When Belgium sneezes, the world catches a cold

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As the eurozone continues to wobble, new analysis of countries' economic interconnectedness finds that some of the countries with the greatest potential to cause a global crash have surprisingly small gross domestic production.

Using data from Bureau Van Dijk - the company information and business intelligence provider - to assess the reach and size of different countries' economies, and applying the Susceptible-Infected-Recovered (SIR) model, physicists from universities in Greece, Switzerland and Israel have identified the twelve countries with greatest power to spread a crisis globally.

The research published today, Thursday 25 November 2010, in New Journal of Physics (co-owned by the Institute of Physics and German Physical Society), groups Belgium and Luxembourg alongside more obviously impactful economies such as the USA in the top twelve.

Using a statistical physics approach, the researchers from the Universities of Thessaloniki, Lausanne and Bar-Ilan used two different databases to model the effect of hypothetical economic crashes in different countries. The use of two different databases aided the avoidance of bias but threw up very similar results.

The data used allowed the physicists to identify links between the different countries, by mapping the global economy to a complex network, and gauge the likelihood of one failed economy having an effect on another.

One network was created using data on the 4000 world corporations with highest turnover and a second using data on import and export relations between 82 countries.

The SIR model, successfully used previously to model the spreading of disease epidemics, is applied to these two networks taking into consideration the strength of links between countries, the size of the crash, and the economic strength of the country in potential danger.

When put to the test with the corporate data, the USA, the UK, France, Germany, Netherlands, Japan, Sweden, Italy, Switzerland, Spain, Belgium and Luxembourg were part of an inner core of countries that would individually cause the most economic damage globally if their economies were to fail.

Using the import/export data, China, Russia, Japan, Spain, UK, Netherlands, Italy, Germany, Belgium, Luxembourg, USA, and France formed the inner core, with the researchers explaining that the difference – particularly the addition of China to this second list – is due to a large fraction of Chinese trade volume coming from subsidiaries of western corporations based in China.

The researchers write, "Surprisingly, not all 12 countries have the largest total weights or the largest GDP. Nevertheless, our results suggest that they do play an important role in the global economic network. This is explained by the fact that these smaller countries do not support only their local economy, but they are a haven for foreign investments."

More information: The researchers' paper can be downloaded for free: iopscience.iop.org/1367-2630/12/11/113043/fulltext

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