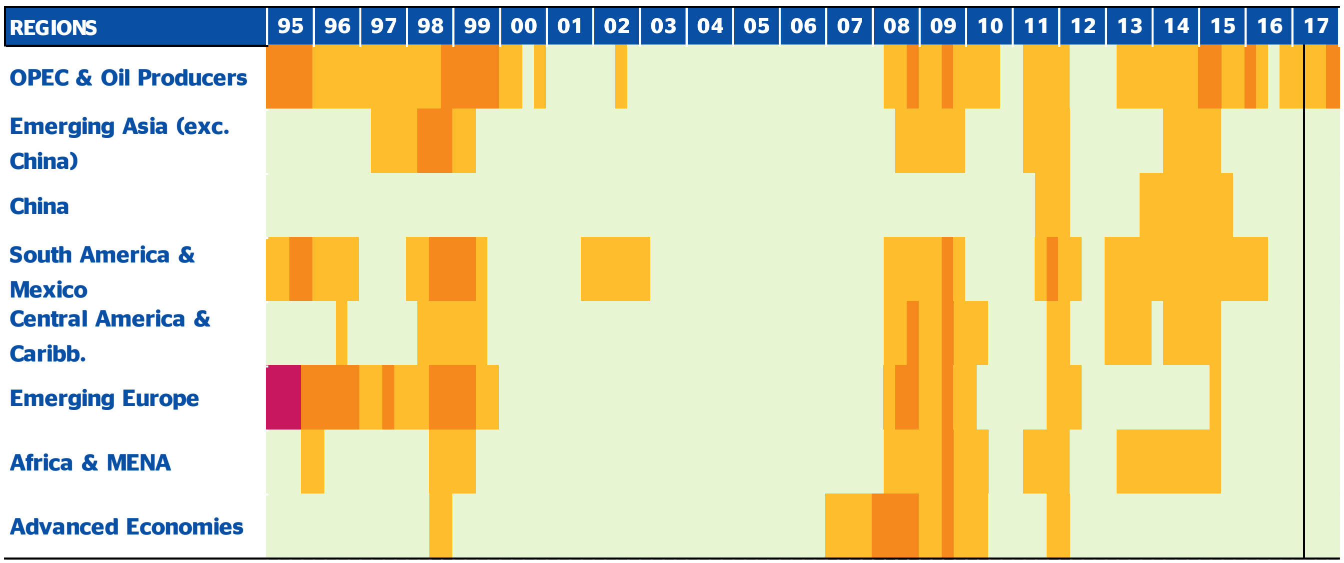
*The probability of a crisis in Q4-2016 is based on Q4-2014 data. Source: BBVA Research

Assessment of financial and external disequilibria

We envisage renewed currency problems tensions in some OPEC & Oil Producer countries.

Early warning system (EWS) of Currency Crisis Risk: probability of currency tensions

The probability of a crisis is based on 4-quarters lagged data, e.g. Probability in Q4-2016 is based on Q4-2015 data



We envisage further currency problems tensions in OPEC & Oil Producer countries such as Russia, Azerbaijan and Venezuela

Safe
Warning
High Risk
Very High Risk

- We have developed a similar Currency-Crises Early Warning System EWS that allow us to estimate the probability of a currency crisis, which is defined as a "large" fall in the exchange rate and in foreign reserves in a given country, according to certain predefined measures.
- The probabilities shown in the table are the simple average of the individual countries probabilities for each region. The list of the leading indicators used in the estimation of the probability and the definition of each region are shown in the Appendix.

Source: BBVA Research

Vulnerability Indicators table by country

Macroeconomic vulnerability and risk assessment

Vulnerability indicators: developed economies

Vulnerability indicators* 2017: developed countries

	Fiscal sustainability			External sustainability			Liquidity management			Macroeconomic performance			Credit and housing			Private debt			Institutional		
	Structural primary balance (1)	Interest rate GDP growth differential 2016-21	Gross public debt (1)	Current account balance (1)	External debt (1)	RER appreciation (2)	Gross financial needs (1)	Short-term public debt (3)	Debt held by non-residents (3)	GDP growth (4)	Consumer prices (4)	Unemployment rate (5)	Private credit to GDP growth (4)	Real housing prices growth (4)	Equity markets growth (4)	Household debt (1)	NF corporate debt (1)	Financial liquidity (6)	WB political stability (7)	WB control corruption (7)	WB rule of law (7)
United States	-1.9	-1.0	108	-2.4	100	9.1	19	14	32	2.3	2.6	4.5	4.0	3.6	16.8	80	74	64	-0.7	-1.4	-1.6
Canada	-1.5	-0.4	91	-2.9	114	-7.5	11	9	24	1.9	2.1	6.9	6.8	-10.2	15.2	102	107	130	-1.2	-1.9	-1.8
Japan	-3.7	-1.1	239	4.2	80	0.3	41	15	10	1.2	0.8	3.1	1.4	1.7	12.8	61	94	48	-1.0	-1.6	-1.5
Australia	-0.7	-1.3	43	-2.8	124	-0.4	3	2	42	3.1	2.0	5.2	2.6	2.6	14.6	123	82	133	-0.9	-1.9	-1.8
Korea	0.4	-1.3	39	6.2	30	3.6	2	6	12	2.7	2.2	3.8	2.2	1.6	8.2	93	105	98	-0.1	-0.5	-1.0
Norway	-10.8	-1.5	33	5.7	170	-2.2	-9	8	55	1.2	2.6	4.5	8.5	-0.6	19.6	102	150	132	-1.1	-2.3	-2.0
Sweden	-1.1	-2.1	40	4.6	182	-6.0	5	10	42	2.7	1.5	6.7	-10.5	4.7	16.2	88	147	188	-1.0	-2.2	-2.0
Denmark	-0.7	-1.0	40	7.5	198	-1.3	5	9	38	1.5	0.7	5.8	-1.7	3.3	-3.4	119	110	306	-0.9	-2.2	-2.0
Finland	-0.8	-1.6	64	-1.3	198	-3.2	8	9	81	1.3	1.5	8.5	-11.0	5.8	14.6	68	113	131	-1.0	-2.3	-2.1
UK	-1.0	-0.8	89	-3.2	282	-10.7	9	7	34	1.7	2.6	4.9	2.0	3.2	18.6	86	74	56	-0.6	-1.9	-1.8
Austria	0.6	-0.9	81	2.4	198	-0.5	5	5	85	1.4	1.7	5.9	3.0	4.6	24.6	54	94	97	-1.2	-1.5	-1.9
France	-0.8	-1.2	98	-1.3	219	-2.7	13	10	65	1.4	1.5	9.6	-0.4	1.5	16.8	56	128	106	-0.3	-1.3	-1.4
Germany	1.2	-1.4	68	7.6	156	-2.7	3	5	63	1.7	2.0	4.2	-2.8	3.9	23.6	53	54	86	-0.7	-1.8	-1.8
Netherlands	1.0	-1.2	60	9.2	544	-1.5	6	5	55	2.1	1.2	5.4	-8.6	2.9	17.4	109	120	93	-0.9	-1.9	-1.9
Belgium	0.1	-0.9	104	0.9	256	0.1	18	15	67	1.6	1.4	7.8	-0.7	1.5	12.6	59	165	52	-0.6	-1.6	-1.4
Italy	1.9	0.8	133	2.5	126	-3.0	17	11	39	1.0	1.6	11.4	-2.6	0.9	13.1	42	77	101	-0.3	0.0	-0.3
Spain	-0.1	-2.2	85	1.8	169	-3.2	18	15	51	3.0	2.1	17.3	-10.4	2.7	19.9	67	101	102	-0.3	-0.5	-0.9
Ireland	1.4	-1.6	75	4.7	780	-3.6	6	7	69	3.5	1.4	6.5	-52.2	7.0	5.5	54	245	48	-0.9	-1.6	-1.8
Portugal	2.7	0.7	129	-0.3	221	-0.7	12	8	64	1.7	2.6	10.6	-11.3	3.5	10.5	74	113	124	-0.9	-0.9	-1.1
Greece	3.3	-1.8	181	-0.3	244	-3.4	15	6	82	2.2	1.3	21.9	-6.6	-1.3	15.4	60	64	145	0.2	0.1	-0.2

Source: BBVA Research, Haver, BIS, IMF and World Bank

*Vulnerability indicators: (1) % GDP (2) Deviation from four-year average (3) % of total debt (4) % year on year (5) % of Total labour force (6) Financial system credit to deposit (7) Index by World Bank governance indicators

Macroeconomic vulnerability and risk assessment

Vulnerability indicators: emerging economies

Vulnerability indicators* 2017: emerging countries

	Fiscal sustainability			External sustainability			Liquidity management			Macroeconomic performance			Credit and housing			Private debt			Institutional		
	Structural primary balance **(1)**	Interest rate GDP growth differential 2014-19	Gross public debt **(1)**	Current account balance **(1)**	External debt **(1)**	RER appreciation **(2)**	Gross financial needs **(1)**	Reserves to short-term external debt **(3)**	Debt held by non-residents **(3)**	GDP growth **(4)**	Consumer prices **(4)**	Unemployment rate **(5)**	Private credit to GDP growth **(4)**	Real housing prices growth **(4)**	Equity markets growth **(4)**	Household debt **(1)**	NF corporate debt **(1)**	Financial liquidity **(6)**	WB political stability **(7)**	WB control corruption **(7)**	WB rule of law **(7)**
Bulgaria	-0.5	0.4	24	2.3	79	-2.5	4	2.9	44	2.9	1.7	7.1	-1.6	4.8	42.0	20	83	79	0.0	0.3	0.1
Czech Rep	0.3	-1.6	36	1.2	73	0.0	6	15	46	2.8	2.3	3.8	0.5	3.7	9.0	31	60	86	-1.0	-0.4	-1.1
Croatia	1.0	0.3	83	2.8	107	-0.3	15	3.7	39	2.9	0.8	13.9	-3.9	1.0	19.1	34	36	93	-0.6	-0.2	-0.2
Hungary	1.6	-1.5	73	3.7	131	-1.8	16	1.8	51	2.9	2.8	4.4	-7.1	2.4	19.6	20	86	85	-0.7	-0.1	-0.4
Poland	-1.4	-2.1	55	-1.7	84	-3.0	10	2.4	53	3.4	2.3	5.5	1.6	3.0	18.1	37	87	106	-0.9	-0.6	-0.8
Romania	-2.6	-2.6	41	-2.8	57	-5.2	8	3.0	47	4.2	2.2	5.4	-1.8	7.6	19.8	16	35	83	-0.2	0.0	-0.2
Russia	-2.0	0.0	17	3.3	36	4.8	4	5.7	17	1.4	4.4	5.5	-2.6	-12.1	6.7	15	51	106	1.0	0.9	0.7
Turkey	-1.1	-1.8	30	-4.7	58	0.6	8	1.0	34	2.5	10.0	11.5	-0.4	4.7	6.8	18	70	123	1.3	0.1	0.1
Argentina	-4.0	-12.6	49	-2.9	32	-4.3	11	1.0	36	2.2	21.6	7.4	-0.1	-29.0	56.0	6	13	61	0.1	0.6	0.8
Brazil	-1.1	2.4	81	-1.3	39	5.7	17	6.5	9	0.2	4.4	12.1	-5.0	-16.2	29.8	24	44	99	0.4	0.4	0.2
Chile	-1.5	-1.8	25	-1.4	68	1.3	4	2.3	22	1.6	3.0	6.9	1.2	-1.8	21.5	35	53	147	-0.4	-1.3	-1.3
Colombia	0.6	0.9	46	-3.6	43	-26.5	5	3.5	33	2.3	4.1	9.5	-1.0	2.2	2.8	21	26	109	1.1	0.3	0.3
Mexico	0.5	0.4	57	-2.8	44	-14.6	9	0.3	34	1.6	5.6	4.1	3.2	4.8	7.7	16	27	83	0.9	0.7	0.5
Peru	-1.0	-1.0	26	-1.9	34	-2.1	5	8.1	42	3.5	2.9	6.7	-1.1	2.5	30.7	15	25	99	0.5	0.6	0.5
China	-2.7	-5.6	67	2.3	10	-2.7	4	3.3	..	6.3	2.3	4.0	7.8	7.1	-0.3	49	161	108	0.6	0.3	0.3
India	-1.5	-4.1	68	-1.2	20	8.8	11	4.9	6	7.2	4.5	5.5	-3.7	-0.8	16.9	10	50	83	0.9	0.4	0.1
Indonesia	-0.8	-3.1	28	-1.9	38	5.2	4	2.2	59	5.1	4.2	5.4	-0.4	1.2	14.9	17	23	98	0.6	0.5	0.4
Malaysia	-0.9	-2.8	56	1.8	76	-9.1	11	0.9	34	4.4	2.7	3.4	-1.5	3.8	1.3	94	--	110	-0.2	-0.3	-0.6
Philippines	0.8	-4.3	33	0.9	21	-3.1	8	5.3	31	6.6	3.3	6.0	3.5	14.5	0.7	3	37	65	0.8	0.4	0.3
Thailand	-0.8	-1.5	42	8.4	38	-0.6	7	2.8	12	3.4	1.4	0.7	-1.8	-1.1	11.9	70	51	100	1.0	0.4	0.1

Source: BBVA Research, Haver, BIS, IMF and World Bank

Vulnerability indicators: (1) % GDP (2) Deviation from four-year average (3) % of total debt (4) % year on year (5) % of total labour force (6) Financial system credit to deposit (7) Index by World Bank governance indicators

Methodological Appendix

Appendix

Methodology: indicators and maps

- Financial Stress Map: It stresses levels of stress according to the normalised time series movements. Higher positive standard units (1.5 or higher) stand for high levels of stress (dark blue) and lower standard deviations (-1.5 or below) stand for lower level of market stress (lighter colours)
- Sovereign Rating Index: An index that translates the letter codes of the three important rating agencies' rating (Moody's, Standard & Poors and Fitch) to numerical positions from 20 (AAA) to default (0). The index shows the average of the three rescaled numerical ratings
- Sovereign CD Swaps Map: It shows a colour map with six different ranges of CD Swaps quotes (darker >500, 300 to 500, 200 to 300, 100 to 200, 50 to 100 and the lighter below 50 bp)
- Downgrade Pressure Gap: The gap shows the difference between the implicit ratings according to the Credit Default Swaps and the current ratings index (numerically scaled from default (0) to AAA (20)). We calculate implicit probabilities of default (PD) from the observed CDS and the estimated equilibrium spread. For the computation of these PDs we follow a standard methodology as described in Chan-Lau (2006), and we assume a constant Loss Given Default of 0.6 (Recovery Rate equal to 0.4) for all the countries in the sample. We use the resulting PDs in a cluster analysis to classify each country at every point in time in one of 20 different categories (ratings) to emulate the same 20 categories used by the rating agencies. The graph plots the difference between CDS-implied sovereign rating and the actual sovereign rating index, in notches. Higher positive differences account for potential Upgrade pressures and negative differences account for Downgrade potential. We consider the +/- 2 notches area as being Neutral
- Vulnerability Radars:
  - — A Vulnerability Radar shows a static and comparative vulnerability for different countries. For this we assigned several dimensions of vulnerabilities, each of them represented by three vulnerability indicators. The dimensions included are: Macroeconomics, Fiscal, Liquidity, External, Excess Credit and Assets, Private Balance Sheets and Institutional. Once the indicators are compiled, we reorder the countries in percentiles from 0 (lower ratio among the countries) to 1 (maximum vulnerabilities) relative to their group (Developed Economies or Emerging Markets). Furthermore, Inner positions (near 0) in the radar shows lower vulnerability, while outer positions (near 1) stand for higher vulnerability. Furthermore, we normalize each value with respect to given risk thresholds, whose values have been computed according to our own analysis or empirical literature. If the value of a variable is equal to the threshold, it would take a value of 0.8 in the radar.

Appendix

Methodology: indicators and maps

Risk thresholds table

Vulnerability Dimensions	Risk thresholds Developed Economies	Risk thresholds emerging economies	Risk direction	Research
Macroeconomics				
GDP	1.5	3.0	Lower	BBVA Research
Inflation	4.0	10.0	Higher	BBVA Research
Unemployment	10.0	10.0	Higher	BBVA Research
Fiscal vulnerability				
Cyclically adjusted deficit ("Strutural Deficit")	-4.2	-0.5	Lower	Baldacci et Al (2011). Assesing fiscal stress. IMF WP 11/100
Expected interest rate GDP growth diferential 5 years ahead	3.6	1.1	Higher	Baldacci et Al (2011). Assesing fiscal stress. IMF WP 11/100
Gross public bebt	73.0	43.0	Higher	Baldacci et Al (2011). Assesing fiscal stress. IMF WP 11/100
Liquidity problems				
Gross financial needs	17.0	21.0	Higher	Baldacci et Al (2011). Assesing fiscal stress. IMF WP 11/100
Debt held by non residents	84.0	40.0	Higher	Baldacci et Al (2011). Assesing fiscal stress. IMF WP 11/101
Short term debt pressure				
Public short-term debt as % of total public debt (Developed)	9.1		Higher	Baldacci et Al (2011). Assesing fiscal stress. IMF WP 11/100
Reserves to short-term debt (Emerging)		0.6	Lower	Baldacci et Al (2011). Assesing fiscal stress. IMF WP 11/100
External Vulnerability				
Current account balance (% GDP)	4.0	6.0	Lower	BBVA Research
External debt (% GDP)	200.0	60.0	Higher	BBVA Research
Real exchange rate (Deviation from 4 yr average)	5.0	10.0	Higher	EU Commission (2012) and BBVA Research
Private Balance Sheets				
Household debt (% GDP)	84.0	84.0	Higher	Chechetti et al (2011). "The real effects of debt". BIS Working Paper 352 & EU Comission (2012)
Non-financial corporate debt (% GDP)	90.0	90.0	Higher	Chechetti et al (2011). "The real effects of debt". BIS Working Paper 352 & EU Comission (2013)
Financial liquidity (Credit/Deposits)	130.0	130.0	Higher	EU Commission (2012) and BBVA Research
Excess Credit and Assets				
Private credit to GDP (annual change)	8.0	8.0	Higher	IMF global financial stability report
Real housing prices growth (% YoY)	8.0	8.0	Higher	IMF global financial stability report
Equity growth (% YoY)	20.0	20.0	Higher	IMF global financial stability report
Institutions				
Political stability	0.2 (9th percentile)	-1.0 (8th percentile)	Lower	World Bank governance Indicators
Control of corruption	0.6 (9th percentile)	-0.7 (8th percentile)	Lower	World Bank governance Indicators
Rule of caw	0.6 (8th percentile)	-0.6 (8 th percentile)	Lower	World Bank governance Indicators

Appendix

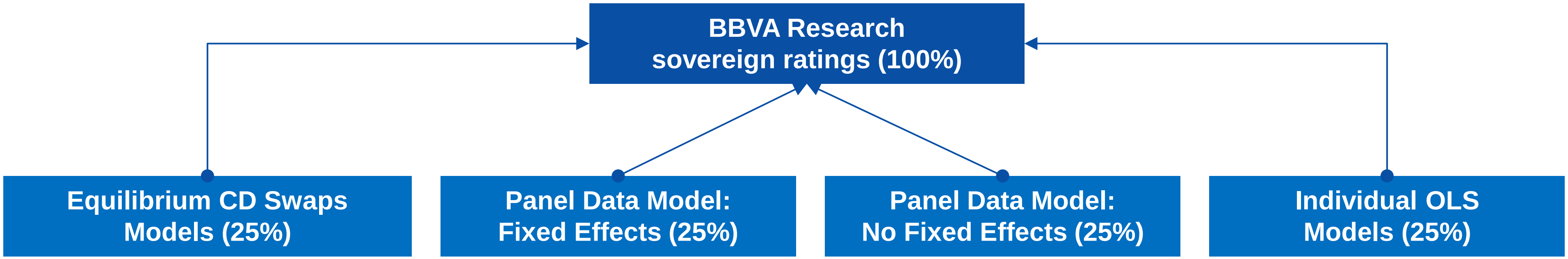
Methodology: models and BBVA country risk

- **BBVA Research sovereign ratings methodology: We compute our sovereign ratings by averaging four alternative sovereign rating models developed at BBVA Research:**
- Credit Default Swaps Equilibrium Panel Data Models: This model estimates actual and forecast equilibrium levels of CDS for 48 developed and emerging countries and 10 macroeconomic explanatory variables. The CDS equilibrium is calculated using the centered 5-year moving average of the explanatory variables weighted according to their estimated sensitivities. For estimating the equilibrium level, the BAA spread is left unchanged at its long-term median level (2003-2016). The values of these equilibrium CDS are finally converted to a 20 scale sovereign rating scale.
- Sovereign Rating Panel Data Ordered Probit with Fixed Effects Model: The model estimates a sovereign rating index (a 20 numerical scale index of the three sovereign rating agencies) through ordered probit panel data techniques. This model takes into account idiosyncratic fundamental stock and flows sustainability ratios allowing for fixed effects , thus including idiosyncratic country-specific effects
- Sovereign Rating Panel Data Ordered Probit without Fixed Effects Model: We used the estimates of the previous model but retaining only the contribution of the macroeconomic and institutional variables, without adding the country “fixed-effect” contribution. In this way we are able to account more clearly for the effect of only those macroeconomic variables that we can identify.
- Sovereign Rating Individual OLS models: These models estimate the sovereign rating index (a 20 numerical scale index of the three sovereign rating agencies) individually. Furthermore, parameters for the different vulnerability indicators are estimated taken into account the history of the country, independent of others. The estimation comes from Oxford Economics Forecasting (OEF) for the majority of countries. For those countries that are not analysed by OEF, we estimate a similar OLS individual model.

Appendix

Methodology: models and BBVA country risk

BBVA Research sovereign ratings methodology diagram



Source: BBVA Research

Appendix

Methodology: Early Warning Systems

EWS Banking Crises:

The complete description of the methodology can be found at https://goo.gl/r0BLbI and at https://goo.gl/VA8xXv. A banking crisis is defined as systemic if two conditions are met: 1) Significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and/or bank liquidations), 2) Significant banking policy intervention measures in response to significant losses in the banking system. The probability of a crisis is estimated using a panel-logit model with annual data from 68 countries and from 1990 to 2012. The estimated model is then applied to quarterly data. The probability of a crisis is estimated as a function of the following leading indicators (with a 2-years lag):

- Credit-to-GDP Gap (Deviation from an estimated long-term level)
- Current account balance to GDP
- Short-term interest rate (deviation against US interest rate)
- Libor interest rate
- Credit-to-Deposits
- Regulatory Capital to Risk Weighted Assets ratio.

EWS Currency Crises:

We estimate the probability of a currency crisis (a large fall in exchange rate and foreign reserves event) is estimated using a panel-logit model with 78 countries from 1980Q1 to 2015Q4, as a function of the following variables (with an 4-quarters lag):

- Credit-to-GDP ratio Gap (based on HP filter)
- Inflation
- BAA Spread
- Cyclical Current Account (based on HP filter)
- Short-term interest rate (deviation against US interest rate)
- Libor interest rate (different lags)
- Real effective exchange rate
- Investment to GDP
- GDP real growth rate (HP-trend and cyclical deviation from trend)
- Total trade to GDP

Appendix

Methodology: Early Warning Systems

EWS Banking Crises Definition of Regions:

- OPEC and Other Oil Exporters: Algeria, Angola, Azerbaijan, Bahrain, Canada, Ecuador, Nigeria, Norway, Qatar, Russia and Venezuela
- Emerging Asia: Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines, Thailand and Vietnam.
- South America & Mexico: Argentina, Brazil, Chile, Colombia, Mexico, Paraguay, Peru and Uruguay
- Other LatAm & Caribbean: Bolivia, Costa Rica, Dominican Rep., El Salvador, Guatemala, Honduras, Nicaragua and Panama
- Africa & MENA: Botswana, Egypt, Israel, Morocco, Namibia and South Africa.
- Emerging Europe: Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Rep, Slovenia, Turkey, Ukraine
- Core Europe: Austria, Belgium, Denmark, Finland, France, Germany, Netherlands, Sweden and United Kingdom.
- Periphery Europe: Greece, Ireland, Italy, Portugal and Spain
- Advanced Economies: Australia, Japan, Korea, Singapore, Iceland, New Zealand and Switzerland.

EWS Currency Crises Definition of Regions:

- OPEC and Other Oil Exporters: Algeria, Angola, Azerbaijan, Bahrain, Nigeria, Norway, Oman, Qatar, Russia, Trinidad and Tobago, United Arab Emirates and Venezuela
- Emerging Asia: Bangladesh, China, Hong Kong, India, Indonesia, Malaysia, Pakistan, Philippines, Thailand and Vietnam.
- South America & Mexico: Argentina, Brazil, Chile, Colombia, Mexico, Paraguay, Peru and Uruguay
- Other LatAm & Caribbean: Bolivia, Costa Rica, Dominican Rep., El Salvador, Guatemala, Honduras, Jamaica and Nicaragua
- Emerging Europe: Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Rep, Slovenia, Turkey, Ukraine
- Africa & MENA: Botswana, Egypt, Israel, Morocco, Namibia, South Africa and Tunisia
- Advanced Economies: Australia, Japan, Korea, Singapore, Canada, Iceland, New Zealand and Switzerland.

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