



# THOUGHT LEADERSHIP BRIEF

## Tapping into Excess Capacity: Chinese Machinery Exports and African Manufacturing Growth

Jin Wang

### KEY POINTS

- ▶ China's investment in African economies has grown exponentially, largely due to its strategies for handling domestic overcapacity. Government policies led to decommissioning of old machinery, which was then exported to Africa. This provided a dual benefit - promoting economic efficiency and sustainability within China, while offering African nations machinery to boost industrialization.
- ▶ While the transfer of machinery has aided African industrialization, its impact is two-fold. It enhances production and productivity in downstream industries, but if imported machinery substitutes local alternatives, it might weaken local manufacturing sectors, fostering dependence on foreign imports.
- ▶ The import's impact varied across firms. Downstream exporters and large firms saw increased wages, productivity, and production. In contrast, non-exporters and medium firms experienced growth in fixed assets and electricity usage, but not employment. Effects varied based on firm size, indicating the heterogeneous nature of the import's impact.

Photo by David Lartey on Unsplash

### ISSUE

#### The Chinese Connection

China's engagement with Africa has grown remarkably in the past two decades, resulting in a transformative impact on the region. China was the primary trade partner for just one African country in 2000, and by 2020 this number rose to 29 countries. However, comprehensive research exploring the implications of this trade relationship and the specific motivations driving China's exporting behaviors has been lacking.



Figures 1 depict the spatial distribution of China as the largest trading partner in Africa in the years 2000 and 2020. In the map, the blue areas represent countries that primarily import goods from China, while the white areas indicate countries that primarily import goods from non-China countries. The grey areas represent countries for which related data is unavailable or missing. (The trading data is obtained from Comtrade.)

**Addressing Domestic Overcapacity: A Key Driver**

Our research uncovers an intriguing incentive behind China’s export to Africa: addressing domestic overcapacity issues. The Chinese government implemented an overcapacity elimination policy (“Announcement of List of Enterprises to Eliminate Excess Production Capacity in Key Industries.”) targeting industries with surplus production capacity, such as steel, cement, tannery, and paper. Enterprises were required to eliminate specified machinery by a deadline. As a result, firms in the machines sector are compelled to find alternative avenues for disposing of these machines. Exporting them to Africa becomes an attractive option for these firms, as it allows them to recoup some value from the machines while complying with the policy.

In the downstream sector, the impact of the overcapacity elimination policy on export is relatively muted. This can be attributed to several factors. One possible reason is the replacement

of old machines with new ones in the regulated sector. As the policy incentivizes firms to upgrade their machinery, the introduction of newer and more efficient machines could enhance productivity and output, thereby maintaining or even improving the supply of intermediate goods to the downstream sector. Consequently, the downstream sector may not experience a significant disruption in its production processes, resulting in a limited impact on its export.

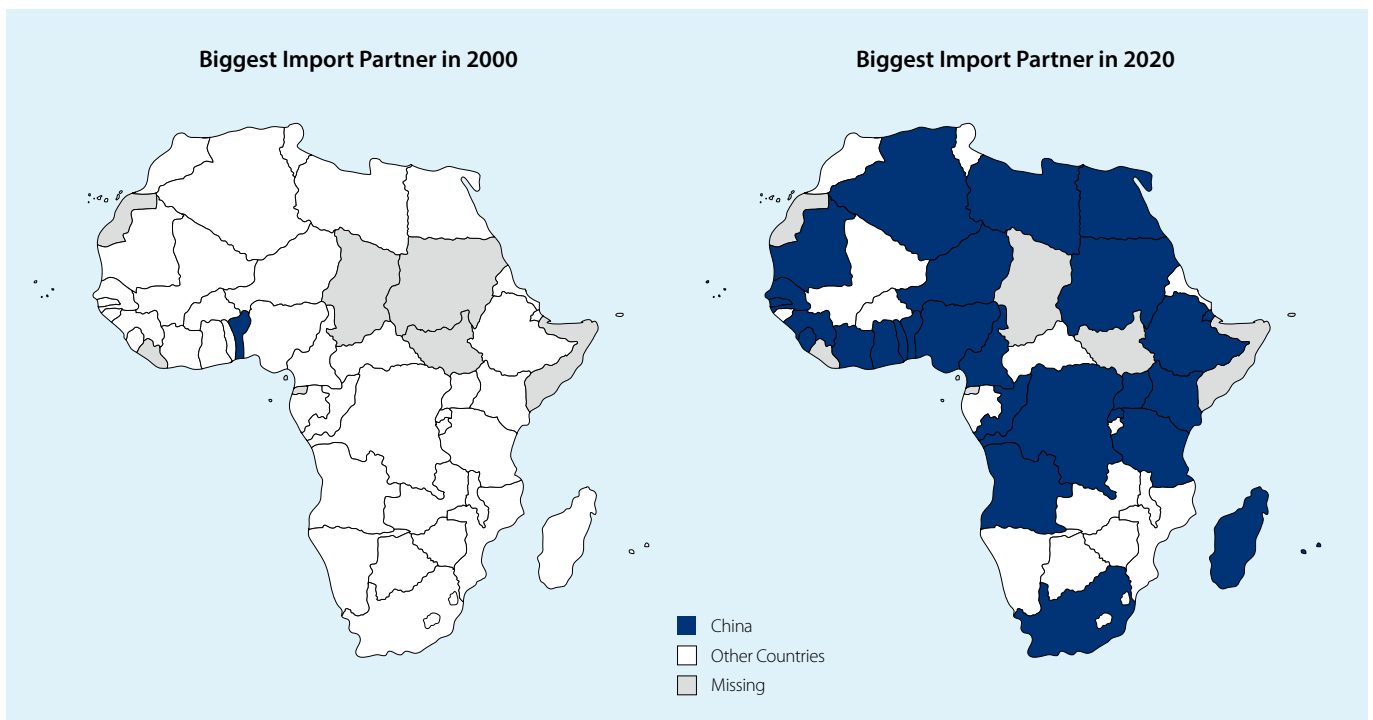
**Impacts of Machinery Transfer on African Economies**

The transferred machinery from China has dual potential impacts on the African economies. The positive effect is the opportunity for African nations to expedite their industrialization processes by utilizing these machines. Conversely, imported machinery can potentially weaken the local machinery sector if it displaces rather than complements local alternatives, potentially affecting long-term sustainability and competitiveness.

**Research Questions and Methodology**

Our study addresses two key questions: whether the domestic overcapacity elimination policy stimulates increased export from China, and the impact of transferred machines on industrialization in Africa. We employed a shift-share instrumental variable and UNIDO Industrial Statistics Database to evaluate indicators such as employment, output, wages, and productivity within the manufacturing sector in Africa.

**Figure 1.**





## ASSESSMENT

The overcapacity elimination policy significantly affected the export values of machines and corresponding sectors in China. We observe a significant 6.33% increase in the export of machines and their corresponding sectors when targeted by the overcapacity elimination policy at the city-commodity level. However, it did not significantly impact export values in the downstream sector. The overcapacity elimination policy imposes restrictions on the use of old machines in the regulated sector. As a result, firms in the machines sector are compelled to find alternative avenues for disposing of these machines. Exporting them to Africa becomes an attractive option for these firms, as it allows them to recoup some value from the machines while complying with the policy. This can occur through direct exports by the firms themselves or through intermediaries such as traders who specialize in exporting old machinery. Consequently, the overcapacity elimination policy may lead to a significant increase in the export of machines and their corresponding sectors to African countries.

In Africa, we observed significant increases in output and productivity in the downstream sector, indicating enhanced production capabilities. However, in the local machinery sector, both output and productivity decreased, suggesting that imported machinery displaced domestic production. We further find that machinery imports lead to increased productivity and production in downstream industries, while wages and employment remain unchanged.

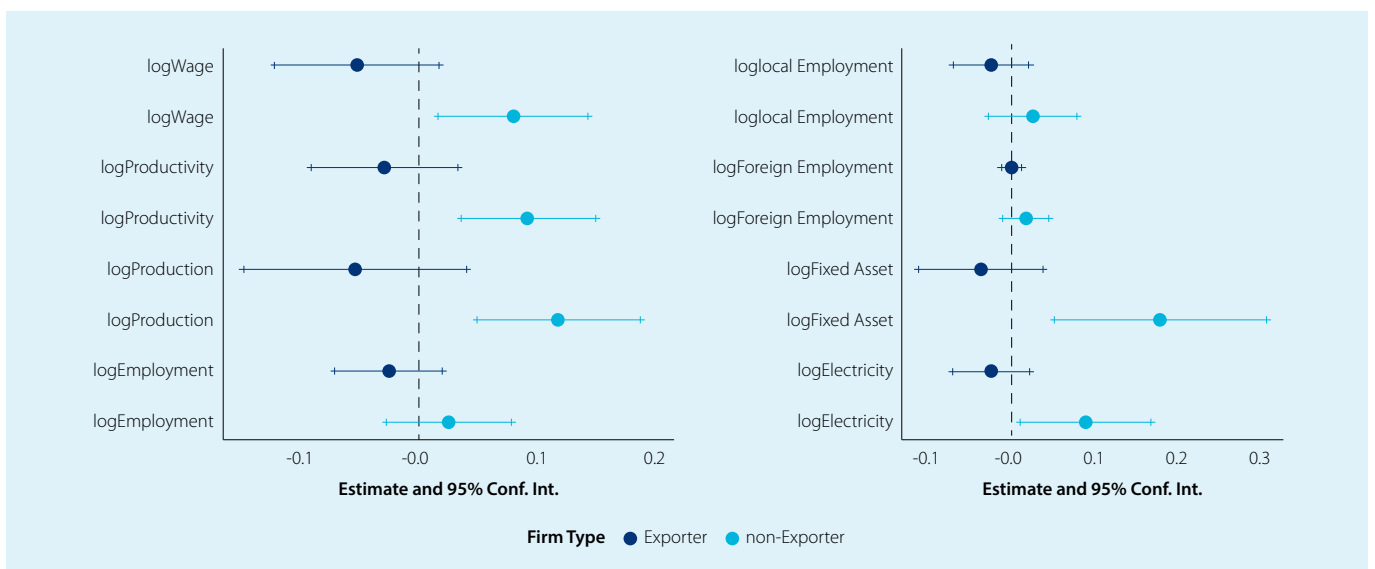
However, in the machinery sector itself, the import of machines does not result in significant changes in wages, production,

or employment. Instead, it even leads to a decrease in productivity in the machinery sector. Specifically, high GDP countries experience a drop in wages, productivity, and production in the machinery sector when machinery imports from China occur. In contrast, low GDP countries do not experience significant changes in the performance of their machinery sector. Ultimately, the study finds that only high-GDP countries are significantly affected by this shock of machinery imports from China.

Using the firm level data, we conduct the subgroup analysis focusing on downstream exporters and non-exporters. Our analysis reveals that the policy-induced shock has a significant impact on downstream exporters, leading to increases in wages, productivity, and production levels. However, we do not observe any significant change in overall employment for this subgroup. The analysis for non-exporters shows no significant change in local employment and foreign employment. However, the policy-induced import is associated with an increase in fixed assets and electricity usage for non-exporters. Overall, our findings suggest that the policy-induced shock has different effects on various outcomes, with significant improvements observed for downstream exporters but limited changes for non-exporters.

Figure 2 illustrates the significant and heterogeneous impact of machinery transfers from China on downstream sectors in Africa. The orange lines represent the impact on African exporters, while the black lines represent the impact on non-exporters, typically smaller firms. The machinery transfers have a positive impact on African exporters, as they are more likely to have access to and benefit from these transfers. In contrast, the machinery transfers have no discernible

Figure 2.



impact on non-exporters, which are often smaller firms that do not engage in exporting activities. This heterogeneity in the impact of machinery transfers underscores the importance of considering the varying effects on different types of firms within the African economy.

### Implications and Contribution to Literature

Our research presents a nuanced understanding of China's influence on Africa's industrialization through trade. It suggests that China's domestic overcapacity elimination policy has led to shifts in China's regional export patterns, thereby affecting African economic outcomes.

Our study contributes to literature on African labor productivity and industrialization, the relationship between globalization and employment in developing countries, and the impact of foreign investment and trade in Africa. It also provides valuable insights into China's influence on foreign countries through trade, contributing to the China shock literature.

Our findings reinforce the necessity for African policymakers to critically assess the long-term impact of importing machinery on local industries while capitalizing on the potential benefits. In the broader perspective, this research adds a new layer to our understanding of the dynamics of global trade and the interplay between domestic policy decisions and international economic outcomes.

This research is supported by the HKUST IEMS Research Grant.



**Jin Wang** is an associate professor of Social Science at the Hong Kong University of Science and Technology. She received her PhD in Economics from the London School of Economics and Political Science. Her research, which mostly has a policy focus, is mainly in the areas of Development Economics, Public Economics and Chinese Economy. She worked on a variety of topics – place-based policies, government hierarchy and incentives, and the labor mobility barriers that are embedded in the *hukou* household registration system of China. Her work has appeared in a range of leading economics journals including *Journal of the European Economic Association*, *American Economic Journal: Economic Policy*, *Journal of Development Economics* and *Journal of Comparative Economics*.

#### Reference:

Lam, Pak Hung, Yatang Lin, Fangyuan Peng and Jin Wang (2024). "Tapping into Excess Capacity: Chinese Machinery Exports and African Manufacturing Growth", HKUST Working Paper.

Read all HKUST IEMS  
Thought Leadership Briefs  
at <http://iems.ust.hk/tlb>



T: (852) 3469 2215  
E: [iems@ust.hk](mailto:iems@ust.hk)  
W: <http://iems.ust.hk>  
A: Lo Ka Chung Building, The Hong Kong  
University of Science and Technology,  
Clear Water Bay, Kowloon

With Support from

