Abstract

Keywords: Critical Loss Analysis, Natural Experiment Analysis, Correlation Analysis, Pattern Analysis, Vector Autoregressive Regression, Granger Causality Test, Stationary Test, Elzinga-Hogarty Test, Industry of Quarrying of Stone and Sand, Manufacture of Non-alcoholic Beverages, Platform Economy, Network Effects, Transaction and Non-transaction Platform, SSNIP, SSNDQ

Market definition plays a preliminary but important role in the implementation of competition/antitrust policy in various countries. Scheffman, Coate, and Silvia (2003) summarize the Federal Trade Commission's experience with enforcing the Merger Guidelines over the past 20 years and group the commonly used quantitative methods for market definition into three categories: Critical Loss Analysis, Natural Experiment Analysis, and Pattern Analysis. However, each method has its pros and cons. Therefore, surveying literature related to the quantitative approaches for market definition and reviewing how these methods are utilized in domestic and foreign cases, as well as using the real market price and quantity data as the applications of these methods, may be of great value towards understanding the practical difficulties and limitations of the quantitative methods of market definition in depth. Additionally, the rise of the digitized economy has also brought limitations and challenges to the current empirical methods for market definition.

In this project, we (1) survey the latest literature on quantitative methods for market definition (including theoretical and empirical academic papers), as well as the recent discussions on market definition in the US and EU; (2) collect data in the industry of Quarrying of Stone and Sand and in the Manufacture of Non-alcoholic Beverages, and then apply suitable quantitative market definition methods to explore the practical difficulties and limitations; (3) provide practical suggestions for the Fair Trade Commission; and (4) discuss how quantitative approaches for market definition are applied/or should be modified theoretically and practically in the digitized economy through literature review.

In Chapter 2, this project briefly introduces how to conduct a critical loss analysis by the following three steps: (1) The users have to calculate the rate of change in sales, which is referred to as "critical loss", under a break-even condition with respect to a SSNIP in the hypothetical monopolist's product (or service) market in a specific geographical area. (2) Then, given the same price change, the users have to estimate the actual market change rate of sales, which is referred to as "actual loss", for the same relevant market. (3) If the estimated actual loss is smaller than the critical loss, the smallest relevant market is defined. Otherwise, the users should further extend the candidate market or geographic area and then repeat the above process until the smallest market is defined. We also collected several practical issues that competition law investigators/empirical economists often encounter.

We further provide an illustration of the implementation of the critical loss analysis for the industry of Quarrying of Stone and Sand in Taiwan. Due to the limitation of insufficient data, we use the cross-county panel data from 2013 to 2016 and treat the whole island of Taiwan as a relevant market. It is also supplemented with some assumptions to deal with the problem of missing data. Although our empirical results show that the island is a relevant market for the Industry of Quarrying of Stone and Sand, our diagnostic tests indicate that the quality of instrumental variables used in this example can be further improved. Moreover, researchers can replace the imposed assumptions with the actual data to obtain more accurate results.

Chapter 3 introduces the methods of natural experiment analysis and pattern analysis, including correlation analysis, the vector autoregressive regression with the Granger causality test, the stationary test, and the Elzinga-Hogarty test. We summarize the implementation procedures and list the limitations for each individual method. For instance, while the stationary test allows for nonstationary data, the data used for correlation analysis and the vector autoregressive regression with the Granger causality test are required to be stationary. Also, we might have the payer problem and silent majority fallacy when applying the Elzinga-Hogarty test. Additionally, we may apply partial correlation to control for common supply and seasonal demand shocks and utilize the first difference transformation to obtain stationary data once the original data is nonstationary.

The detailed data requirements and usage limits for these quantitative market-definition methods are also summarized in Table 17, which might serve as a reference for subsequent operational applications. This chapter

also applies correlation analysis, the vector autoregressive regression with the Granger causality test, and the stationary test as an illustration of the implementation of pattern analysis for the manufacture of non-alcoholic beverages (including vegetable juices, carbonated drinks, mineral water, sports drinks, coffee drinks, and tea drinks) from 1992/01 to 2018/04. Although the conclusions are slightly different from various methods, comparing them might result in a more solid conclusion: these six types of beverages did not belong to the same market.

Chapter 4 further explores the preliminary methods of market definition in the digitized economy. In particular, the indirect network effects might differ in different types of platform structures. Thus, traditional market definition methods should be further adapted for two/multi-sided markets. However, the difficulty of collecting data in multi-side markets, free payment services, the various indirect network effects under different market structures, and the concentration of digitalized markets all make this task more complicated. More efforts should be devoted to developing appropriate market definition methods for the digitized economy.

Chapter 5 concludes the project. The critical loss analysis is the most economically logical but requires the most data information. While a natural experiment analysis can also identify causality and then well-define the market, an exogenous shock is needed and the pre- and post-shock data should be accessible. The data requirement for pattern analysis is the least among these three market definition quantitative methods, but we have to carefully control for nonstationarity and common supply/seasonal demand shocks. The competition law enforcement officers should find the balance between the quality/accuracy and inadequate data under time constraints.

Last but not least, data are prerequisite for conducting quantitative market definition methods. In the short run, price data should be collected as much as possible for the potential antitrust industries. Antitrust/competition law enforcers might work with economists/econometricians to establish different standard analysis processes for various industries as well. In the long run, it is important to collect the data required for the hypothetical monopolist test. Finally, due to the rapid development of the platform economy, in addition to the long-term and continuous attention to the latest changes in the related literature, domestic researchers should also conduct more in-depth discussions on such issues.