

BBVA Research

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# **WebSite de BBVA Research**

## **Big Data & IA**

**Methodology**

# A real-time and HD view of the economy

**A high-frequency, high-definition (HD) snapshot of economic, geopolitical and social developments (Transactions and Text)**

Daily Data

Robustness and Validation

High quality

Leading signals

Differential Analysis

Interactive and customizable website

Frontier use of Big Data & AI

# What's in the Geopolitics Section : Geopolitics, Social and Global Issues captured in News by AI sentiment

## Geopolitics

Follow here our media sentiment indicators developed with AI techniques to analyze the global geopolitical landscape

Geopolitics & economics Global Issues

Real time media sentiment indicators per country to monitor the global geopolitical landscape

### Economic sentiment

It captures the sentiment and media coverage of news about the economy in the country

Show more

### Economic Policy Uncertainty

It collects news about the country's economic policy uncertainty (monetary, fiscal and regulatory policies)

Show more

### Trade Policy Uncertainty

Global trade faces several challenges. We disentangle between the perception to verbal a material cooperation news articles to trade

Show more

### Geopolitical risk

It captures the country's geopolitical events and associated risks

Show more

### Political tensions

It monitors the country's political instability, uncertainty and fragmentation

Show more

### Protests

It is based on the media coverage regarding so protests or unrest in the country

Show more

### Conflicts

It covers the media coverage of armed conflicts, which go beyond protests

Show more

### Bilateral tensions

It collects news that are speaking about two countries/regions to monitor their relationship

Show more

## Geopolitics

Follow here our media sentiment indicators developed with AI techniques to analyze the global geopolitical landscape

Geopolitics & economics Global Issues

Media sentiment and web searches indicators per country to study the performance of the main hot topics with an impact on the global geopolitics

### Semiconductors

Sentiment to semiconductor chips, which are essential to modern technologies and play a critical role in some key strategic industries

Show more

### Cyberattacks

Perception on Cybercrime, one of the main risks and concerns in the next decade

Show more

### Artificial Intelligence

AI has become a major global issue, with a great potential for the society, but challenges too. We analyze the perception of AI by countries

Show more

### Environment

The environment represents one of the main global challenges ahead. Our analysis breaks it down into key dimensions such as public sentiment toward climate change, biodiversity, droughts, and floods

Show more

### Inequality

Social and income inequality is a major issue. We monitor the sentiment of inequality over time and by countries

Show more

# Geopolitical and social indicators with data from news media

What transformations they undergo and how to interpret them

## Methodology and transformation

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- Indicators constructed from **international, national, regional, and local media data, classified by language and media origin (local vs. foreign).**
- **Use of Machine Learning (PLN) and AI techniques** to capture the set of terms for monitoring different topics. **The algorithms capture the coverage and sentiment of the news.**
- Depending on the meaning of the indicator, only the coverage in its construction or coverage multiplied by sentiment is considered.
- The data are presented as a 28-day moving average and standardized with respect to the indicator's own history (they have a mean of zero and a variance of 1).

## Interpretation and usage guidelines

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- **Interpretation based on the indicator** (risk, uncertainty, sentiment, etc.). Positive (negative) values indicate higher (lower) risk/uncertainty/sentiment relative to the average for the period 2017-present for each indicator in each country.
- **The evolution of the indicators is analyzed in relation to their historical values** (they are not numerically comparable between countries).
- The **28-day moving average** smooths the evolution of the indicators and captures monthly inertia.
- **The indicators show signals based on media coverage, not official data.** They are useful for showing trends, changes, or turning points and quantifying issues for which there is no official data..

# Geopolitical and social indicators with data from news media

## Methodology References

We have developed a daily tracker with weekly updates to monitor protest and conflict indicators for every country in the world from 2017 to present day. To construct this, we use a rich 'big database' of international events ([GDEL](#)), created by [Leetaru and Schrod](#) ([2013](#)). GDEL is an open-source database which extracts and parses digital news monitoring world events covered by news media from nearly every corner of the world, whether broadcast, printed or published on the web, in over 100 languages, every moment of every day, updated every 15 minutes. Thus, it contains a comprehensive and high resolution catalog of geo-referenced events and themes.

Using different dictionaries, several thousands of taxonomies and themes are identified in the news pieces to classify the information. The algorithms used by GDEL also identify emotions, organizations, locations, news sources and events across the world as well as their average sentiment using Natural Language Processing (NLP) techniques and the lexicon approach.

Focusing on sentiment, once each news piece is translated into English, GDEL applies more than 40 different dictionaries that classify words associated with positive and negative tone to compute the average "tone" of all documents containing one or more mentions to the events we are looking for. The score ranges from -100 (extremely negative) to +100 (extremely positive), although common values range between -10 and +10, with 0 indicating neutral. Every processed socio-political event in GDEL is coded using the [Conflict and Mediation Event Observations](#) (CAMEO) event coding system developed by [Schrod](#) and [Yilmaz \(2007\)](#). CAMEO is a broadly used coding scheme to systematize the analysis of political and social events and divide them in a scale ranging from material and verbal cooperation to verbal and material conflict

# Geopolitical and social indicators with data from news media

## Methodology References

### BBVA Economic Sentiment Index

This is an index originally constructed by BBVA Research based on the tone and coverage associated with the GDELT searches with the next set of keywords:

"(economic activity OR economic growth OR economic decline OR economic performance OR economic output OR GDP OR national accounts OR value added OR recession)".

The index construction is a weighted product made of the tone (i.e. associated sentiment) and relative coverage (i.e. number of news related to ECONOMICS divided by the total number of published news). The information is collected at the country level and aggregated by day. In order, present homogeneous indicators, all the indices are normalized (minus average and divided by standard deviation) and transformed into a 28-days moving average. The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar since we are interested in identifying the events that stand out from the normal behavior of the indicator.

# Geopolitical and social indicators with data from news media

## Methodology References

## BBVA Economic Policy Uncertainty Index

This is an index originally constructed by BBVA Research based on the relative coverage associated with the GDELT searches with the next country-specific set of keywords:

- United States: "United States (uncertainty OR uncertain) (economic OR economy) (congress OR legislation OR white house OR regulation OR federal reserve OR deficit)"
- China: "China (uncertain OR uncertainty) (economy OR economic OR business) (fiscal OR monetary OR Commission OR bank OR legislation OR tax OR bonds OR debt OR tariff OR deficit)"
- Canada: "Canada (uncertain OR uncertainty)(economic OR economy)(policy OR tax OR spending OR regulation OR central bank OR budget OR deficit)"
- Mexico: "Mexico (economic OR economy) (uncertain OR uncertainty) (regulation OR deficit OR budget OR Bank OR BdeM OR Banxico OR congress OR senate OR deputies OR legislation OR taxes OR Federal Reserve)"
- Spain: "Spain (uncertainty OR uncertain OR instability OR risk) (economic OR economy) (parliament OR government OR Hacienda OR deficit OR budget OR expenditure OR debt OR taxes OR law OR reform OR regulation OR Bank)"
- Australia: "Australia (uncertain OR uncertainty) (economic OR economy) (regulation OR Reserve Bank of Australia OR RBA OR deficit OR tax OR taxation OR taxes OR parliament OR senate OR cash rate OR legislation OR tariff OR war)"
- Brazil: "Brazil (uncertain OR uncertainty) (economic OR economy) (regulation OR deficit OR budget OR tax OR central bank OR Alvorada OR Planalto OR congress OR senate OR deputies OR legislation OR law OR tariff)"
- Chile: "Chile (uncertain OR uncertainty) (economic OR economy) (politics OR tax OR regulation OR reform OR congress OR senate OR spending OR debt OR budget OR Central Bank OR Ministry of Finance)"
- Colombia: "Colombia (economy OR economic) (uncertainty OR uncertain) (politics OR politician OR government OR tax OR reform OR deficit OR debt OR spending OR congress OR crisis OR Bank OR Ministry OR corruption OR peace OR conflict OR subsidy)"
- France: "France (uncertain OR uncertainty) (economic OR economy) (congress OR legislation OR regulation OR central bank OR ECB OR deficit)"
- Germany: "Germany (uncertain OR uncertainty) (economic OR economy) (congress OR legislation OR regulation OR central bank OR ECB OR deficit)"
- India: "India (uncertain OR uncertainty OR uncertainties) (economic OR economy) (regulation OR central bank OR monetary policy OR policymakers OR deficit OR legislation OR fiscal policy)"
- Pakistan: "Pakistan (uncertainty OR uncertain OR unpredictable OR unclear OR unstable) (economics OR economy) (regulation OR policy OR bank OR SBP OR FBR OR tax OR parliament OR deficit OR government OR reserves OR taxes OR legislation)"
- Russia: "Russia (uncertain OR uncertainty) (economic OR economy) (policy OR tax OR spending OR regulation OR central bank OR law OR Duma OR budget)"
- Turkey: "Turkey (uncertain OR uncertainty) (economic OR economy)"
- United Kingdom: "(United Kingdom OR UK) (uncertain OR uncertainty) (economic OR economy) (policy OR tax OR spending OR regulation OR Bank of England OR budget OR deficit)"
- All other countries: "{COUNTRY\_NAME} (uncertain OR uncertainty) (economic OR economy) (policy OR tax OR spending OR regulation OR central bank OR budget OR deficit)"

The specific choice of keywords for each country tries to replicate the methodology presented by Baker, Bloom and Davis in 2016 in their paper "Measuring Economic Policy Uncertainty" (reference). The constructed index corresponds to the relative coverage (i.e. number of news related to EPU/total number of published news) of EPU in each country. The information is collected at the country level and aggregated by day. In order to present homogeneous indicators, all the indices are smooth with a 28-day moving-average and normalized (minus average and divided by standard deviation). The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar, since we are interested in identifying the events that stand out from the normal behavior of the indicator.

# Geopolitical and social indicators with data from news media

## Methodology References

### BBVA Trade Policy Uncertainty Index

This is an index originally constructed by BBVA Research based on the relative coverage associated with the GDELT searches with the next set of keywords: "(tariff OR tariffs OR import OR imports OR export OR exports OR trade OR dumping OR antidumping OR GATT OR WTO) (duty OR duties OR barrier OR barriers OR ban OR bans OR tax OR taxes OR subsidy OR subsidies)". The specific choice of keywords tries to replicate the methodology presented by Dario Caldara, Matteo Iacoviello, Patrick Molligo, Andrea Prestipino, and Andrea Raffo in 2020 in their paper "The Economic Effects of Trade Policy Uncertainty" (reference).

The constructed index corresponds to the relative coverage (i.e. number of news related to TPU/total number of published news) of TPU in each country. The information is collected at the country level and aggregated by day. In order to present homogeneous indicators, all the indices are smooth with a 28-day moving-average and normalized (minus average and divided by standard deviation). The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar, since we are interested in identifying the events that stand out from the normal behavior of the indicator.

# Geopolitical and social indicators with data from news media

## Methodology References

### BBVA Geopolitical Risk Sentiment Index

This is an index originally constructed by BBVA Research based on the tone and coverage associated with the GDELT search of the intersection of two sets of keywords, according to the methodology of Caldara, Dario and Matteo Iacoviello (2022). The data should contain at least one theme included in the GDELT taxonomy of each group (group 1 and group 2).

- Group 1 includes the following topics: war, conflict, hostvisit, revolutionary violence, appraiser, rebellion, violent unrest, peacekeeping, mutual recognition agreements, ceasefire, treaties, parliament and legislatures, military, troop, nuclearpower, hydropower, terror, rebels guerrillas and insurgents, kidnap, alliance, group popular resistance committee, insurgency, group social resistance, military cooperation, navy, aerial photographer and/or rebels.
- Group 2 includes the following topics: act harmthreaten, advertiser, risk, concern worldwide, speciesendangered, crisis, trouble, dispute boards, dismissal procedures, boycott, disruption, slfid military buildup, sanctions, blockade, financial vulnerability and risks, soc quarantine, unrest ultimatum, makestatement, outbreak, announcer, armourer, persecution, crash, raid, armedconflict, act forcepostrue, bombthreat, kill, strike.

The index construction is a weighted product made of the tone (i.e. associated sentiment) and relative coverage. We multiply the resulting indicator by -1 for a sake of interpretation. The information is collected at the country level and aggregated by day. In order to present homogeneous indicators, all the indices are normalized (minus average and divided by standard deviation) and transformed into a 28-days moving average. The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar since we are interested in identifying the events that stand out from the normal behavior of the indicator.

# Geopolitical and social indicators with data from news media

## Methodology References

### BBVA Political Tensions Sentiment Index

This is an index originally constructed by BBVA Research based on the tone and coverage associated with the GDELT search of keywords for political instability, political uncertainty, political crisis, political polarization, political extremism, political turmoil and political conflict and the theme included in the GDELT taxonomy USPEC\_POLITICS\_GENERAL1. This theme includes news related to the following fields:

Elections and campaigns, political parties and politicians, government institutions and branches, executive orders and presidential actions, Congressional activities and legislation, supreme Court decisions and judicial appointments, political scandals and corruption, civil rights and social justice issues, foreign policy and international relations, national security and defense policy, Immigration policy and border security, Healthcare policy and reform, environmental policy and regulation, tax policy and reform, gun control and firearms policy, education policy and reform, Infrastructure policy and investment, social welfare policy and programs, civil liberties and privacy concerns, political polarization and partisanship.

The keywords contained in the query use “OR” statements so that the mention of any of them returns news articles containing any one of them as long as the news articles are classified within the GDELT taxonomy theme USPEC\_POLITICS\_GENERAL1.

The index construction is a weighted product made of the tone (i.e. associated sentiment) and relative coverage (i.e. number of news related to USPEC\_POLITICS\_GENERAL1/total number of published news). We multiply the resulting indicator by -1 for a sake of interpretation. The information is collected at the country level and aggregated by day. In order, present homogeneous indicators, all the indices are normalized (minus average and divided by standard deviation) and transformed into a 28-days moving average. The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar since we are interested in identifying the events that stand out from the normal behavior of the indicator.

# Geopolitical and social indicators with data from news media

## Methodology References

### BBVA Protest Index

We collect news articles about protests all over the world according to the definition of protest coming from the CAMEO taxonomy. Particularly, we capture news articles speaking about: demonstration or rally, demonstration for leadership change, demonstration for policy change, demonstration for rights, demonstration for change in institutions and regime, conducting hunger strikes for leadership change, conducting hunger strikes for policy change, conducting hunger strikes for rights, conducting hunger strikes for change in institutions and regime, conducting previously unspecified hunger strikes, conducting strikes or boycotting for leadership change, conducting strikes or boycotting for policy change, conducting strikes or boycotting for rights, conducting strikes or boycotting for change in institutions and regime, conducting previously unspecified strikes or boycotting, obstructing passage or blocking, obstructing passage to demand leadership change, obstructing passage to demand policy change, obstructing passage to demand rights, obstructing passage to demand change in institutions and regime, protesting violently or rioting, engaging in violent protest for leadership change, engaging in violent protest for policy change, engaging in violent protest for rights, engaging in violent protest for change in institutions and regime, engaging in previously unspecified political dissent.

We use the coverage to both types of news articles on a daily and country basis to construct an intensity index for protests. The number of protests each day and each country is divided by the total number of all events recorded by GDELT for that day in each country to create a protest intensity score by country. This way, the indicator tracks the level of prevalence of protest activity over time, correcting for the exponential rise in media coverage over the last years and the imperfect nature in which news are processed by computers.

We apply a moving average of 28 days (to include four complete weeks with the same number of days of the weeks) to reduce noise of daily information and identify signals more clearly

# Geopolitical and social indicators with data from news media

## Methodology References

### BBVA Conflict Index

We collect information on news articles about conflict all over the world, based on the coverage associated with the GDELT search of the theme included in the GDELT taxonomy ARMED\_CONFLICT. This topic includes events like: use conventional military force, impose blockade, restricting movement, occupying territory, fighting with artillery and tanks, employing aerial weapons, violating ceasefire, engaging in mass expulsion, engaging in mass killings, engaging in ethnic cleansing, using previously unspecified unconventional mass violence, using chemical, biological, or radiological weapons, detonating nuclear weapons, using weapons of mass destruction.

The index construction is based on the relative coverage (i.e. the number of news related to ARMED\_CONFLICT divided by the total number of published news). The information is collected at the country level and aggregated by day. In order to present homogeneous indicators, all the indices are normalized (minus average and divided by standard deviation) and transformed into a 28-days moving average. The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar since we are interested in identifying the events that stand out from the normal behavior of the indicator.

# Geopolitical and social indicators with data from news media

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## BBVA Bilateral Tensions Index

In order to monitor the relationship between two countries and its evolution over time, we use all the events classified in the CAMEO taxonomy as verbal conflict or material conflict, where the actor that makes the action is first one that appears in the legend and the actor that receives that action is the second country or region in the legend. That is, for example, in the series NATO-Russia we get all news articles classified as verbal or material conflict according to the CAMEO taxonomy where NATO is the active actor and Russia the passive actor to reflect the stance of NATO towards Russia.

The index construction is a weighted product made of the tone (i.e. associated sentiment) and relative coverage. We multiply the resulting indicator by -1 for a sake of interpretation. The information is collected at the country level and aggregated by day. In order, present homogeneous indicators, all the indices are normalized (minus average and divided by standard deviation) and transformed into a 28-days moving average. The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar since we are interested in identifying the events that stand out from the normal behavior of the indicator.

# Global topics using media data

## Methodology References

### **BBVA Semiconductor Sentiment Index**

This is an index originally constructed by BBVA Research based on the tone and coverage associated with the GDELT search of “semiconductors” for all countries. The resulting news obtained after the query is done contains information relating to semiconductor-related news and topics for each country.

The index construction is a weighted product made of the tone (i.e. associated sentiment) and relative coverage (i.e. number of news related to semiconductors divided by the total number of published news). The information is collected at the country level and aggregated by day. In order, present homogeneous indicators, all the indices are normalized (minus average and divided by standard deviation) and transformed into a 28-days moving average. The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar since we are interested in identifying the events that stand out from the normal behavior of the indicator.

# Global topics using media data

## Methodology References

### **BBVA Cyberattacks Sentiment Index**

This is an index originally constructed by BBVA Research based on the tone and coverage associated with the GDELT search of the theme included in the GDELT taxonomy CYBER\_ATTACK.

The index construction is a weighted product made of the tone (i.e. associated sentiment) and relative coverage (i.e. number of news related to CYBER\_ATTACK divided by the total number of published news). We multiply the resulting indicator by -1 for a sake of interpretation. The information is collected at the country level and aggregated by day. In order, present homogeneous indicators, all the indices are normalized (minus average and divided by standard deviation) and transformed into a 28-days moving average. The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar since we are interested in identifying the events that stand out from the normal behavior of the indicator.

# Global topics using media data

## Methodology References

### **BBVA Artificial Intelligence Sentiment Index**

This is an index originally constructed by BBVA Research based on the tone and coverage associated with the GDELT search of the following “artificial intelligence” or “AI” for all countries. The resulting news obtained after the query is done contains information relating to artificial intelligence-related news and topics for each country.

The index construction is a weighted product made of the tone (i.e. associated sentiment) and relative coverage (i.e. number of news related to artificial intelligence divided by the total number of published news). The information is collected at the country level and aggregated by day. In order, present homogeneous indicators, all the indices are normalized (minus average and divided by standard deviation) and transformed into a 28-days moving average. The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar since we are interested in identifying the events that stand out from the normal behavior of the indicator.

# Global topics using media data

## Methodology References

### BBVA Environment Sentiment Index

This is an index originally constructed by BBVA Research based on the tone and coverage associated with the GDELT search of the theme included in the World Bank taxonomy: WB\_567\_CLIMATE\_CHANGE. Such a theme includes news related to the following definition of climate change: Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time (i.e., decades to millions of years). Climate change may refer to a change in average weather conditions, or in the time variation of weather around longer-term average conditions (i.e., more or fewer extreme weather events). Narrower themes included in this broader concept are Climate Change, Adaptation, Climate Change Law, Climate Change Mitigation, Climate Finance, Climate Resilient Development, Climate Science and Climate Services. The keywords “climate change” are included as they allow higher accuracy in searches. The composite index presents 3 versions.

- **BBVA Biodiversity Sentiment Index:** this is an index originally constructed by BBVA Research based on the tone and coverage associated with the GDELT search of the theme included in the World Bank taxonomy WB\_2084\_BIODIVERSITY. Such a theme includes topics directly related to environmental sustainability such as terrestrial and marine biodiversity, transboundary biosphere reserve, etc.
- **BBVA Drought Sentiment Index:** this is an index originally constructed by BBVA Research based on the tone and coverage associated with the GDELT search of the theme included in the GDELT taxonomy: NATURAL\_DISASTER\_DROUGHT.
- **BBVA Water-Induced-Disasters Sentiment Index:** This is an index originally constructed by BBVA Research based on the tone and coverage associated with search of any of the following keywords: Flood, tsunami, monsoon, heavy rain, tropical storm, high water, storm surge, torrential, tidal wave, typhoon, cyclone, flash flood, intense rainfall or storm damage.

Indices construction is a weighted product made of the tone (i.e. associated sentiment) and the coverage ratio (i.e. number of news related to the defined topics before/total number of published news). We multiply the resulting indicator by -1 for a sake of interpretation. The information is collected at the country level and aggregated by day. In order, present homogeneous indicators, all the indices are normalized (minus average and divided by standard deviation) and transformed into a 28-days moving average.

# Global topics using media data

## Methodology References

### **BBVA Inequality Sentiment Index**

This is an index originally constructed by BBVA Research based on the tone and coverage associated with the GDELT search of the theme included in the GDELT taxonomy INEQUALITY.

The index construction is a weighted product made of the tone (i.e. associated sentiment) and relative coverage (i.e. number of news related to INEQUALITY divided by the total number of published news). We multiply the resulting indicator by -1 for a sake of interpretation. The information is collected at the country level and aggregated by day. In order, present homogeneous indicators, all the indices are normalized (minus average and divided by standard deviation) and transformed into a 28-days moving average. The moving average transformation aims to reduce noise of daily information and identify signals more clearly. We do not perform any outlier treatment or similar since we are interested in identifying the events that stand out from the normal behavior of the indicator.

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