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Research Brief

The Economic Logic of Policies to Address Import Dependence in Clean Energy Goods

Michael Jakob, Matthias Kalkuhl, Robert Marschinski, Michael Mehling, and Joschka Wanner

Global supply chains for clean energy goods are vulnerable to economic fragmentation and geopolitical tensions, giving rise to concerns about excessive import dependence. A new MIT CEEPR Working Paper examines these challenges through the lens of market failures, offering a welfare economics perspective on policy responses. It identifies key sources of inefficiency –ranging from technology spillovers to coordination failures – and assesses policy options such as diversification, stockpiling, and trade restrictions. By linking supply chain risks to specific market failures, the Working Paper provides a structured framework for evaluating strategic policy choices.

Background

The increasing fragmentation of global supply chains and rising geopolitical tensions raise concerns about import dependence. These concerns are of particular importance for 'clean energy goods' – i.e. clean energy technologies and critical raw materials needed to produce them. These goods are not only essential for climate change mitigation, but are also seen as an important driver of future economic dynamics.

Our working paper contributes to the literature by analyzing causes of, and solutions for, import dependence in the language of market failures. This focus allows assessing different policies from a welfare economics perspective that accounts for trade-offs between different policy objectives. To our knowledge, only one previous study has attempted to explicitly relate policies addressing supply chain issues to specific market failures (Baldwin and Freeman, 2022), and our paper is the first to focus on clean energy goods.

In the working paper, we start out by conceptualizing import dependence. We then identify relevant market failures and policies to correct those market failures. We conclude with a brief discussion of policy implications.

Conceptualizing Import Dependence

We speak of 'dependence' when imports represent a high share of total domestic consumption and are sourced from few supplier countries or just one supplier country. Reducing import dependence is increasingly recognized as an important policy objective: in the European Union, for instance, the notion of 'strategic autonomy' has become a defining paradigm of international economic policy that prioritizes

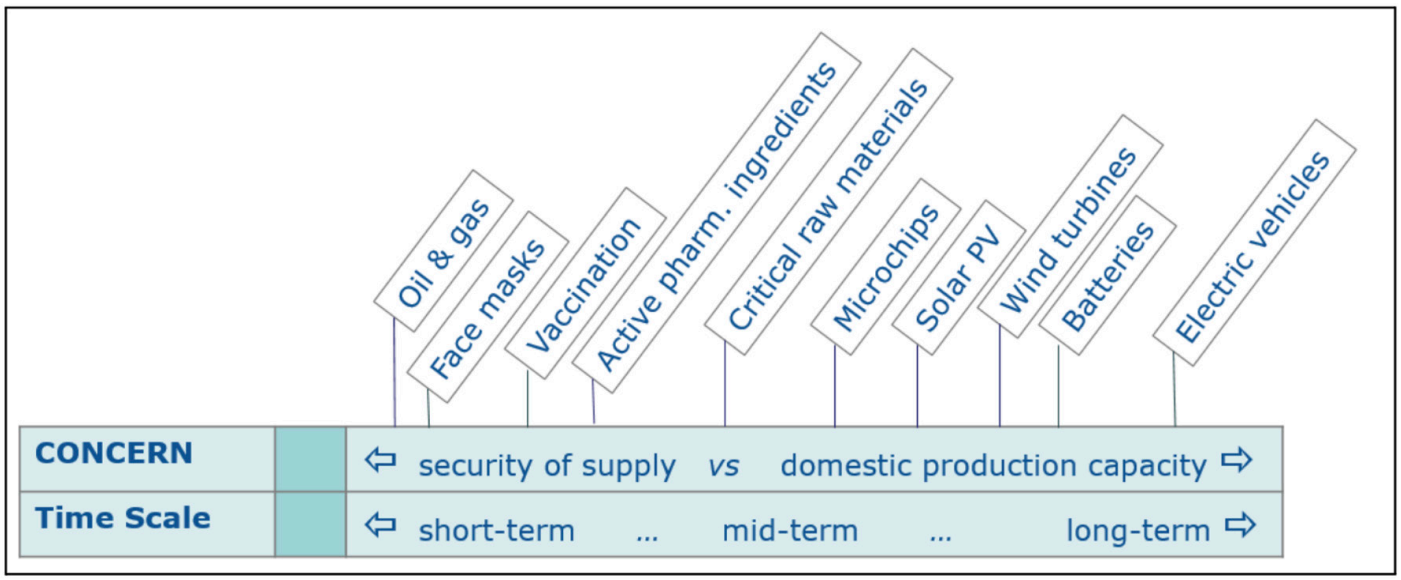

Figure 1. Conceptual diagram to systematize different aspects related to import dependence.
Note that the relative position of the specific issues shown at the top is indicative and mainly serves for the purpose of illustration.

'de-risking' of supply chains (European Commission 2023). Whereas some emphasize the importance of boosting domestic production in sectors of strategic importance ('reshoring'), others have argued in favor of fostering trade relations with countries with strong economic ties and good diplomatic relations ('friendshoring') (Cerdeiro et al., 2024). In a similar vein, authors debate the extent to which 'decoupling' from certain trade partners is possible and desirable, or whether 'derisking' by diversification of import portfolios constitutes a more feasible policy option (Farrell and Newman 2019).

Import dependence has been discussed for several issue areas, ranging from conventional energy imports, pharmaceutical substances, and medical equipment, to high-tech products as well as clean energy goods. For each of these commodities, specific reasons underlie the concern about excessive imports. These include, e.g., short-term energy security in the case of gas and oil imports, or crisis-preparedness for medical substances and devices. The latter two are short-term concerns and focus on security of supply, i.e. it does not matter so much by whom and from where these goods are supplied as long as the supply is reliable. A different rationale applies to high-tech and clean energy goods such as electric vehicles or batteries, where short-term supply is less important than securing domestic production capacities, underpinned by mid- to long-term industrial policy considerations of competitiveness and value chain capture. These characteristics of import dependence are illustrated in Figure 1.

Identifying Relevant Market Failures and Policies to Address Them

From a welfare economics perspective, a competitive market equilibrium without market failures and without government intervention in domestic or international markets leads to efficient trade flows and import volumes. Governments may have other incentives to intervene in international trade flows and supply chains (Juhász and Lane 2024), but if they deploy policies purely on the grounds of removing market inefficiencies, they would have no reason to intervene against high levels of import dependence.

We disentangle these two different sets of motivations by analyzing which market failures might result in too little domestic production or too little diversification, respectively, from a self-interested perspective that aims to maximize national welfare. Market failures that are responsible for too little domestic production include localized technology spillovers or economies of scale and agglomeration effects. Domestic production might also benefit national security in the absence of markets that are able to provide insurance against supply interruptions in the case of a geopolitical conflict. Moreover, as transaction costs can hinder compensating social interest groups that would lose from a clean energy transition, distributional considerations can also provide a rationale for policies that temporarily promote domestic production. Even though the latter consideration is not a market failure in the strict sense, it creates a rationale for policy intervention. Market failures responsible for firms underinvesting in activities that would increase their resilience

to supply shocks include coordination failures, information costs, myopic behavior, and the expectation that policy makers will intervene in times of serious crises.

If we assume that import dependence is the manifestation of one or more market failures, policy makers can implement measures to promote domestic production and diversify supply chains for goods that are deemed to be of strategic importance. Policies to promote domestic production include: support for research, development and deployment; trade interventions; and state ownership. Policies to foster diversification and resilience include: establishing strategic reserves/stockpiling; developing substitutes and fostering a circular economy; using tradable or tiered import rate quotas; providing information on supply networks and substitution possibilities; preempting coercion from other countries by building up a credible threat of retaliation; and entering strategic partnership with key supplier countries. The relevant market failures and policies to address them are summarized in Table 1.

Relevance for Policy Making

Most of the identified market failures underlying import dependence cannot be addressed directly, and the choice of policy instruments is often not straightforward. It is hence crucial to not only focus on the effectiveness of a policy to spur domestic production or diversification. Instead, policy makers also need to consider trade-offs with other policy objectives. For example, trade restrictions create artificial barriers that can prevent production from being located where it is most cost-effective. Economic costs are crucial, as economically inefficient approaches can hamper the transition to a clean energy system. Direct trade-offs might also arise between the objectives of achieving more domestic production and of diversifying supply chains, so that policy makers will need to find a way to strike a balance between these objectives.

Policies to address import dependence will in most cases be part of a broader policy mix that combines different policy instruments in a way that also accounts for how they impact on different market failures. For real-world policy design, it will be decisive to focus on a narrow set of import dependencies and on policies that address the most important market failures (Pisani-Ferry, Weder di Mauro, and Zettelmeyer 2024). It also seems advisable to use a precautionary approach that takes into account potential impacts of ill-designed policy failures. Some policies, such as providing information or stockpiling strategic reserves, will likely have a substantially lower potential for adverse side effects than others, such as trade restrictions.

Policy formulation will also need to account for the broader geopolitical context. For instance, an important policy objective may be to shift economic activity away from geopolitical rivals by either incentivizing increased domestic production or production in third countries. To strategically deprive geopolitical rivals of certain economic opportunities, policy makers might aim to block their competitors' access to technologies that open up a broad range of development

	Source of market failure	Policies to address market failures
Too little domestic production	Localized technology spill-overs Economies of scale and agglomeration externalities Missing insurance markets Transaction costs	Support for research, development and deployment Trade restrictions State ownership
Too little diversification and resilience	Moral hazard and policy makers' lack of commitment Coordination failures Information costs Myopia	Stockpiling Developing substitutes and establishing a circular economy Tradable or tiered import rate quota Facilitating information provision Preempting coercion

Table 1. Summary of market failures that may result in too little domestic production and too little diversification, respectively, and policies to address them.

prospects (such as microelectronics) or that are of critical military importance (such as nuclear technology).

Our working paper offers a first conceptual step towards better understanding the market failures and broader geopolitical objectives underlying different policies to address import dependence. Subsequent research will be needed to better understand the interplay of different market failures and their implications for an appropriate policy mix.

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Link to the full working paper discussed in this brief:

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About the Authors

Michael Jakob is the founder of Climate Transition Economics in Berlin. He holds a Ph.D. in economics from the Technical University of Berlin and has obtained degrees in physics, economics, and international relations from universities in Munich, St. Gallen, and Geneva. He previously served as a Senior Fellow with the Ecologic Institute in Berlin and a Fellow with the Mercator Research Institute on Global Commons and Climate Change in Berlin.

Matthias Kalkuhl heads the Climate Economics and Policy department and the Welfare and Policy Design working group at the Potsdam Institute for Climate Impact Research (PIK). He is also a professor at the Faculty of Economics and Social Sciences at the University of Potsdam. He received his Ph.D. from the Technical University of Berlin in 2012, and was previously a co-director of the Mercator Research Institute on Global Commons and Climate Change (MCC) in Berlin.

Robert Marschinski is based at the Joint Research Centre (JRC) of the European Commission. His recent research addresses economic policy and the global competitiveness of EU industries and the EU Single Market. He also works on policy instruments for environmental and climate policy. Before obtaining his Ph.D. in climate economics and policy from the Technical University of Berlin, he completed a degree in physics at the University of Bologna.

Michael Mehling is Deputy Director of the Center for Energy and Environmental Policy Research (CEEPR) at the Massachusetts Institute of Technology in Cambridge, Mass., and a professor at the School of Law of the University of Strathclyde in Glasgow. He holds a Ph.D. in law from the University of Helsinki and completed his legal studies in Constance and Hamburg. Previously, he served as President of Ecologic Institute in Washington, DC.

Joschka Wanner is an assistant professor of quantitative international and environmental economics at the Julius-Maximilians-Universität Würzburg (JMU), an external researcher at the Kiel Institute for the World Economy, and an affiliate of CESifo. He obtained his Ph.D. in economics from the University of Bayreuth in 2019. His Ph.D. thesis is entitled *Gravity in International Trade: Econometric Challenges and Environmental Extensions.*

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