

The use of Big Data at BBVA Research

to better understand the society,
the economy and the world

Google Cloud Financial Services Day
November 2019

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Big Data at BBVA Research using BigQuery

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Economics, Political and Geopolitical analysis

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Media and Google Trends

01

Opportunities in the digital era. Big Data at BBVA Research using BigQuery

Opportunities in the digital era. Big Data at BBVA Research using BigQuery

New sources of data provide a better, "RealTime" and "High Definition" analysis for our clients...



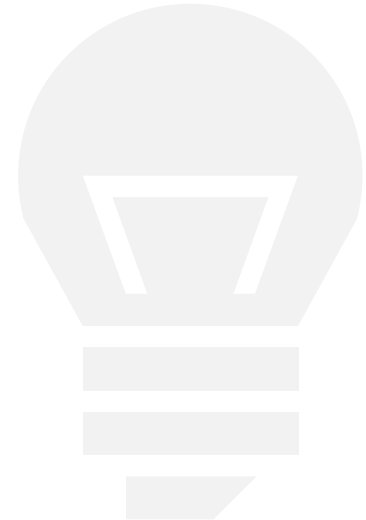
Economic indicators in Real Time



Economic Analysis in High Definition



Social & Economic Networks



The use of **Big Data** and **Data science** techniques allows us to quantify these trends.

Opportunities in the digital era. Big Data at BBVA Research using BigQuery

... and also exploiting non traditional data to better understand political, social and geopolitical challenges



Geopolitical events



Political events and social reaction



Natural disasters and epidemics



New data may end up changing the way in which we approach empirical questions and the tools they use to answer them.

Opportunities in the digital era. Big Data at BBVA Research using BigQuery

Text as Numbers: a key source of information to enrich analysis



of the total amount of web pages on the internet is given **textual or unstructured data**



Text mining to extract meaning from strings of letters



The potential use of textual information and text sources **improves the understanding of the social, economic and financial systems**

It helps us to comprehend what drives **agent's economic expectations, policy decisions, measures of uncertainty, ...**

Opportunities in the digital era. Big Data at BBVA Research using BigQuery

New framework in the digital era



> Availability of new types of datasets (including text)



> Combination of historical data with real time data



> Advanced data science techniques and algorithms



> New answers to old questions



> Better, faster infrastructure higher computational abilities



> Especially useful in countries where lower data availability

20%
of used data

80%
of available data



Opportunities in the digital era. Big Data at BBVA Research using BigQuery

Our working process

Databases

SaaS

Analysis

Visualization



GDELT
Correlate
Google Trends

 Google BigQuery

BBVA
Research

CARTO  
 Google Data Studio

Opportunities in the digital era. Big Data at BBVA Research using BigQuery Technology provides us new opportunities to analyze massive data on real time and high definition coming from new sources

Massive Flows of New Data

On Real Time

High Definition

New Sources: Texts & Images

Political, Geopolitical Social Indexes
(Political Index)



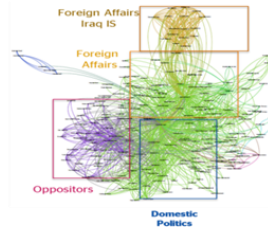
To elaborate Political, Social & geopolitical Indexes...

Geographical Analysis Housing Prices
(sentiment on Housing Prices)



... analyze with high granularity the transmission of shocks...

Politics & Financial Networks
(Political Networks)



...Build Networks to understand the interaction between agents...

Monetary & Stability tones by Central Banks
(sentiment Analysis on Central Bank texts)



... Use Text as Numbers to interpret sentiment in policy docs...

Measuring Sentiments, Narratives on News
(sentiment Analysis on Economy and Society News)

$$S = (e, a, s, h, g, t)$$



... disentangle "Information Bias" between what we read and reality

Mix Hard data & Sentiment & VAR models
(Vulnerability and Risks Index Models)



... build hybrid models including hard and sentiment data to ...

02

News & Narratives: News & Networks for Economics, Political and Geopolitical analysis

News & Narratives: News & Networks for Economics, Political and Geopolitical analysis

News as a new source of information.

What is GDELT?

Global Database on Events Location and Tone

- Open database of human society from every corner of the globe dating back to 1979
- ... georeferenced across the entire planet...
- ... including over 300 events around the world and more than 30000 themes...
- ...and collecting emotions using some of the most sophisticated algorithms

$$\text{Average tone} = \frac{\sum \text{Positive words} - \sum \text{Negative words}}{\sum \text{Total words}}$$



Global Content Analysis Measures (GCAM)

40 different **sentiment dictionaries** to capture more than **2300 emotions and dimensions** with a value score

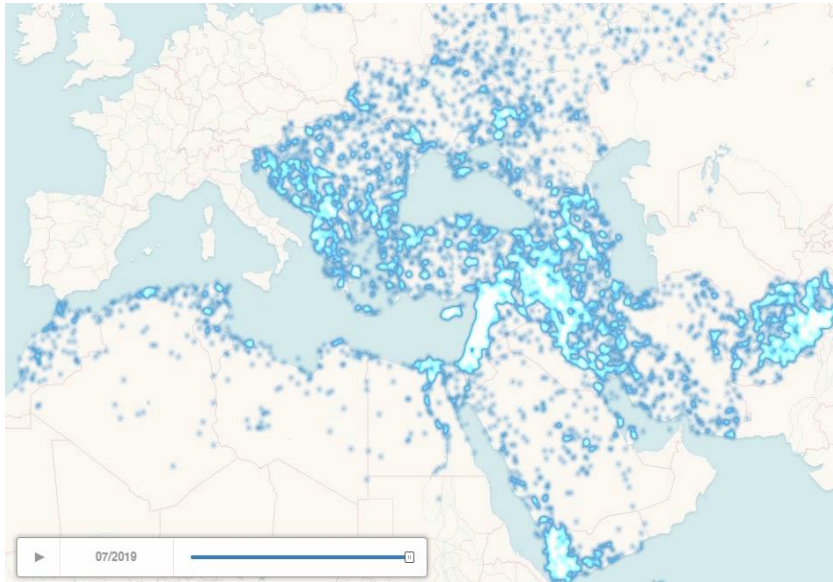
News & Narratives: News & Networks for Economics, Political and Geopolitical analysis

GDELT allow us Tracking Geopolitics on real time...

Is useful to identify the main hot spots and potential spillovers

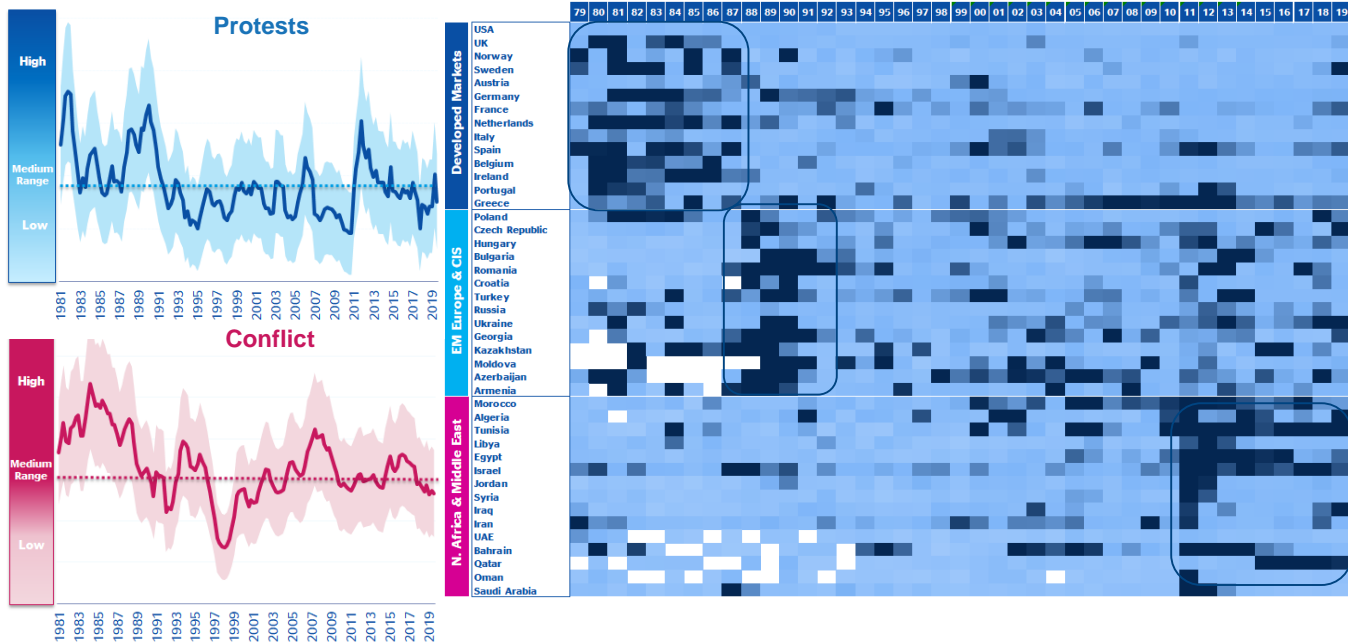
CONFLICT INTENSITY MAP 2017-19

(NUMBER OF CONFLICTS/ TOTAL EVENTS)



News & Narratives: News & Networks for Economics, Political and Geopolitical analysis ...and also from an historical perspective

BBVA RESEARCH WORLD CONFLICT AND PROTEST INTENSITY INDEX 1979-2019

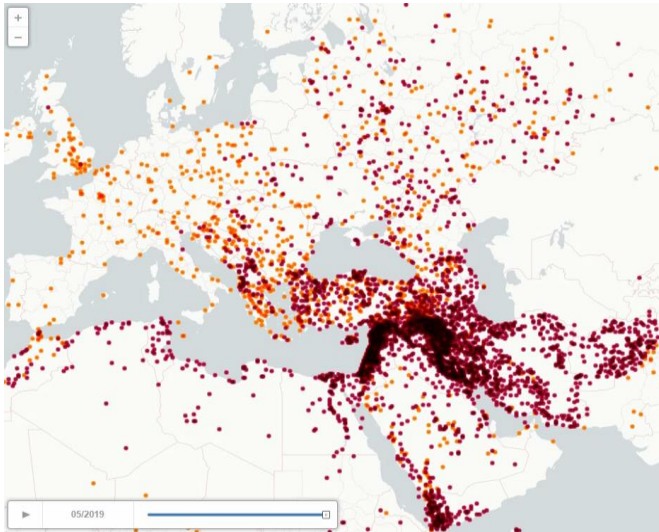


News & Narratives: News & Networks for Economics, Political and Geopolitical analysis

We can focus on the “critical” challenges such as migration...

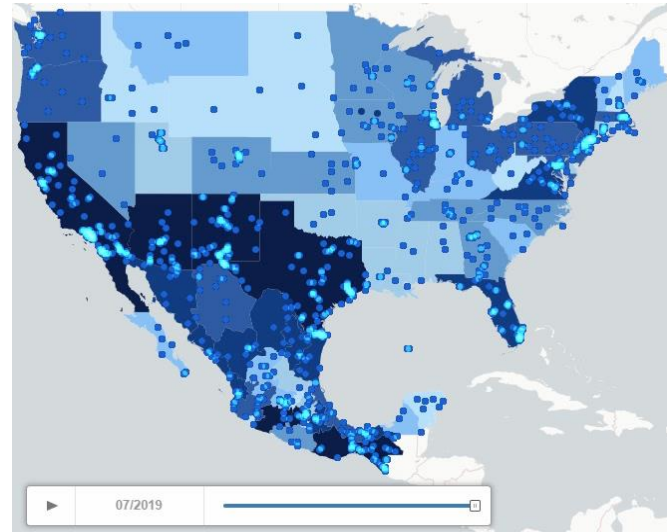
BBVA RESEARCH REFUGEES FLOWS MAP 2015-19

(MEDIA CITATIONS ON REFUGEES' ORIGIN: RED, DESTINY:ORANGE)



BBVA RESEARCH REFUGEES FLOWS MAP 2018-19

MEDIA COVERAGE. DARKER BLUE SHOWS HIGHER VALUES

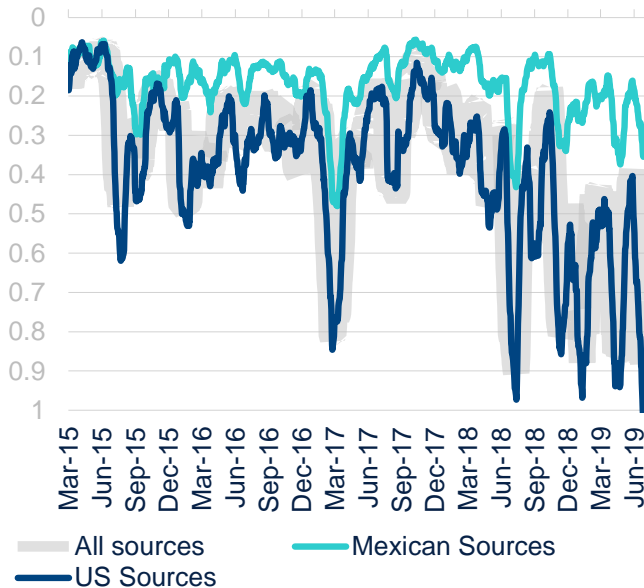


News & Narratives: News & Networks for Economics, Political and Geopolitical analysis

... and how media talks about it... Narrative matters

BBVA RESEARCH INMIGRATION INDEX 2015-19

MEDIA COVERAGE * (-TONE)



INMIGRATION TERMS IN US & MEXICO SOURCES

POSITION AND SIZE SHOWS A HIGHER MEDIA COVERAGE

Mexican media sources



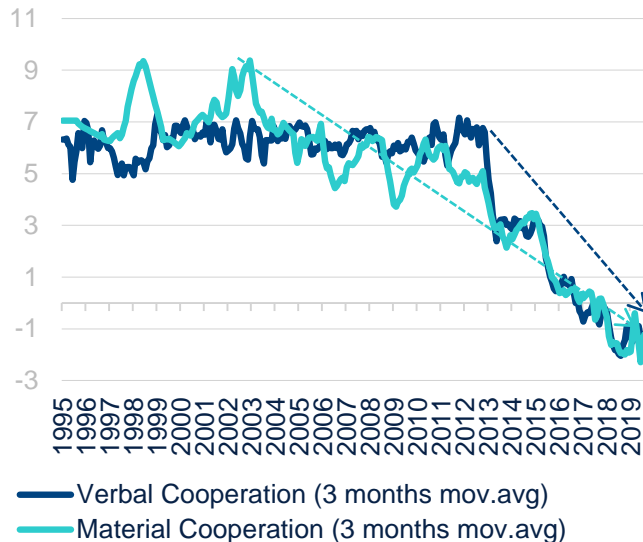
US media sources

News & Narratives: News & Networks for Economics, Political and Geopolitical analysis

“Words” can be different from “Deeds” some times... like the world trade material evolution and its narrative

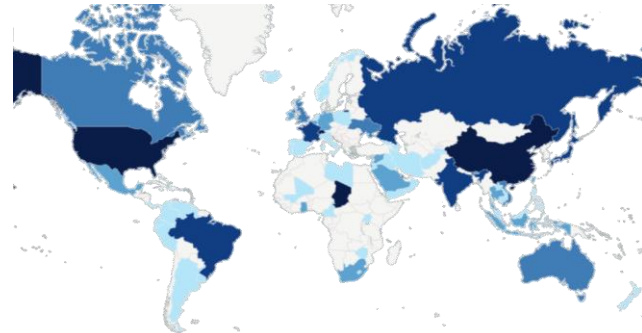
BBVA RESEARCH WORLD TRADE SUPPORT INDEX

(TONE & COVERAGE VERBAL COOPERATION AT WTO)



BBVA RESEARCH TRADE SUPPORT INDEX 2008-17

(VERBAL COOPERATION INDEX, IN DIFF 2017-2008)



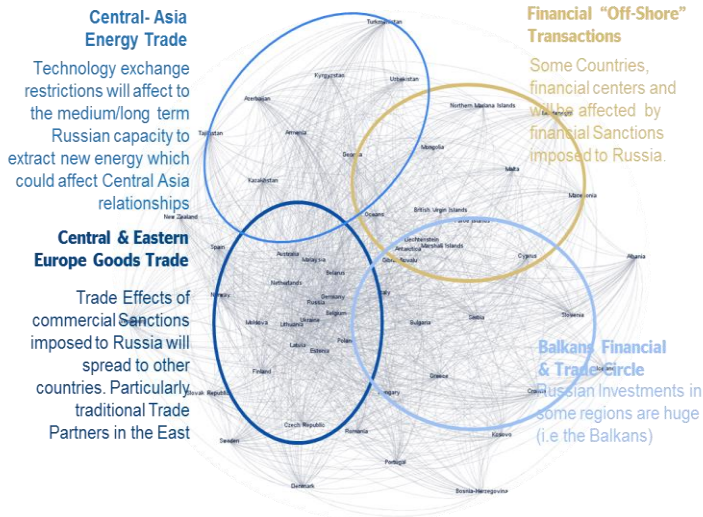
THE GLOBAL INCIDENCE OF PROTECTIONISM 2008-2015 (GLOBAL TRADE ALERT)



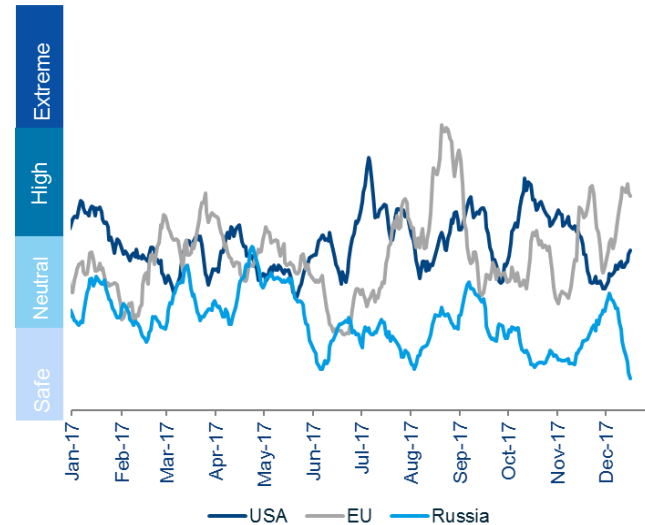
News & Narratives: News & Networks for Economics, Political and Geopolitical analysis

“News” can be an important source of information in geopolitical events like sanctions and foreign relationship

RUSSIAN SANCTIONS SPILL-OVERS NETWORK (GROUPED BY DIFFERENT CLUSTERS)



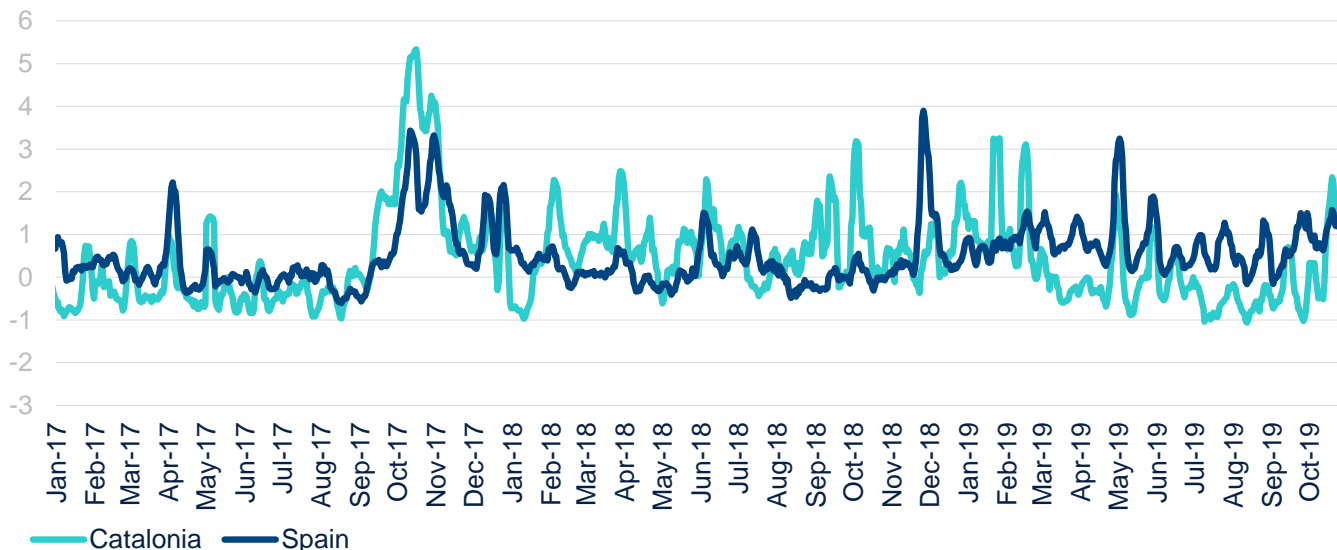
FOREIGN RELATIONS: TURKEY VS US & RUSSIA (MA 7 DAYS)



News & Narratives: News & Networks for Economics, Political and Geopolitical analysis

Even events closer to us... such as the Economic Policy Uncertainty Index in Spain based on news

BBVA RESEARCH ECONOMIC POLICY UNCERTAINTY INDEX: SPAIN AND CATALONIA (NORMALIZED DATA, MOVING AVERAGE 7 DAYS)

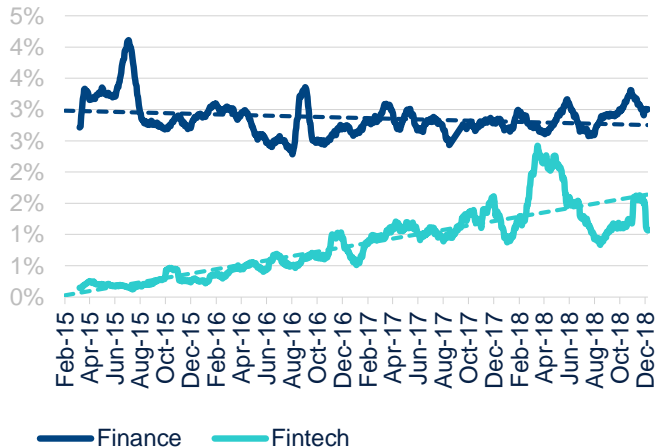


Economic Policy Uncertainty increased in Spain and Catalonia since 2015. General and Catalonian elections, Brexit, 1-O, ... are moving the series upwards.

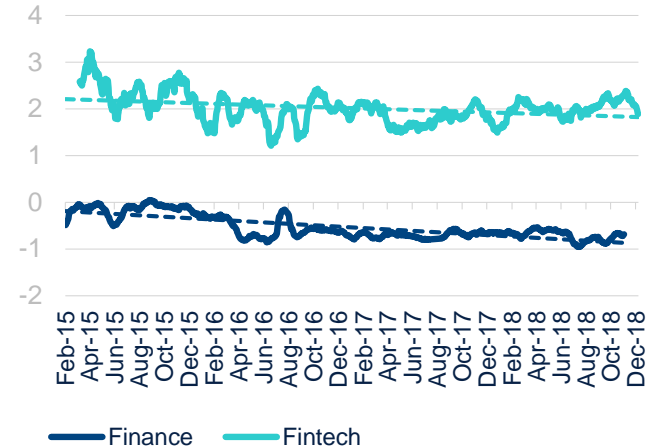
News & Narratives: News & Networks for Economics, Political and Geopolitical analysis

The FinTech Universe through the Eyes of the Media and Social Networks

FINTECH AND FINANCE MEDIA COVERAGE OVER TIME 2015-2018 (MOV AVG 30 DAYS. RELATIVE RATIO WITH RESPECT TO TOTAL NEWS)



FINTECH AND FINANCE MEDIA SENTIMENT OVER TIME 2015-2018 (MOV AVG 30 DAYS)



Media coverage is calculated as the ratio between news related with Fintech/ Fintech&Data / Fintech&Digital Payments with respect to the total number of news in the same day. Media sentiment goes normally from -10 (negative perception) to 10 (positive perception), with 0 indicating neutral.

Media coverage of FinTech increased over time, catching up with that of Finance and with a persistent gap between the perception of both topics.

03

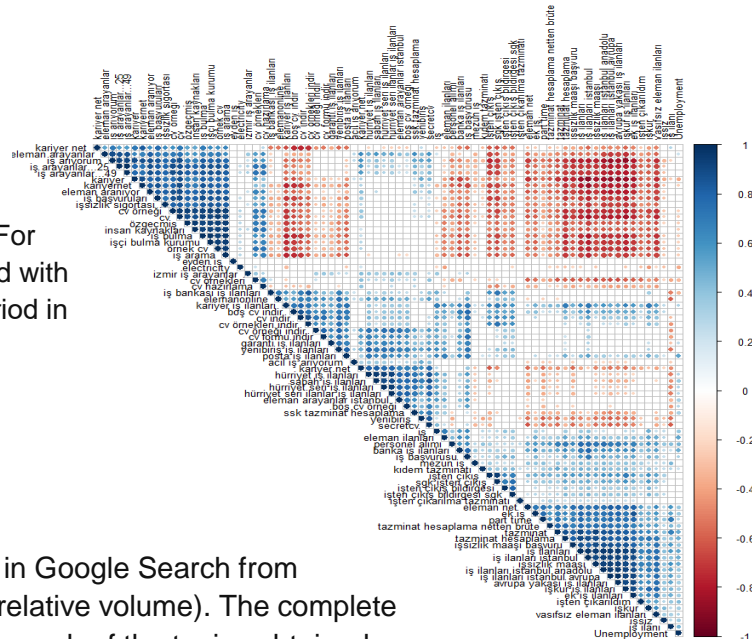
Economics in Real Time and High Definition: Media and Google Trends

Economics in Real Time and High Definition: Google correlate and trends

Google Correlate & Trends can help us to find terms related to employment searches in Turkey

Google Correlate

Finds the most correlated searching topics (100) for a given search term in interest across various regions, languages and time horizons. For the initial launch, we focused in terms correlated with 'unemployment' in Turkish during the whole period in Turkey (75 topics in total).



Google Trends

Analyzes the popularity of top search queries in Google Search from 2004 across various regions and languages (relative volume). The complete monthly search series have been extracted for each of the topics obtained with Google correlate in Turkey.

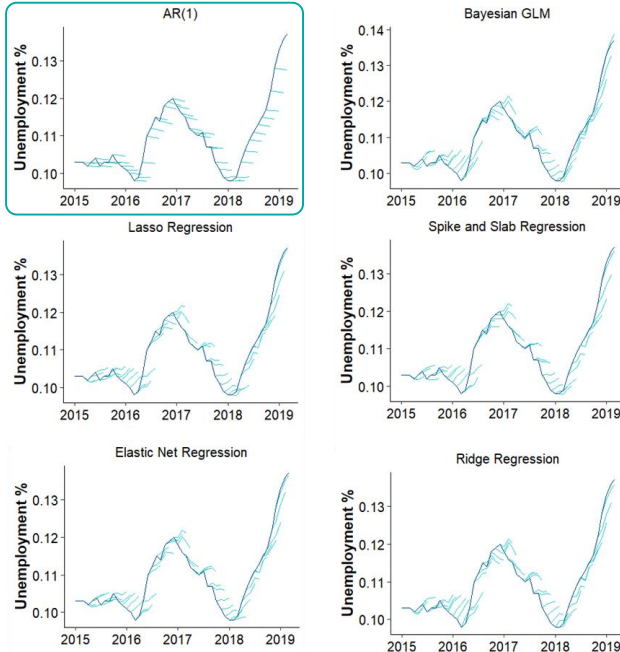
Economics in Real Time and High Definition: Media and Google Trends

Providing extra information to nowcast unemployment. In the case of Turkey providing an advantage of 3 months

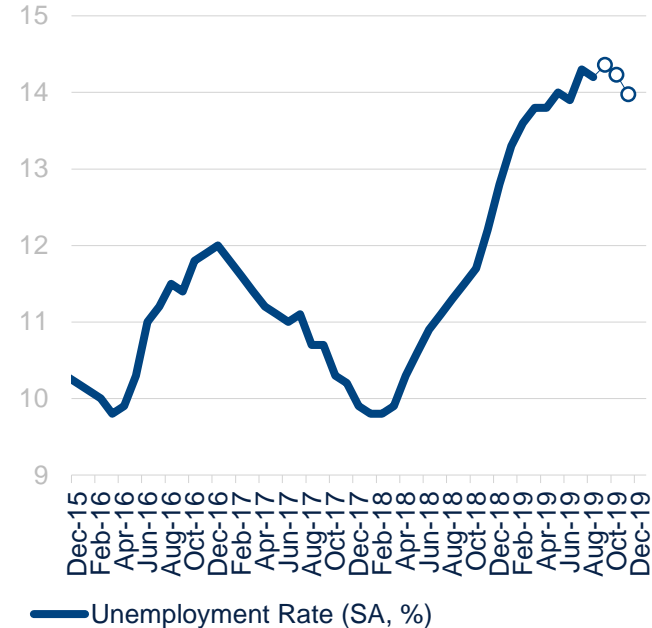
UNEMPLOYMENT OUT-OF-SAMPLE FORECASTS

(3M RECURSIVE OUT OF SAMPLE FORECASTS)

Benchmark to beat



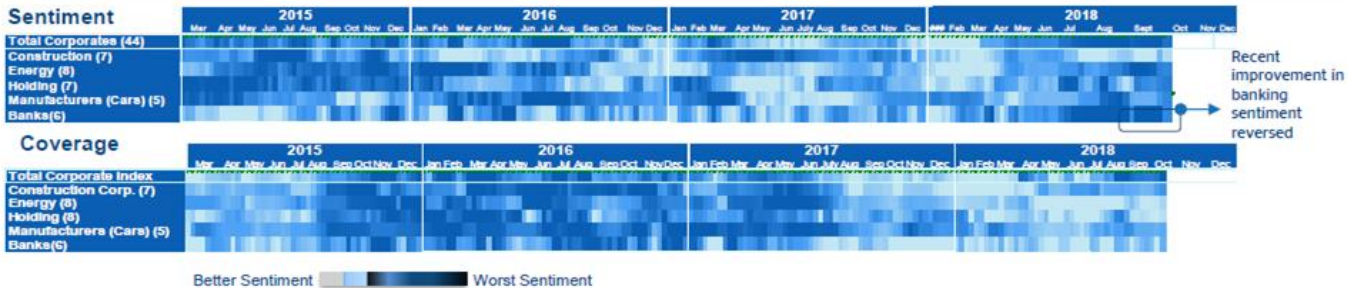
TURKEY: UNEMPLOYMENT RATE (SA) NOWCAST



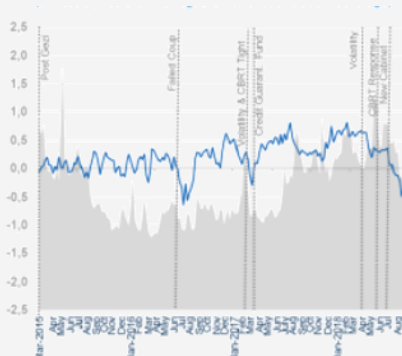
Economics in Real Time and High Definition: Media and Google Trends

Corporate news Sentiment can provide us “Early Warning Signals” of corporate balance sheet health...

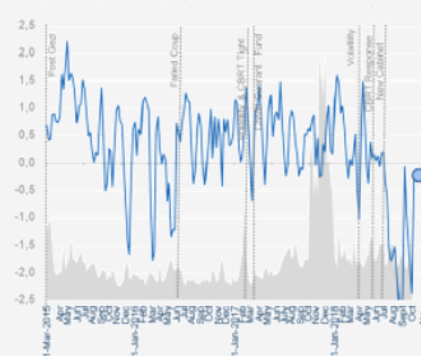
TURKEY: BBVA RESEARCH MEDIA SENTIMENT AND COVERAGE ON TURKISH CORPORATES



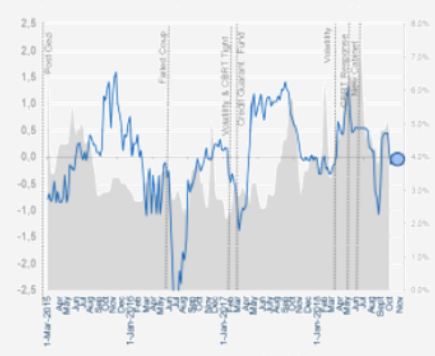
TOTAL CORPORATES



BANKS



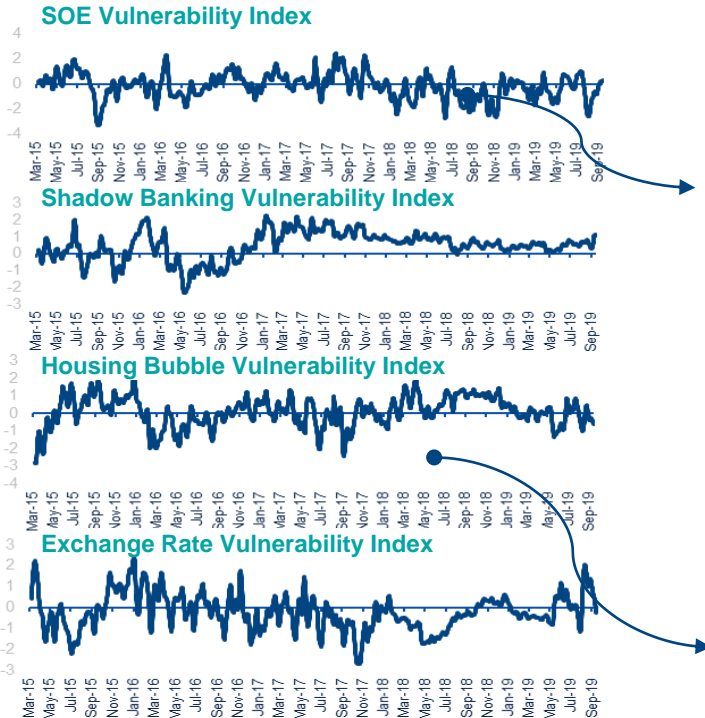
MANUFACTURERS



Economics in Real Time and High Definition: Media and Google Trends

And we can develop hybrid Indicators (Hard Data & Sentiment Data) to disentangle risks in China

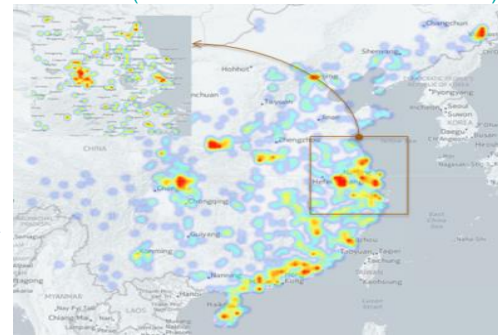
CHINESE VULNERABILITY SENTIMENT INDEX (CVSI)



CHINA SOE MAP (SENTIMENT ON SOE)



GEOGRAPHICAL ANALYSIS HOUSING PRICES (SENTIMENT ON HOUSING PRICES)



You can find us at:



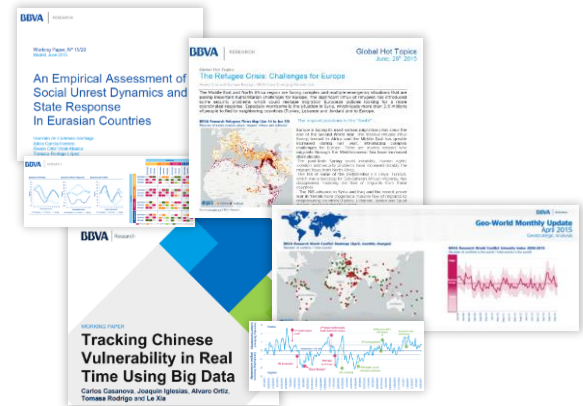
www.bbva.com



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Thank you!

The use of Big Data at BBVA Research

to better understand the society,
the economy and the world

Google Cloud Financial Services Day
November 2019