China Economic Review 48 (2018) 170–185

Contents lists available at ScienceDirect

China Economic Review

Embracing globalization to promote industrialization: Insights from the development of Singapore's petrochemicals industry

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ARTICLE INFO

Article history:
Received 6 October 2015
Received in revised form 6 January 2017
Accepted 6 January 2017
Available online 8 January 2017

JEL classification:
O25

Keywords:
Industrial policy
Cluster
Strategy
Petrochemicals
Singapore

ABSTRACT

Debates about industrial policy reveal disagreements on three salient issues. The first is whether government can overcome its own failures, namely knowledge constraints and rent-seeking, to correct market failures. The second is whether government should go beyond horizontal policies to adopt more activist interventions such as "winner-picking." The third is whether intervention should follow or defy the country's comparative advantage. Singapore's experience in developing a globally competitive petrochemicals industry, within only a few decades and through vigorous interventions, provides meaningful insights into these debates and offers valuable lessons for developing countries. The lessons drawn from this paper suggest three fundamental principles for designing a promotion strategy and a strategic action framework for implementation.

1. Introduction

Singapore has experienced transformational economic growth in the past five decades, progressing from a third-world country facing formidable economic and social challenges to a vibrant global economic hub with continuing growth potential. While Singapore's success is often described as an economic "miracle," its development process is no mystery and can serve as an example for other nations. As one of the major driving forces of the country's transformation, Singapore's petrochemicals cluster can serve as an instructive case.

How was it possible for Singapore, a tiny city-state with no natural resources, limited capital, and an undeveloped industrial structure, to achieve rapid success in developing a globally competitive position in petrochemicals, a resource- and capital-intensive industry? Underlying the cluster's success story is the effectiveness of Singapore's government in promoting this industry.

Insights from the case of Singapore's petrochemicals industry can shed light on debates concerning industrial policy, convincing policy makers that government failures can be overcome to fix market failures and enable both sectors work more effectively through deeper interdependence and synergy. The case is also evidence that a combination of horizontal and selective policies is more effective than relying only on the former. Furthermore, the case demonstrates that as globalization has become a major force transforming the world economy, a developing country can build a world-class industry within a short timespan by strategically embracing its comparative advantages, wisely positioning itself in the global economy, and continually upgrading its endowment structure.

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[1] I am grateful to three anonymous reviewers for valuable comments and I thank Kris Hartley and Nguyen Chi Hieu for research assistance.

http://dx.doi.org/10.1016/j.chieco.2017.01.003

This case is structured as follows. Section 2 highlights salient issues from debates about industrial policy and outlines theoretical insights addressed by the study. Section 3 provides a comprehensive overview of Singapore's petrochemical cluster. Section 4 details the government's strategic approaches and policy coordination framework in promoting the development of the industry. Section 5 discusses related lessons and their transferability to developing countries. Section 6 offers concluding remarks.

2. Debates on industrial policy and insights from Singapore's experience

Robust debates on industrial policy have been occurring for decades but remain inconclusive. These debates cluster around three basic questions: 1) Is industrial policy justified? 2) To what extent should government intervene? 3) Which approaches characterize an effective industrial policy?

2.1. Is industrial policy justified? Market failure vs. government failure

The principal argument supporting the adoption of interventionist industrial policy is that market mechanisms do not always function efficiently, especially in developing countries. Therefore, government intervention is needed to correct market failures, particularly in two overlapping areas crucial to economic development: externalities and coordination.

Externalities are mainly associated with the mismatch between private gains and social benefits in entrepreneurial activities (Warwick, 2013). Economic activities having positive external effects and receiving close attention by government and scholarship include the acquisition of technology and industry information, R&D, exporting, foreign direct investment (FDI), structural change, entrepreneurial entry, and worker training (Rodrik, 2004; Lin, 2009, 2012; Naudé, 2010a; Harrison & Rodriguez-Clare, 2010). For developing countries, Hausmann and Rodrik (2003) specify "self-discovery," which is the process by which entrepreneurs explore markets and experiment with new product lines, as an externality-generating activity. The authors argue that although this process is essential to industrial development, entrepreneurs may refrain from investment due to the problem of appropriability – a situation in which the entrepreneur is unable to reap all investment benefits if a venture succeeds, but must bear full cost if it fails.

Coordination failure is another major obstacle to development (Rodrik, 2004, 2008; Lin, 2010, 2012). Coordination is related to the initiation of projects (e.g. upgrading factor conditions) that compel private firms to make simultaneous investments, benefitting invested parties through economies of scale and spill-over effects. Coordination is dependent on institutional arrangements that facilitate collaboration among government agencies and between the public and private sectors. In theory, this process enhances the quality of decision making and aligns the interests of all concerned parties. Coordination is vital in enabling companies to overcome constraints in finance, infrastructure, and logistics that hinder market entry and upgrading efforts. Coordination also helps firms achieve synergistic gains through deeper linkages within and between industries.

Given the potential benefits of managing market failures, governments in nearly every country have engaged in some degree of industrial policy intervention (Chang, 2009; Lin, 2012). However, success is rare and many countries have experienced disappointing results. There are several hindrances – often referred to as government failures – that stymie industrial policy (Aghion, Boulanger, & Cohen, 2011; Naudé, 2010b; Rodrik, 2008). The first is information constraints. Governments lack the information necessary to adequately substitute for market mechanisms in picking industrial "winners." The second hindrance is associated with rent-seeking and regulatory capture. In particular, if firms in target industries depend heavily on subsidies and import protection, they are likely to become the target of rent-seeking and political capture (Krueger, 1974; Lin, 2009). The third hindrance concerns capabilities. With weak capacity and limited institutional support, governments in developing countries often lack adequate capabilities in designing and implementing sound industrial policy.

2.2. To what extent should the government intervene? 'Soft' industrial policy versus 'hard' industrial policy

Concerning the potential benefits of industrial policy, there are differing views about how deep government intervention should be. Accounting for the risk of government failures, Harrison and Rodriguez-Clare (2010) propose an approach known as horizontal ('soft') industrial policy, which focuses on coordinating efforts to enhance productivity through deeper cooperation and consultation between government and industry. Activities related to this approach include programs and grants supporting particular clusters through worker upskilling, technology adoption, and regulatory and infrastructure upgrading. The authors argue that this approach has two advantages over selective ('hard') industrial policy, which relies on activist interventions in support of prioritized sectors and traditional measures such as tariffs and financial incentives. One advantage is its restriction of opportunities for rent-seeking, and the other is its compatibility with free trade agreements that many countries have embraced in recent decades (expected to increase with continuing globalization trends).

Presenting a counter argument to the 'soft' industrial policy approach, Aghion et al. (2011) find that state subsidies in particular sectors can be beneficial, especially in countries with a less mature capital market. According to the authors, governments in many countries continue to use subsidies and tax breaks as instruments to promote industrial development and attract foreign direct investment.