

A Word of Caution: State-Capitalist Investment in US Shale Gas

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Fracking of shale gas remains a controversial but important energy source in the US and also for China – the largest consumer of energy worldwide. In recent years, China has invested significantly in the US shale-gas sector, prompting questions about the impact of foreign direct investment from state-capitalist countries on US shale gas. Professor **Usha Haley** at Wichita State University and her colleagues undertook a comprehensive evaluation of the implications of Chinese foreign investment in the context of the US-China geo-political landscape. We consider the important consequences of their work here.

Shale Gas: Unconventional But Important

Shale gas constitutes a form of natural gas consisting mostly of methane. It is described as an 'unconventional' source of natural gas, given the need for advanced technologies known as hydraulic fracturing (commonly known as fracking) to extract it. Globally, the US is the largest producer of shale gas and, in 2014, was noted by President Obama as particularly important to US 'energy independence'. This concept of energy independence lies critically on the ability to reduce the reliance on imported energy and maximise the resources that the US can draw upon internally while maintaining sustainable living environments.

China also considers the extraction of shale gas as strategically important – unsurprising, given the country's status as the largest consumer of energy worldwide. Yet, China only produces about half of the natural gas that it consumes. While having plentiful resources to extract shale gas independently, a lack of technological expertise in doing so has led to China's opting to invest significantly in US shale extraction instead as a source of imports.

Professor Usha Haley at Wichita State University in the USA has worked with colleagues to understand the impact of this foreign direct investment. The researchers note that while, in general, foreign direct investment can bring many benefits, including the transfer of technology between countries and the promotion of international trade, good reasons exist for concern about investment from less technologically advanced state-capitalist economies such as China. These reasons have particular pertinence in the evolving, complex geo-political context of US-China relations.

Impact of State-Capitalist Investment

From an economic perspective, 'technology-push' (scientific progress) and 'demand-pull' (the relationship between customers and markets whereby demand exceeds supply) play important roles in shaping development and innovation. It is critical to understand not only the effects of domestic policies on these factors (as most commonly studied) but also the impact of foreign countries when their investment has shifted the locus of control in their favour.

Despite the controversy surrounding fracking due to its potentially negative environmental, health, and safety impacts, the number of patents for fracking technology has continued to increase substantially in recent years. Meanwhile, over the same timeframe, comparatively small changes have emerged in the number of patents for other, more environmentally responsible technologies in the acquisition of shale gas, such as horizontal drilling. On closer inspection, the increase in patents associated with fracking can be primarily attributed to China.

Professor Haley and her colleagues adopted a broad range of investigative approaches to gain better insight into the influence of Chinese investment in US shale gas. They obtained a wealth of data from interviews with US and Chinese managers working in the shale-gas sector, archived patent data, data on federal regulation, company statistics, industry operations, environmental and media reports, cost/benefit projections, and utilised published findings.

The researchers examined data from the upstream (exploration and production), midstream (transportation and storage), and downstream (provision of final products) sectors of the shale-gas sector. They compared the impacts associated with the pre-Chinese (2000–2008) and post-

Chinese (2009–2018) investment periods to determine whether Chinese state-capitalist investment had altered technology development in energy – and if so, how.

Observations and Critical Insights

Professor Haley and her colleagues provide new and important insights into the impact of Chinese investment on the US shale-gas sector. Most strikingly, the researchers point to the unequivocal evidence that Chinese investments have altered the trajectories of green technology to the detriment of the US. This is because Chinese investors have prioritised the immediate production of shale gas using established technology rather than investing in innovation directed at developing more environmentally friendly approaches to shale-gas extraction. Though federal regulation to decrease green-house emissions, such as methane, increased, in the shale-gas sector, the regulations had no effect on such emissions after the Chinese invested in US shale gas.

Professor Haley notes that the approach of prioritising the immediate production of shale gas has led to negative impacts extending beyond environmental protection to national security, trade, and employment in the US. In particular, innovation from small- and medium-sized companies that have historically pioneered the exploring and developing of new energy resources and technology has suffered as a result.

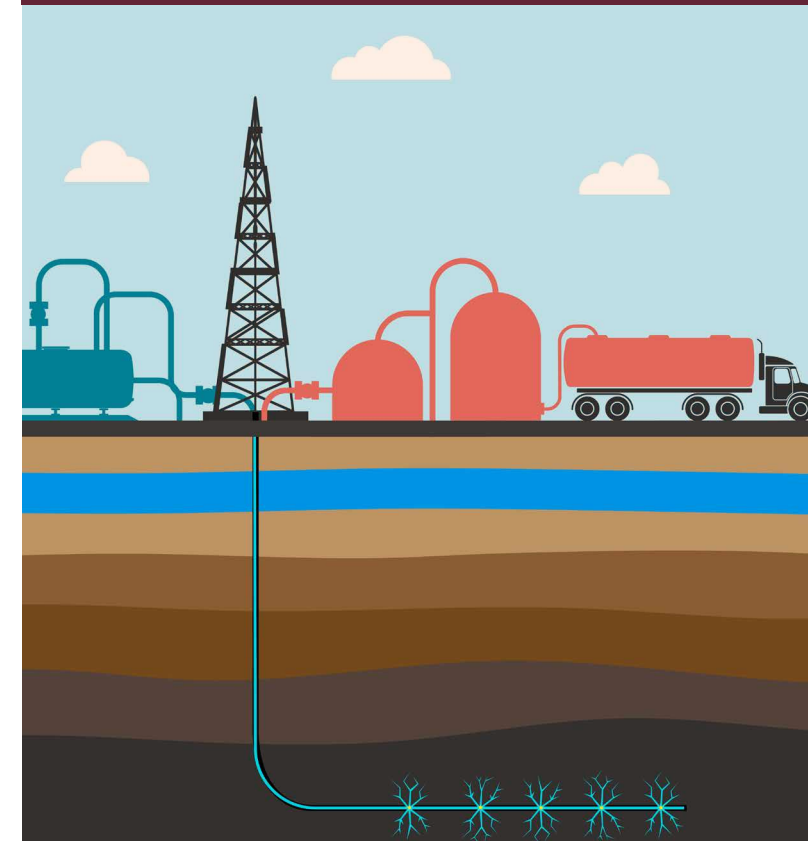
A Final Word of Caution

Until now, researchers and policymakers have limited insights into how Chinese investments in technology affect US innovation, environmental concerns, or national security. On the basis of their comprehensive data, Professor Haley and her colleagues now warn that investments from less technologically advanced economies, such as China, may require caution. They propose that targeted regulation and close monitoring will be necessary to more effectively and proactively manage decisions, future policies, and the funding of future investments.

Professor Haley's research findings are significant and will undoubtedly inform future studies in this field. Perhaps most importantly, we can now see the urgent need to develop a more dynamic understanding of the intertwined processes, histories and other factors that impact the trajectory of technologies, particularly in energy and the oil-and-gas industry, but also further afield.

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MEET THE RESEARCHER

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Professor Usha Haley completed her PhD at New York University. She is now the W. Frank Barton Distinguished Chair in International Business and Professor of Management at Wichita State University. She is also the elected chair of the [World Trade Council of Wichita](#). Over the course of her impressive career to date, Professor Haley has held full-time faculty positions at West Virginia University, Massey University (New Zealand), University of New Haven, University of Tennessee-Knoxville, New Jersey Institute of Technology/Rutgers, Australian National University (Australia), National University of Singapore (Singapore), and ITESM-Monterrey (Mexico). She has received multiple awards in recognition of her contributions to research and teaching, and has published extensively and been highly cited in academia. Her work has also received considerable media attention, including coverage in the *Economist*, *Financial Times*, *Wall Street Journal*, *New York Times*, *BusinessWeek*, *Chronicle of Higher Education* and *Times Higher Education*, paying clear testimony to the significance and real-world importance of her committed endeavours. Her research has been directly incorporated into federal regulation in the US, Germany and other countries.

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FURTHER READING

The final report submitted to the National Science Foundation can be viewed [here](#).

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