

Price shocks, exposure to critical raw materials and innovation

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Abstract

This paper investigates the relationship between exposure to critical raw materials (CRMs) and firms’ innovation performance. We develop a novel measure of CRM exposure by applying natural language processing techniques to patent abstracts and mapping collaboration networks. Using this framework, we analyze the determinants of CRM exposure, its association with innovation outcomes, and the impact of price shocks on firms’ innovative activity. Our findings reveal that CRM exposure is a highly persistent phenomenon shaped by sunk costs, knowledge accumulation, and increasing returns to specialization. Larger firms engaged in extensive collaboration networks are more likely to be exposed, benefiting from greater resource availability and absorptive capacity. Under stable market conditions, CRM exposure is positively associated with both the intensity and specialization of firms’ innovation. However, price shocks substantially undermine innovation performance, particularly in CRM-related technological domains. These results underscore the need for industrial policies that aim to stabilize supply chains, support exposed companies and strengthen the resilience of critical high-tech sectors.

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