Why is asbestos still mined?: Structural path analysis of asbestos mining and manufacturing of asbestos-containing products

Topic: Input-Output Accounts and Statistics
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Despite causing serious health issues, why has asbestos not yet been banned worldwide? Global Burden of Disease (GBD) data attribute 230,000 deaths in 2021 to occupational asbestos exposure and 6 million deaths total from 1990 to 2021. Although most developed countries have already banned asbestos, around 120 developing and semi-developed countries are still using asbestos.
The reason asbestos is not yet banned universally is that stakeholders who benefit economically from using asbestos differ from those who suffer the health risks. For countries using asbestos, prioritizing their own economic interests, to move toward banning asbestos, it may be effective to clarify the economic disadvantages of continuing asbestos use. In particular, clarifying how many workers are potentially exposed to asbestos health risks and what is driving the mining and use of asbestos should provide important scientific insights supporting banning asbestos. However, little previous asbestos-related research has taken an economic approach, with (to our knowledge) no studies having clarified how mining and use of asbestos are induced through global supply chains.
We expanded the OECD Inter-Country Input-Output tables (OECD-ICIOT) for 2014 for both asbestos mining and production of asbestos-containing products to compile an asbestos extended multi-regional input-output table (AMRIOT). Using this AMRIOT, we then estimated the monetary activities of asbestos-related industries and clarified the global flows of mineral asbestos in tonne. To clarify the contribution of asbestos-banned countries, we then estimated, by country and by industry, the quantity and production value of asbestos that were induced by the final demand of each country. We also estimated the number of workers employed in asbestos-related industries.
In our methodological approach, we divided each original OECD-ICIOT industrial sector that includes asbestos mining and the manufacturing sectors of asbestos-containing products, such as textiles, paper, cement, and auto parts, into an asbestos-related sector and a non-asbestos sector, based on the U.S. Geological Survey (USGS) Minerals yearbook and the UN Comtrade Database. We also estimated the number of workers in each asbestos-related industry sector based on individual country's statistics and United Nationsâ€™ data. Using the AMRIOT, we estimated how the asbestos production in the major asbestos mining countries, such as Russia, China, Brazil, and Kazakhstan, is induced by the final demand of trading partner countries using a multi-regional input-output analysis (MRIOA) model. In addition, we conducted a structural path analysis (SPA) to clarify the relationship between countries and industries quantitatively. We tried to evaluate the contribution of each country and the final demands on the amount of mineral asbestos mining, asbestos inputs, and the number of workers employed in asbestos-related industries.
The results showed that 81,406 tonnes of asbestos mining and 807 employees was induced by asbestos-banned countries, accounting for 4% of the total induced in 2014. As an industrial material, asbestos use induced by asbestos-banned countries contributed to the production of cement (40,623 tonnes), textiles (28,182 tonnes), motor parts (6,851 tonnes), and asbestos paper (5,641 tonnes).
Comparing India and China, which use large amounts of asbestos as inputs to their manufacturing sectors, interesting results were obtained. India imported and used 383,475 tonnes of asbestos as inputs for its manufacturing sectors of asbestos-containing products. However, these asbestos-containing product manufacturing industries are strongly connected to domestic industries. Most manufacturing of asbestos-containing products, around 87%, is induced by the final demand for asbestos-containing products in India itself.
Although China is an asbestos-mining country, it imports around 133,125 tonnes from Russia and Kazakhstan. In China, 502,614 tonnes of asbestos were used in the manufacturing sectors of asbestos-containing products, mainly those of motor parts (53%) and the textile industry (32%).

Contrary to India, the Chinese manufacturing sectors of asbestos-containing products are induced not only by China but also by many trading partners along complex paths. In particular, the production activities of the asbestos-containing motor parts industry induce a related path through the motor parts industry, land transportation, and machinery industry via global supply chains. The construction industry also contributed significantly to production in the asbestos cement industry in China.

The results of this study provide scientific knowledge that will support international cooperation to ban asbestos by introducing an economic approach to the field of asbestos research. The method used in the present study can also be applied to estimating hazardous raw materials other than asbestos to clarify their global flows and effects.