

Media big data based continuous monitoring of global risks

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As the world is entering into an era with unprecedented uncertainty, challenges, and crises, continuous monitoring and forewarning of general risks occurring around the globe has become increasingly important. For this purpose, we employ the Global Database of Events, Language (or Location), and Tone (GDELT), which is a massive political science database created for studying worldwide political conflict and instability, and develop an information-theoretical approach to characterize spatiotemporal evolution of general risks happening in the world. Assuming that a country's behavior is largely embodied in the structure of the events it engages and computing the differences in event structures using relative entropy between countries using GDELT's 290 event types derived from news data of 167 countries around the world from 2000 to 2022, we show that greater difference in the behavior of a country relative to the rest of the world signifies the greater degree of its general risk. In particular, the approach predicts the inevitability of the Ukraine-Russia war, if no compromise between NATO and Russia was made. Moreover, if we focus on the part of the curves shown in Fig. 1 after the war broke out in February 24, 2022, we observe that the risks in Ukraine, though temporarily jumped, very soon waned. However, the story in Russia is totally different — the risk has been among the highest in the world since then. This clearly demonstrates the effectiveness of numerous rounds of sanctions on Russia. However, after Ukraine planned a counteroffensive in September, 2022, the risk in Ukraine again has jumped. Therefore, while we can conclude that justice will prevail, there will be hard times ahead, however.

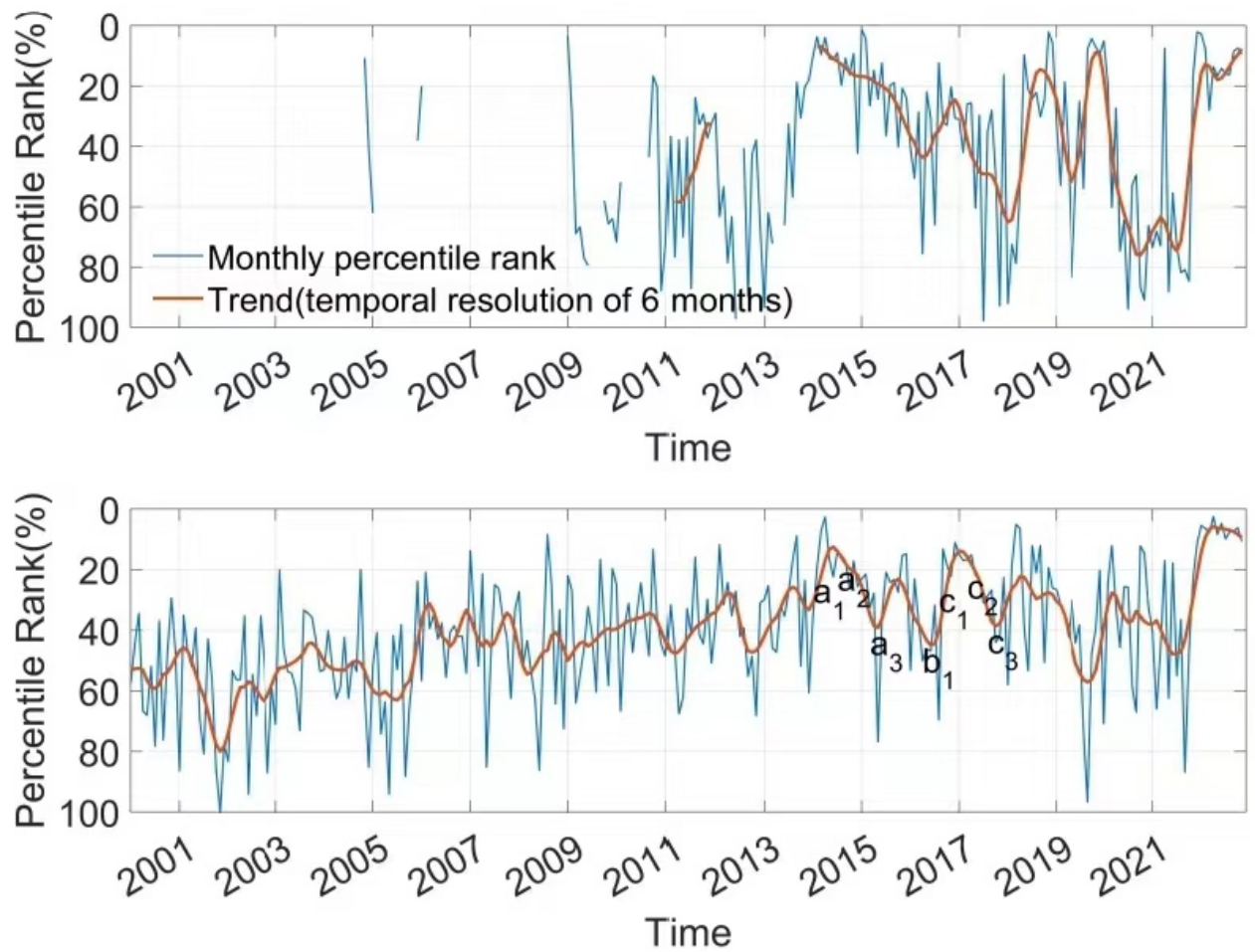


Figure 1: Percentile rank of general risk for Ukraine (top) and Russia (bottom) computed from massive news media data using relative entropy. The blue and the red curves have temporal resolution of 1 month and half year.