
A Study on Constructing the Competitiveness Index for Korean Foreign Affiliates: Developing a System for Monitoring International Industrial Trends Using Data on Multinational Corporations with Global Value Chains

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Foreign direct investment (FDI) and trade have been increasing rapidly around the world since the 1980s. Meanwhile, the unstoppable march of international trade has been accompanied by the expansion of global value chains (GVCs), enabling companies to coordinate their production processes more efficiently with cross-border operations. And multinational corporations (MNCs) have been leading this expansion of production networks worldwide. Korean MNCs, too, have been aggressively investing in and trading with operations abroad.

The expansion of GVCs increases the overall volume of trade worldwide by increasing the demand for intra-firm trade between parent companies and their offshore operations. Overseas subsidiaries are tied to their parent companies through the trade of intermediary materials. However, recent studies have shown that overseas subsidiaries and parent companies are also becoming increasingly linked through various forms of intangible assets, in-

cluding human resources. Changes in the competitiveness of overseas subsidiaries therefore significantly affects the competitiveness of their parent companies and, by extension, the strengths of the economies in which their parent companies are located.

Despite the growing significance of overseas subsidiaries, a system for effectively and consistently monitoring their competitiveness has not yet been established. This is mainly due to the difficulty of acquiring statistics and data necessary for the development of such a system as well as the difficulty of identifying the diverse elements of competitiveness measurement that need to be controlled. In response to this problem, we discuss and analyze the empirical aspects of developing a system capable of monitoring the competitiveness of overseas subsidiaries.

We survey the established literature and analyze the available empirical data to identify the trends and patterns of the expansion of production networks worldwide, and then discuss the need for the development of an index with which to measure and monitor the competitiveness of overseas subsidiaries. To this end, we use Korea Exim Bank's data on the overseas subsidiaries of Korean companies to identify the current status of such subsidiaries. We also survey the existing literature on the FDI decision theory and GVC expansion, and draw implications for the development of an index of competitiveness. We then apply our index to Korean companies' overseas subsidiaries in China and assess its utility.

Chapter 2 of this report provides an empirical analysis of GVCs today, offering empirical evidence of the strengthening ties between overseas subsidiaries and the Korean economy. We also ascertain Korean MNCs' involvement in the expansion of GVCs

worldwide. Our empirical analysis reveals that, amid the falling cost of trade and expansion of GVCs worldwide, Korean MNCs, too, have actively expanded their production networks around the globe. Our analysis confirms that the trade of intermediary goods binds overseas subsidiaries and the Korean economy together, and that much of this trade is concentrated in Korean parent companies and their overseas subsidiaries.

In addition, Chapter 2 explains the channels via which the changing level of competitiveness in overseas subsidiaries affects the competitiveness of their parent companies in Korea, in light of the FDI decision theory and expansion of GVCs. We then examine Korean companies' decisions to launch overseas subsidiaries in certain locations through the lens of the FDI decision theory and explore its implications. The theoretical discussion provided in Chapter 2 forms the basis for the methodology, discussed in Chapter 3, for how to account for or control the attributes or shocks inherent to the given industries or regions that influence the competitiveness of overseas subsidiaries.

Chapter 3 provides an overview of the existing literature on developing indices of the competitiveness of overseas subsidiaries and the development of an actual index to be applied to the subsidiaries of Korean companies operating in China. Here, we use the data envelopment analysis (DEA) technique to measure company-level productivity, and then use these measures as the basis for the index of the competitiveness of each industry. We convert the productivity of individual firms into industrial competitiveness by applying weighted averages, and in an attempt to assess the index of industrial competitiveness, we estimate the productivity of

subsidiaries in China in relation to their local competitors.

To test our competitiveness index, we applied it to the competitiveness of the Chinese manufacturing industries in which Korean subsidiaries were operating from 2005 to 2009. During this period, the productivity of the subsidiaries lagged behind that of their local competitors, with only the Korean companies capable of maintaining a certain level of productivity launching such subsidiaries in China. Our competitiveness index also reveals an overall decline in the competitiveness of Korean companies' subsidiaries operating in the Chinese manufacturing industries. However, the competitiveness of some subsidiaries began rising again in and after 2007.

Finally, we discuss the diverse issues involved in using and interpreting our competitiveness index. We also caution against the range of possible problems that could arise in the application of our competitiveness index, and propose possible solutions based on our examination of the causes of said problems.

Chapter 4 provides additional analyses designed to supplement the industrial competitiveness index we developed in the foregoing chapter. This chapter thus provides additional information on how our competitiveness index could be used in more diverse fields. Our additional analysis on the competitiveness of Korean companies' subsidiaries in China provides a more thorough understanding of how these subsidiaries' competitiveness has changed over time.

Applying a method proposed by Fare et al. (1994), we analyze the dynamic changes in the productivity of individual firms, and then divide these changes among technical changes resulting from increases in the productivity of leading companies, on the

one hand, and efficiency changes reflective of the productivity of overseas subsidiaries, on the other. This additional analysis reveals that, despite the overall downward pattern of the competitiveness of Korean companies' subsidiaries in China, the causes of the decline differ from industry to industry. Some industries have experienced losses of competitiveness due to the increasing productivity of leading competitors, while other industries' competitiveness declined due to the decreasing competitiveness of the subsidiaries.

The second supplementary analysis statistically estimates the decisive factors of productivity for subsidiaries in China. Our estimation reveals that the more tangible assets they hold and the greater the presence of Korean managers, the more productive the subsidiaries. This suggests that investment in tangible assets and the dispatch of Korean managers are important in ensuring the competitiveness of subsidiaries in the Chinese market. It was also noted that the productivity of Korean subsidiaries tends to decline over time, in line with the declining industrial competitiveness index.

The third supplementary analysis examines the changes in the numbers of new subsidiaries launched in different industries. While the changes in the competitiveness index were consistent, the changes in the number of newly launched subsidiaries varied widely across industries, suggesting that the changes inherent to industries has significant influence on companies' decisions regarding the launch of new subsidiaries.

Finally, Chapter 5 summarizes the findings of our analysis and identifies the implications and limitations of the competitiveness index we developed. Due to the limitations on the data and meth-

odology used, this study has a number of shortcomings, but these do not overshadow the significance and distinctiveness of this study as the first attempt to develop an index of competitiveness for overseas competitiveness. The chapter also provides advice on further developing and refining the competitiveness index, particularly with respect to amassing and managing data on overseas subsidiaries. We conclude by suggesting ways in which new competitiveness indices can be developed for more recent years and with respect to countries other than China.