Research Briefs
IN ECONOMIC POLICY

CATO INSTITUTE

August 11, 2021 | Number 261

Industrial Policy Implementation

Empirical Evidence from China's Shipbuilding Industry

By Panle Jia Barwick, Cornell University; Myrto Kalouptsidi, Harvard University; and Nahim Bin Zahur, Cornell University

Industrial policy has been widely used in developed and developing countries. Examples include the United States and Europe after World War II; Japan in the 1950s and 1960s; South Korea and Taiwan in the 1960s and 1970s; and Brazil, China, India, and other developing countries more recently. Industrial policies are now back in the spotlight in developed countries, such as Europe and the United States. Designing and implementing industrial policies is a complicated task. Governments seeking to promote the growth of selected sectors have a wide range of policy tools at their disposal, including subsidies on output, provisioning loans at below-market interest rates, preferential tax policies, tariff and nontariff barriers, and so on. They must also choose the timing of policy interventions and whether to target selected firms within an industry.

Despite the prevalence of industrial policies in practice and the contentious debate in the literature regarding their efficacy, remarkably few empirical studies directly evaluate the welfare implications of these policies using microlevel data. Our research fills this gap in the literature with a focus on China, currently the most prominent proponent of industrial policies. During the past two decades or so, Chinese firms have rapidly dominated a number of global industries, such as steel, auto, and solar panels, partly because of government support. In 2015, China unveiled its plan to become the leader among the world's manufacturing powers by 2049.

We focus on the shipbuilding industry, an illustrative example of the quick ascent of China's manufacturing sector into global influence during the 2000s. At the turn of the century, China's nascent shipbuilding industry accounted for less than 10 percent of world production. During the 11th (2006–2010) and 12th (2011–2015) national five-year plans, it was dubbed a pillar industry in need of special oversight and support. Since then, an unprecedented number of national policies were issued with the goal of developing the infant industry into the largest worldwide. Within a few years, China overtook Japan and South Korea and became the leading ship producer in terms of output. However, this impressive output growth was achieved via a massive entry wave of new firms, which exacerbated industry fragmentation and caused low capacity utilization. Plummeting ship prices during the aftermath of the financial crisis threatened the survival of many firms in the industry and prompted the government to place a moratorium on the entry of new firms. In addition, policy support was shifted toward select firms on a whitelist in an effort to promote industry consolidation.

The example of shipbuilding, which echoes patterns observed in other industries (steel, solar panels, autos, etc.), highlights the complexity of designing industrial policies and the difficulties associated with empirically evaluating past experiences. Not only do we need to identify policies that are implemented, which are often opaque, but we also need to properly account for the role of industry dynamics, business cycles, and firm heterogeneity.

Our research uses shipbuilding as a case study to address two questions of interest. First, how did China's industrial

Editor, Jeffrey Miron, Harvard University and Cato Institute

policy affect the evolution of both the domestic and global industries? Second, what is the relative performance of different policy instruments, which include production subsidies (e.g., subsidized material inputs, export credits, and buyer financing), investment subsidies (e.g., low-interest long-term loans and expedited capital depreciation), entry subsidies (e.g., below-market-rate land prices), and consolidation policies (whitelists)?

Our analysis delivers four sets of main findings. First, like many other policies unleashed by China's central government in the past few decades, the scale of the industrial policy in the shipbuilding industry is massive relative to the size of the industry. Our estimates suggest that the policy support from 2006 to 2013 is equivalent to RMB 624 billion (USD $96.2 billion), with the lion's share going to entry subsidies (RMB 431 billion [USD $66.5 billion]), followed by production subsidies (RMB 156 billion [USD $24.1 billion]) and investment subsidies (RMB 37 billion [USD $5.7 billion]). It boosted China's domestic investment and entry by 140 percent and 120 percent, respectively, and increased its world market share by 40 percent, almost three-quarters of the increase in world market share occurred via business stealing from rival countries. However, the policy created sizable distortions and generated merely RMB 153 billion (USD $23.6 billion) of net profits to domestic producers and RMB 288 billion (USD $44.4 billion) of worldwide consumer surplus. The policy attracted a large number of inefficient producers, exacerbated the extent of excess capacity, and did not translate into significantly higher industry profits over the long run.

Second, the effectiveness of different policy instruments is mixed. Production and investment subsidies can be justified on the grounds of revenue considerations, but entry subsidies are wasteful and lead to increased industry fragmentation and idleness. This is because entry subsidies attract small and inefficient firms; in contrast, production and investment subsidies favor large and efficient firms that benefit from economies of scale. Production subsidies are more effective at achieving output targets, while investment subsidies are less distorting over the long run. In addition, welfare losses are convex and deteriorate when multiple policies interact and induce firms to make further inefficient decisions.

Third, our analysis suggests that the efficacy of industrial policy is significantly affected by the presence of boom and bust cycles, as well as by heterogeneity in firm efficiency, both of which are important features of the shipbuilding industry. A countercyclical policy would have outperformed the pro-cyclical policy that was adopted by a large margin. Indeed, the effectiveness of these features at raising long-run industry profit differs nearly threefold, which is primarily driven by two factors: a composition effect (more low-cost firms operate in a bust than a boom) and the much cheaper expansion during recessions. In a similar vein, had the government targeted subsidies toward more-efficient firms, the policy distortions would have been considerably lower.

Fourth, we examine the consolidation policy adopted in the aftermath of the financial crisis, whereby the government implemented a moratorium on entry and issued a whitelist of firms chosen for government support. This strategy was adopted in several industries to curb excess capacity and create large conglomerates that could compete globally. Consistent with the evidence previously discussed, we find that targeting low-cost firms creates fewer distortions; that said, the government's whitelist was suboptimal because it favored state-owned enterprises and did not include the most efficient firms. Finally, the profit gains of a policy package that involves entry subsidies (to overcome entry barriers and capital market inefficiencies) followed by a consolidation phase (to reduce fragmentation) are dwarfed by the cost of the subsidies and do not provide a compelling justification for enacting them.

Our results highlight potential mechanisms underlying industrial policies' diverging outcomes across countries. For instance, in East Asian countries, where industrial policy was considered successful, the policy support was often conditioned on performance. In contrast, in Latin America, where industrial policy was viewed as ineffective, there were no mechanisms to weed out nonperforming beneficiaries. Our analysis illustrates that similar mechanisms are at work in China's modern-day industrial policy in the shipbuilding industry. The policy's return was low in earlier years when output expansion was primarily fueled by the entry of inefficient firms but increased considerably over time as the government used performance-based criteria (the whitelist) to channel subsidies. This kind of targeted policy design is substantially more successful than open-ended policies that benefit all firms.

Finally, we examine possible rationales for adopting industrial policy in our context. As firms have market power, which distorts market output, strategic trade considerations may provide an incentive for policymakers to intervene. Nonetheless, simulation results suggest that strategic trade benefits are small, as the extent of market power is limited. In addition, there is no evidence of industrywide learning by doing, another common rationale for industrial policy. In terms of spillovers to the rest of the economy, we find limited evidence that the shipbuilding industry generates significant spillovers to other domestic sectors (e.g., steel production, ship owning, or the labor market).

On the other hand, the substantial increase in the global fleet ensuing from China's increase in ship production did lower freight costs and increased China's imports and exports. Our (back-of-the-envelope) calculations indicate that the policy (which averaged $11.3 billion annually between 2006 and 2013) lowered freight rates by 6 percent and boosted China's trade volume by 5 percent, or $144 billion annually. That said, evaluating the welfare gains of the associated increase in trade volume requires a general equilibrium trade model and falls beyond the scope of this analysis. Finally, noneconomic arguments, such as national security, military considerations, and the desire to be the world number one, could also be relevant in designing this policy. Regardless of the motivation, our analysis estimates the policy's costs and assesses the relative efficacy of different policy instruments.

NOTE:

This research brief is based on Panle Jia Barwick, Myrto Kalouptsidi, and Nahim Bin Zahur, "Industrial Policy Implementation: Empirical Evidence from China's Shipbuilding Industry," March 2021, https://barwick.economics.cornell.edu/Yr21_20210310_ChinaShipyard.pdf.