Pia Andres October 14th, 2024

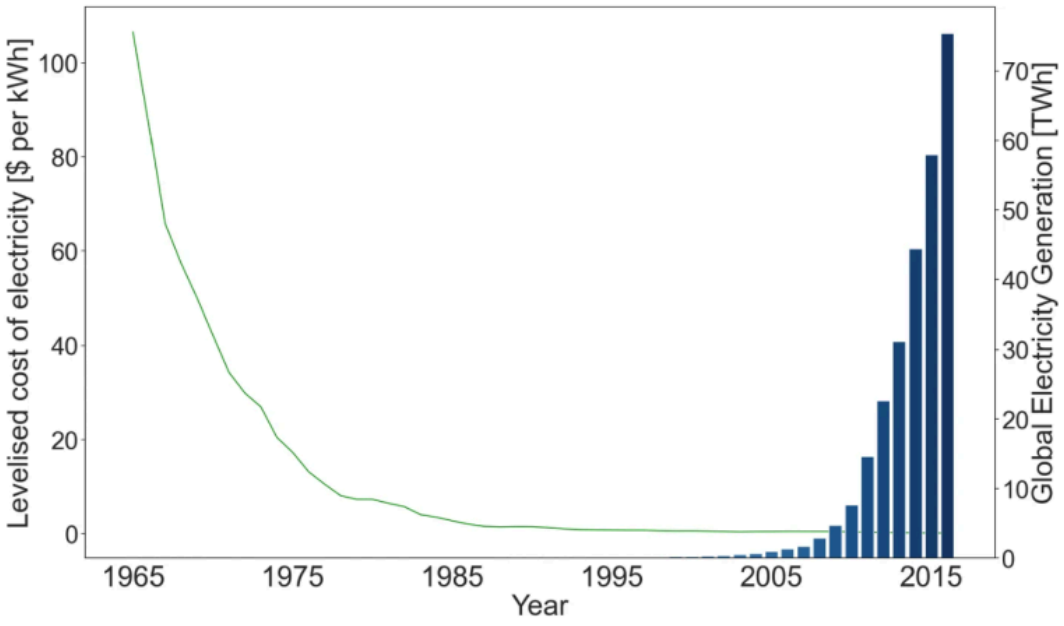
How China's rise has shaped innovation and exit among Europe's solar firms

Should the EU protect European firms by restricting imports of solar technology from China? Drawing on new research, **Pia Andres** *finds that Chinese competition has resulted in many European firms going out of business, but some of those that have survived have adapted by innovating more intensely.*

Renewable energy is key to enabling the transition to a low carbon economy. It should therefore be good news that the cost of generating electricity from solar power has declined dramatically in recent decades, exceeding even the most optimistic forecasts and enabling solar to effectively compete with fossil fuels.

Solar is now widely regarded as the poster child for successful green technology innovation, enabled by government support. Figure 1 plots the evolution of the global average levelised cost of electricity and global electricity generation from solar photovoltaic (PV) technology between 1965 and 2016, illustrating the dramatic fall in costs over time, as well as a rise in deployment starting in the early 2000s.

Figure 1: Trends in the levelised cost of electricity and global electricity generation from solar PV



Note: The levelised cost of electricity is the average cost per unit of electricity generated over the entire lifetime of an energy-generating asset. Source: Way et al. (2022), Dudley et al. (2018).

While policy-supported learning-by-doing and technological progress – as well as other factors such as lower material costs – have contributed significantly to the success of solar PV technology, the scale up of low-cost manufacturing in China with its associated economies of scale and intensified global competition have also played a central role.

And while one might expect cheaper low carbon energy to be universally welcomed, given the urgency of avoiding catastrophic climate change, China's dramatic rise to dominance in the solar sector was met with protective tariffs by the United States in 2012. The European Commission followed suit by imposing tariffs in 2013, later agreeing on a minimum price and limited import volume with China.

Chinese competition and the European solar sector

In both the US and EU cases, industry groups lobbied for tariffs on the grounds that Chinese competitors received unfair government support. The justification for imposing anti-dumping and counter-veiling measures relies on the argument that such unfair competition damages domestic industries.

In a new study, I investigate one possible basis for this claim, by studying the effect of Chinese competition on innovation in the European solar sector. Using a sample of 10,137 firms in 15 EU countries over the period 1999-2020, I show that competition from China had a heterogeneous effect on sampled firms.

There was an increase in patenting among those with a low historical stock of solar PV patents, but a reduction among those whose historical patent stock fell within the top 10th percentile of sampled firms. Firms at the very top of the distribution, with a patent stock within the top 1st percentile, also

increased patenting in response to competition. My results suggest that these effects average out to zero. That said, since firms with a lower historical knowledge stock tended to innovate more in general, it seems competition incentivised the most innovative firms even further.

On the flipside, I also find evidence in line with the broad consensus that Chinese import competition drove many European firms out of the market. My analysis suggests that a $100 million increase in exposure-weighted imports from China increased the odds of a firm exiting in the following three years by about 10%, while a unit increase in the exposure-weighted percentage share of Chinese imports in the solar PV market increased the same odds by 70%. Overall, it seems that many European solar firms did not survive the China shock – but some of those who did adapted by innovating more intensely.

Supporting clean technology

In the years following the study period, China has further cemented its dominant position in the global market for solar PV and other low carbon supply chains. In 2022, between 76% and 96% of installed manufacturing capacity across all solar PV components was located in China, as well as 64% of global manufacturing capacity in nacelles and 69% of capacity for blades (both key components for wind turbines), and 80% of production capacity for batteries.

Both the US and the EU have continued to respond using protectionist measures, including domestic content provisions as well as protective tariffs. In May 2024, the Biden administration increased tariffs on Chinese electric vehicle imports from 25% to 100%, and those on lithium-ion batteries and battery parts from 7.5% to 25%. Tariffs on solar cells were raised from 25% to 50%. In July, the European Commission announced provisional duties of 17.4%-37.6% on Chinese electric vehicle imports, and on 4 October, EU member states voted in favour of imposing tariffs of up to 45% on Chinese electric vehicles.

Protectionism increases the cost of using low carbon technologies, and therefore has the potential to slow down climate change mitigation efforts. On the other hand, concerns over supply chain resilience – particularly in the face of geopolitical tensions – in key energy technologies should be given serious consideration.

Likewise, government support for clean technology may well require domestic firms and workers to benefit in order to be politically feasible. However, whether protectionist measures are the most appropriate way to promote domestic manufacturing in clean technologies – or indeed, whether they are effective at all – is unclear.

While the US Inflation Reduction Act includes generous subsidies for clean technologies, the EU's Net Zero Industry Act relies primarily on regulatory reform. Perhaps it is time to consider a more direct approach to promoting low carbon manufacturing: by supporting research and development

and providing cheap finance and other upstream subsidies, instead of relying on costly protectionist measures.

For more information, see the author's accompanying paper in Environmental and Resource Economics

---

Note: This article gives the views of the author, not the position of EUROPP – European Politics and Policy or the London School of Economics. Featured image credit: Supawit.S / Shutterstock.com

---

Subscribe to our newsletter

About the author

Pia Andres

Pia Andres is a Research Economist in Productive and Inclusive Net Zero in the Centre for Economic Performance at the London School of Economics and Political Science.

Posted In: EU Politics | LSE Comment | Politics

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

© LSE 2024