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Structural Transformation in Energy-Intensive Manufacturing: The Case of Italian Foundries

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Abstract Summary

The paper examines the structural changes and industrial decline in the Italian foundry sector. The sector operates as a Tier-1 supplier of metal casting components, making it very sensitive to cyclical automotive demand, OEM pricing pressures, and supply chain disruptions. This systemic exposure comes with high direct energy consumption and strict compliance requirements under European environmental policies, including the CBAM. The energy intensity of the foundry industry ranges between 25% to 40% of production costs, while 60% – 70% of its output is forwarded to the automotive industry; tracking structural shocks across this network is critical for assessing the resilience of European heavy industry. We estimate a five-variable BSVAR system based on a set of narrative sign restrictions. Narrative restrictions are applied around four major events: the Lehman Brothers' collapse of 2008, the sovereign debt crisis of 2011, the coronavirus pandemic lockdown of 2020, and the Russian gas supply disruption of 2022. The results reveal that an energy cost shock triggers an immediate, contractionary shift in foundry output and downstream automotive activity, with effects remaining highly persistent over a 15-month horizon. FEVD analysis shows that a downstream aggregate demand shock accounts for about 41% of output variance over the 24-month forecast window, whereas the remaining 59% is driven by cost-side innovations. Specifically, energy cost shocks account for 20% of output variance, global metal price shocks 17%, productivity shocks 11%, and markup shocks 10%. Moreover, historical decompositions reveal that while the 2008 and 2020 contractions stemmed from collapses in aggregate demand and productivity, the recent post-pandemic decline was uniquely driven by persistent energy cost shocks. These results show that during severe supply chain crises, supply-side cost factors may override downstream market linkages, highlighting the need for industrial policy and targeted supply chain resilience under the European Green Deal

Presenting Author Biography

His research interests lie at the intersection of macroeconomics, energy economics, climate change, and sustainability, with a particular emphasis on the economic implications of environmental policies. His current PhD project, funded by a PNRR co-financed scholarship in collaboration with ASSOFOND, examines the economic impact of decarbonization policies in the EU energy sector. The research aims to assess how regulatory measures influence industrial transformation, investment decisions, and long-term sustainability within the sector. Through his work, Ebenezer seeks to contribute to the ongoing discourse on the effectiveness of decarbonization policies, offering insights to support policy development and sustainable economic growth.