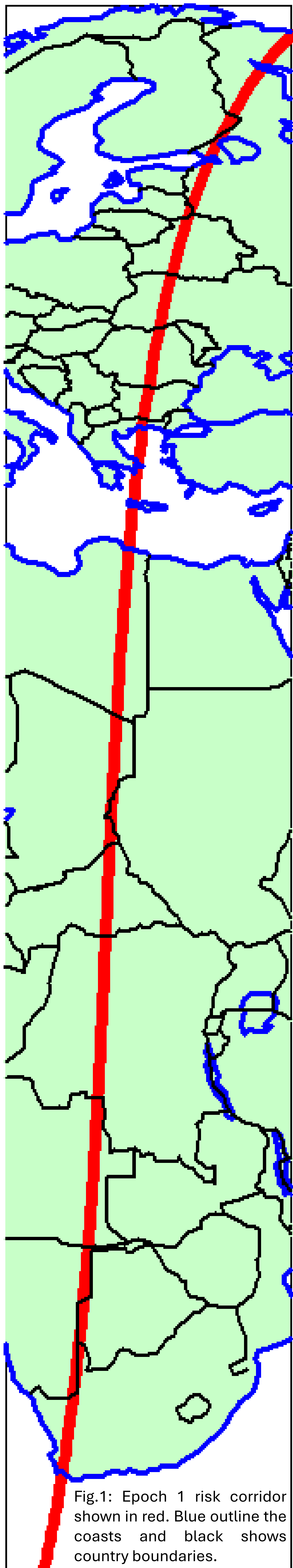


Global Supply Chain Exposure to Asteroid Impacts

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The damage from asteroid impacts is often measured in terms of areal extent or affected populations from the initial effects from blast waves, non-ionizing thermal radiation, and tsunamis (if the impact is over an ocean) [1-4]. Cascading hazards have the potential to extend geographic areas affected and prolong risk to additional populations [5]. Both initial effects and subsequent cascading hazards may have societal consequences beyond just the direct loss of life and property. Supply chain disruption should be added to the list of possible societal (economic) consequences that are not necessarily fully captured by the metrics of affected populations or areal extent of damages from an asteroid impact. Supply chains form a complex network of production and distribution of goods and services. Identifying where supply chains are vulnerable, to local disruption is important for maintaining resilience and can be applied to studies examining the consequences of asteroid impacts. Visualization by [6] of the risk corridor (Fig. 1) provides a qualitative way of identifying potential vulnerabilities from any hazard, including asteroid impacts. While the current version uses 2019 data, and the data resolution is only available by country level outside of the United States, the web application still provides a tool to access possible supply chain disruptions that could be part of pre-impact preparedness (Fig. 2). Preliminary analysis of the epoch 1 risk corridor [7] suggests the countries with the greatest potential impact for supply chain disruptions are: South Africa, Romania, Finland, Ukraine, and Angola, respectively. This study has identified these countries for detailed analysis.

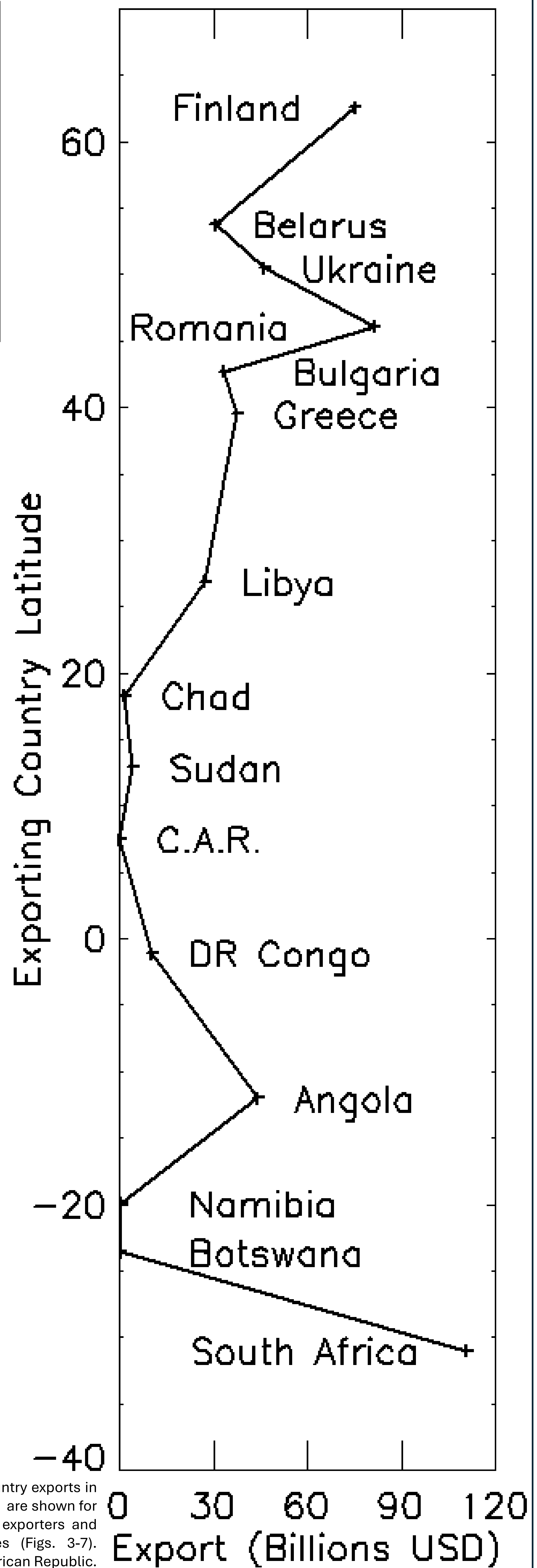
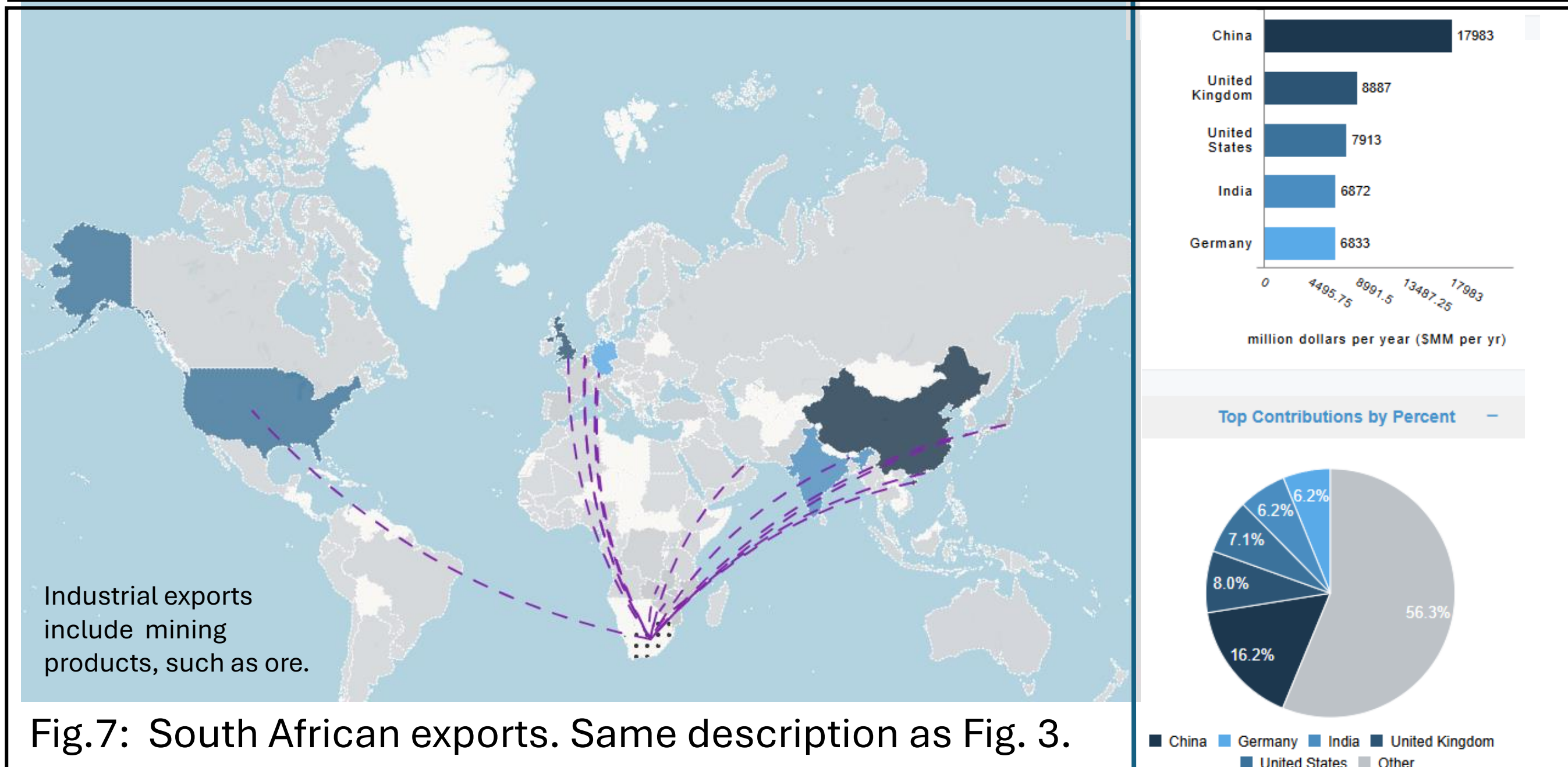
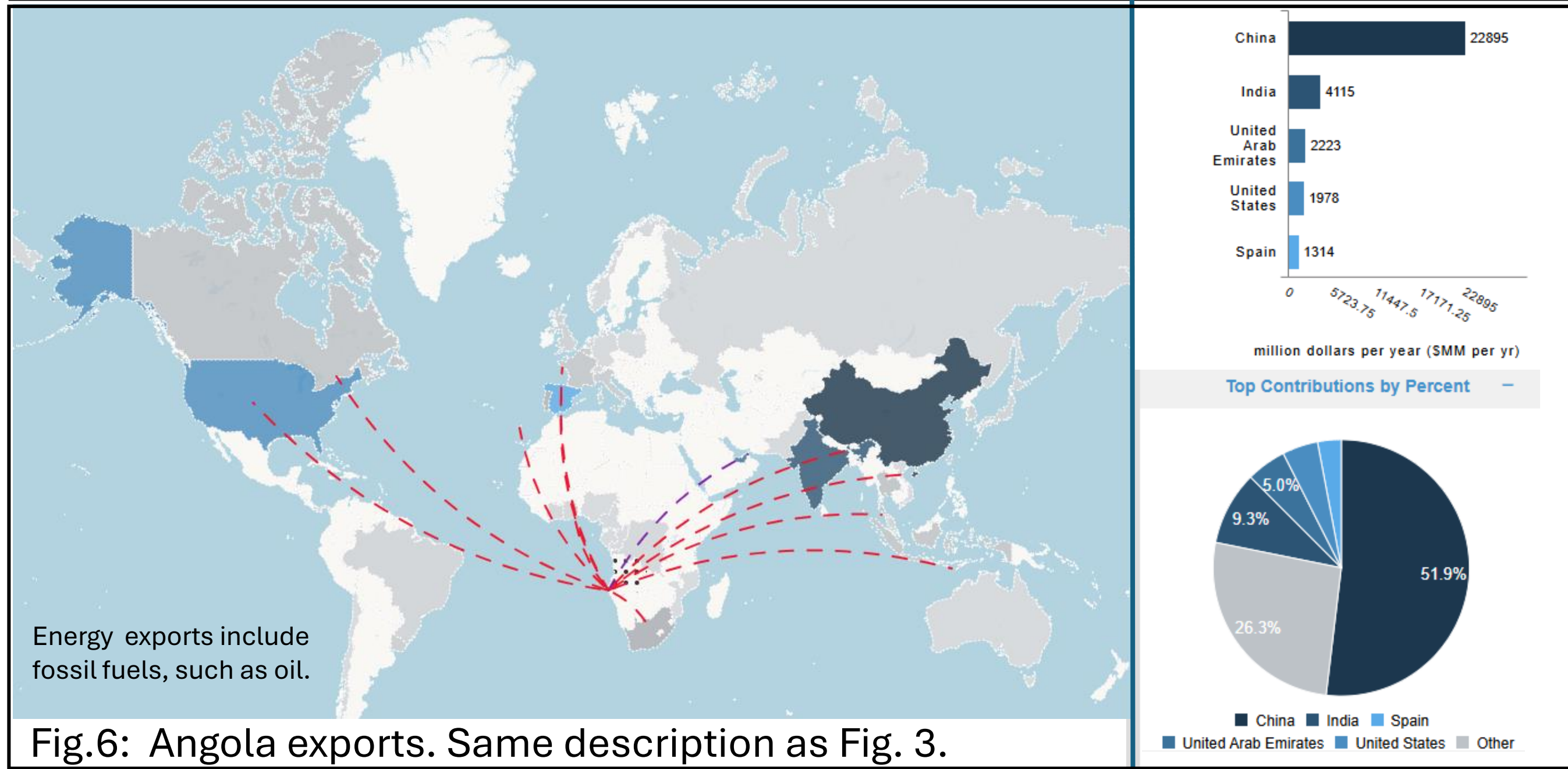
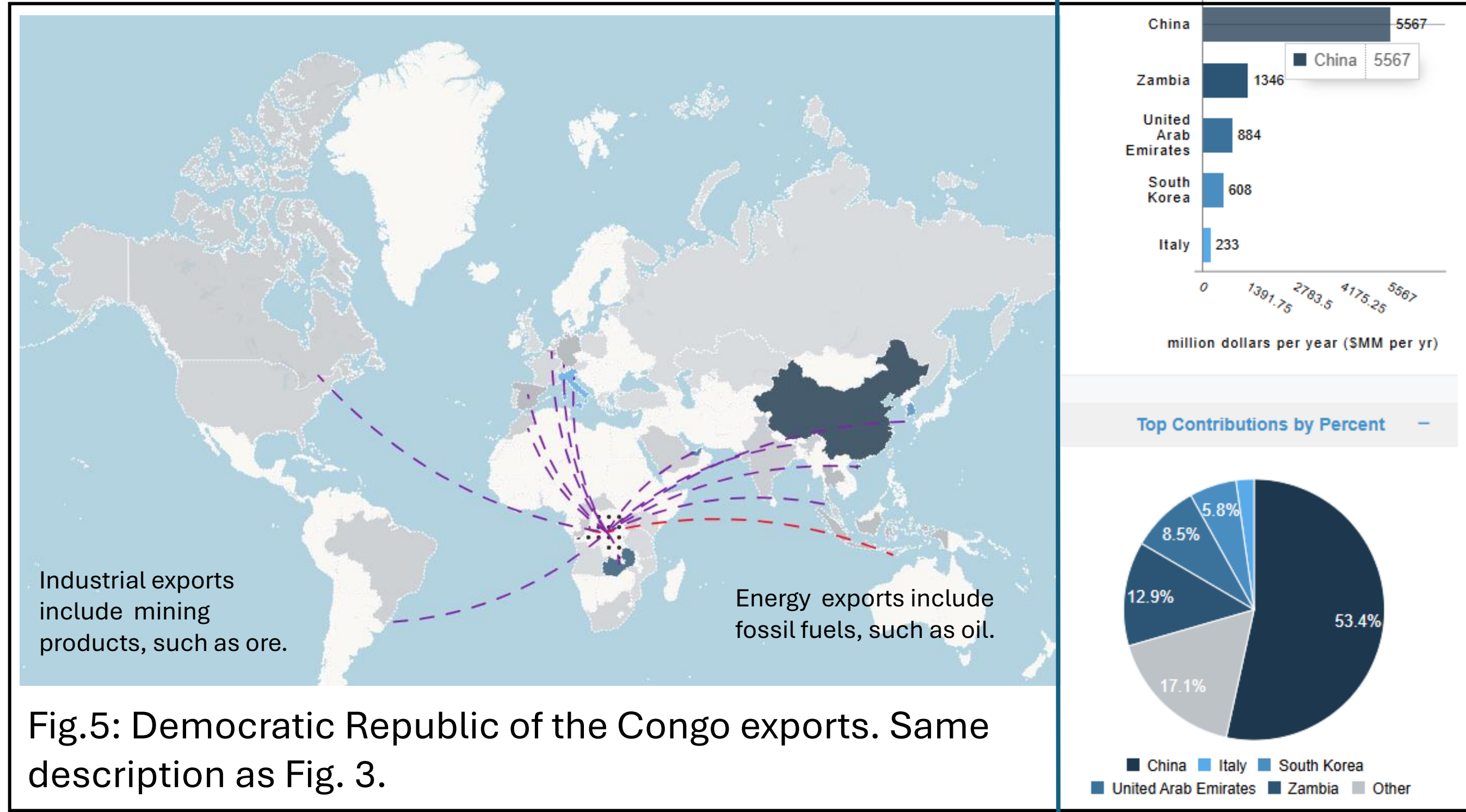
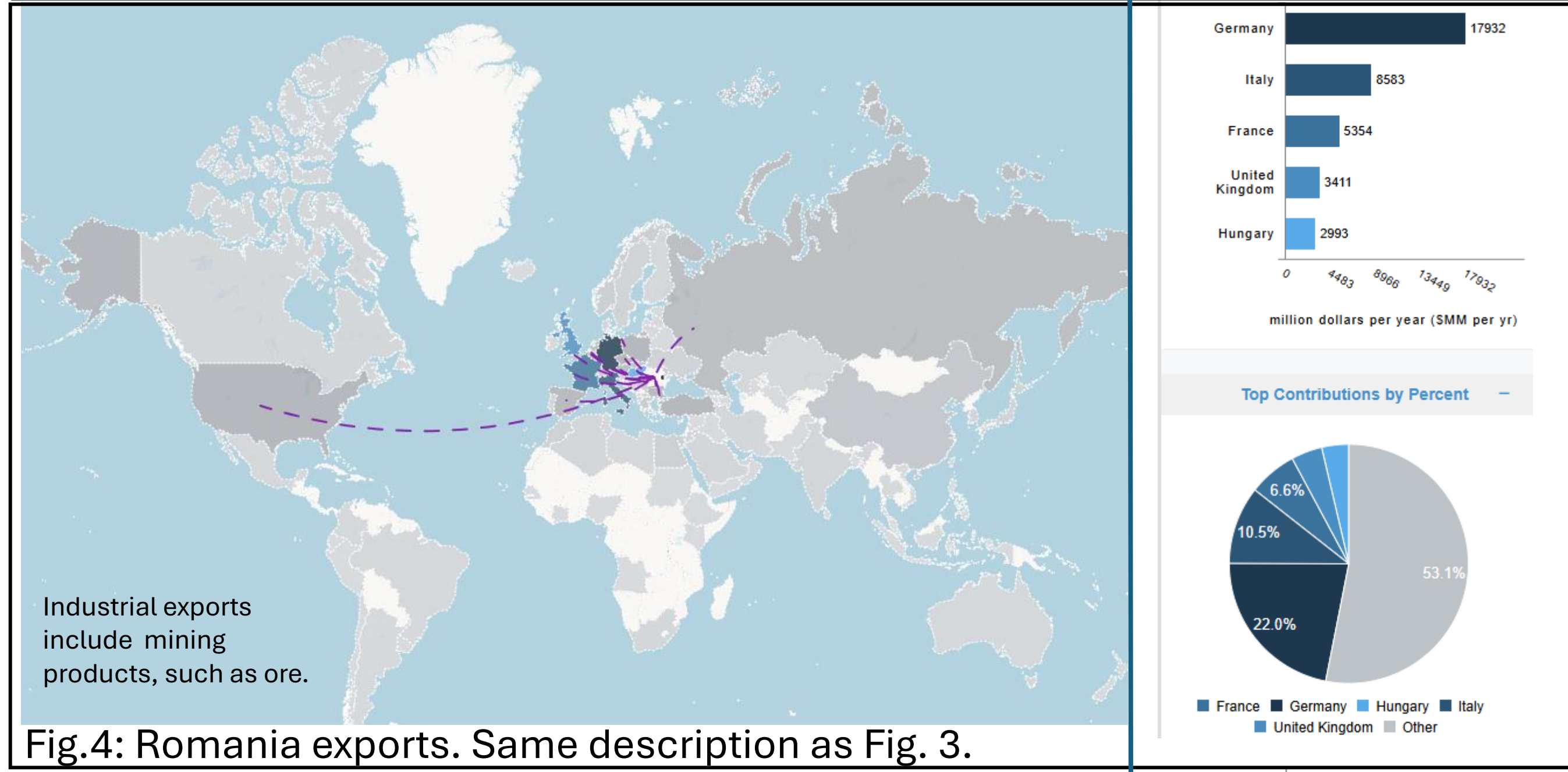
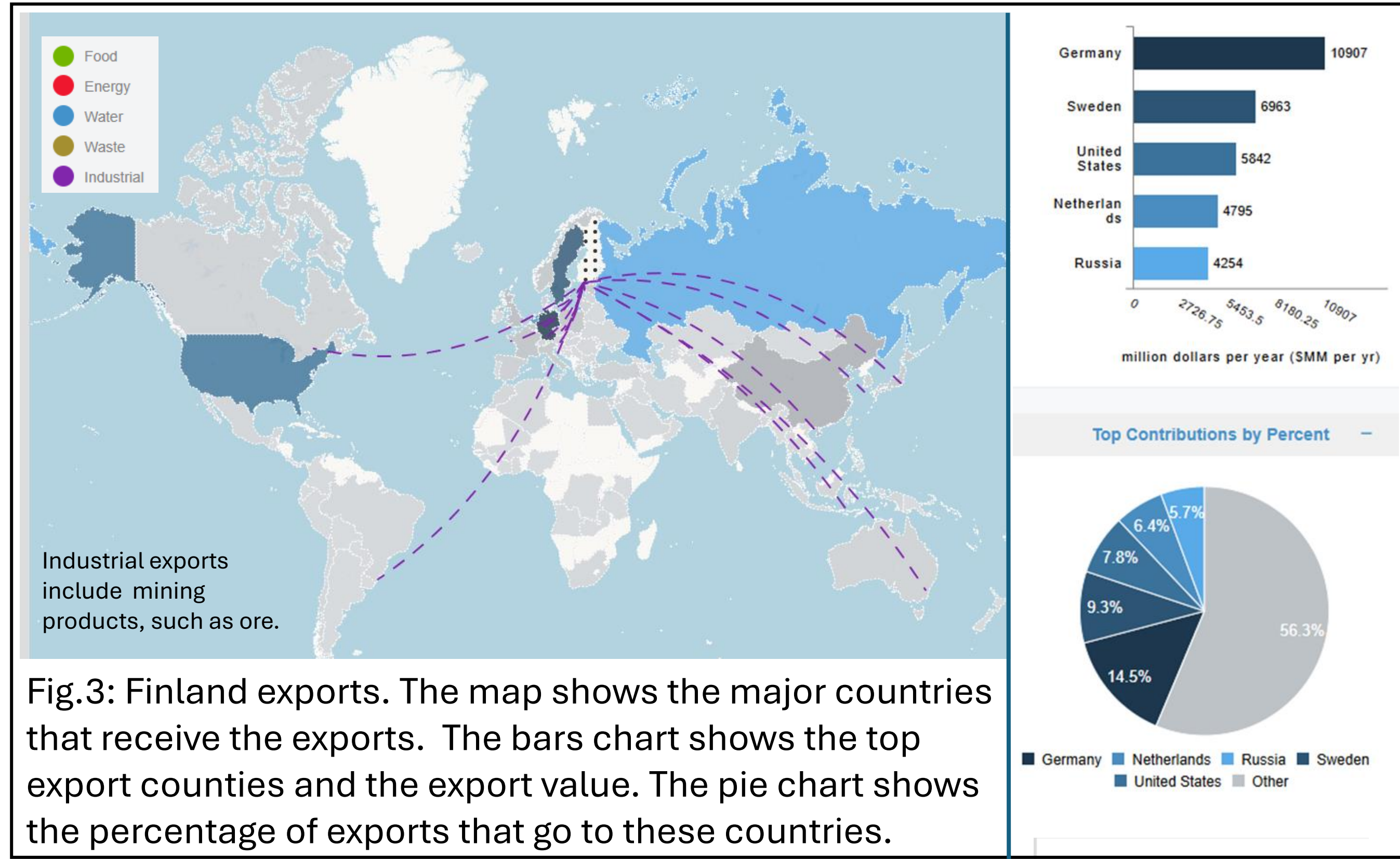


Fig. 2: Risk corridor country exports in billions of USD. Details are shown for five of the high value exporters and the epoch 2 countries (Figs. 3-7). C.A.R. is the Central African Republic. DR Congo is the Democratic Republic of the Congo.

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