A mathematical model determines which nations are more stable and which are more likely to break up

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According to the model, when countries were paired together, those that would be more inclined to unite would be Austria and Switzerland, Denmark and Norway and France with Great Britain. Credit: Niklas Morberg

Thanks to a new model created by an international research group, it is now possible to predict which European countries are more likely to become united or which are more likely to break up. It does so by not only considering demographic and economic criteria but, most ingeniously of all, culture and genetics.

Ignacio Ortuño Ortín, researcher at the Carlos III University of Madrid (UC3M) and co-author of the study that was published in the *Journal of Economic Growth* states that "our method quantitatively analyses the

stability and disintegration of European nations. It also estimates the implicit benefits of a larger European Union or, in other words, what would happen if the EU were one country. Furthermore, we give empirical support for the use of genetics as an indicator of cultural heterogeneity amongst nations."

It has always been common knowledge that the more nations that join together in unity, the greater the profits. This is because the market gets bigger and costs are shared. On the other hand, when many regions or countries are brought together there is a difference in populations, both economically and culturally. This, in turn, implies a high cost. There was a need for methodology that quantitatively analyses these two aspects using specific cases.

A group of researchers from the UC3M, the Toulouse School of Economics (France), the Southern Methodist University (Dallas, USA) and the New Moscow School of Economics (Russia) have worked on this.

The [mathematical model](#) that they put forward includes factors such as a country's wealth alongside size and cultural differences in terms of population genetics. According to the expert, the most difficult aspect to quantify when making predictions is the 'measurement' of countries from a cultural point of view. Ortuño guarantees that this is the most original part of the study. We take population genetics data and then use it to support the fact that such [genetic](#) distance between regions can be used as a good tool when approaching cultural distance.

According to the scientists, this does not suggest that genetics explains culture but that there is a correlation between the two. This means that populations that have mixed more display greater cultural similarity. "We are not saying that genes explain the way a person thinks," clarifies Ortuño.

In order to put consistency of their model to the test, a real-life case was chosen: the disintegration of Yugoslavia. The authors of the study found that the economic differences between its republics determined the order of disintegration - a fact that coincided with their model. Likewise, cultural differences, although small, played a key role in triggering instability.

Predictions for other countries

The model's first theoretical predictions were made by pairing two countries based on the hypothetical situation of Europe being a single country and on the regions that are more prone to separate from their current nation.

If the European Union were to become stronger and had a common fiscal as well as monetary policy (both of which together would turn it into a single country), in the long run, Greece and Portugal would benefit the most. In terms of percentages, Portugal would benefit from an increase in wealth of 13%, Greece would see an increase of 11.9% and Ireland with 8.9% and Finland with 8% would follow. Spain would see a growth of 4.1% whereas those countries that would benefit least would be Germany, followed by Italy and then France.

The researchers have also predicted what regions have more incentives to separate from the nations to which they belong. "We are not suggesting that it would be beneficial for these regions to separate but it is true that, in relative terms, the Basque Country and Scotland have more incentives," they claim.

According to the model, those that are more inclined to pair up would be Austria and Switzerland, Denmark and Norway and France with Great Britain. Spain would be more interested in uniting with France but "this does not necessarily mean that France would be interested in uniting

with Spain," says Ortuño. He adds that "we avoid taking the strategic decisions of countries into account. This means that our model predicts how much a country would benefit if a union were to occur."

The team is currently working on a new project with collaborators in Moscow who are applying the same method to understand the stability of regions in Russia.

More information: Klaus Desmet, Michel Le Breton, Ignacio Ortuño-Ortín, Shlomo Weber. "The stability and breakup of nations: a quantitative analysis", *Journal of Economic Growth* 16:183, 2011. DOI 10.1007/s10887-011-9068-z

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