Chapter 9
Supply Chain Disruptions and the Effects on Price Stability:
An Intercountry Analysis

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ABSTRACT

The widespread impact of price instability issues in the world has originated in global financial problems for more than three decades, and the effect of wars on the price changes remained mostly local or regional. But today, the impact of price instabilities rooted in supply chain bottlenecks is broader and more persistent in nature. With this changing price instability structure, analyzing the interdependence in production among the countries and exploring their effect on countries' inflation levels has become crucial. With this motivation, the chapter examines these relations by the BVAR model. The interdependence of countries' own purchasing managers' index, representing the supply chain disruptions, and their impulse on the producer price index, representing the inflation, are captured by the BVARs. The chapter focuses on the cases of a group of specific economies and chooses three countries: Germany, the United States, and Turkey. The findings remark that these countries' inflation levels are associated with their major trading partners' supply chain disruptions.

INTRODUCTION

Various reasons such as a pandemic, political crisis, disasters, economic crisis, or war may result in supply chain disruptions. Recently, the most significant supply chain bottlenecks in the world have been experienced during the Covid 19 pandemic. Since the beginning of the early phase of the outbreak, the lockdown and short-time working order have disrupted both the production and distribution stages of supply chains. These unexpected developments in the business world restructured the planned jobs, commitments, and even priorities. The experiences increased the costs soon afterward and ultimately led to price surges in the markets of almost all countries. The countries ran into inflation issues with the incidents extended over pandemic time. However, the outcomes of the price instabilities or inflation did

not influence the economies in the same way across the countries, as their economic resilience levels are not the same. Clearly, in a global world, the same singular developments lived by the trade partners have led to similar economic consequences hardly these consequences have not been as crucial as in other countries' economies.

For the activities in the global trade, the countries rely necessarily on other countries' production processes. Many European manufacturers are dependent on China and other Asian countries for some crucial goods and semifinal goods. In March 2020, for instance, 60% of the German mechanical industry was disrupted because of the shutdowns in Italy and China (Van Der Putten, 2020). Likewise, in North America, U.S. production contributes to manufacturing in Canada and Mexico, and the lockdowns in the U.S. restricted the trade between the U.S. and these Latin countries (Baldwin and Tomiura, 2020). The disruptive effect of the pandemic did not stay regional since the countries such as Germany, the U.S., China, Japan, and Korea are dominant for all countries' final goods markets (Van Der Putten, 2020).

In terms of the macroeconomy, the severe consequences of the supply disruptions can be traced back to the principal indicators like the growth, employment, or exchange rate. Its impact on price stability is closely related to all these macroeconomic indicators. That is why price stability is one of the keys outcomes that need to be analyzed to grasp the economic impact of the disruptions. Modern supply chains are highly uncertain, and the supply chain processes are very complicated by their nature (Datta, P.P. and Christopher, 2011). On top of that, detecting and analyzing the effect on the prices, which have micro and macro dynamics, get more complicated. From this aspect, it gains prominence to explore the countries' data of the most interconnected partners in trading simultaneously.

In the literature, the relationship between retail prices and the developments in the retail supply chain is investigated by Ballantyne and Langcake (2016), and they found more significant evidence compared with the model built by the exchange rate. Majan and Tomar (2020) examine the effects of disruptions in food supply chains on product availability and food prices in India due to Covid 19. Commonly in the relevant literature, the studies suggest that supply chain disruptions have led to price increases (Meier and Pinto, 2020; Cavallo et al. 2014; Glick and Taylor, 2010; Attinasi et al. 2022; Santacreu and LaBelle, 2022). On the contrary, Greenwood and Hanke (2022) discuss that inflation in the U.S. is not due to problems in the supply chain but the result of the excess monetary growth in the market.

This chapter primarily aims at investigating price instability originating from supply chain disruptions. For this purpose, a group of countries is determined based on the dominance in a focus country's export and import activities. Here the specified focused country is Turkey. For the variable representing the supply chain disruption, Purchasing Managers' Index (PMI) data is preferred, and for the variable as an indicator of inflation, Producer Price Index (PPI) is selected. PMI is one of the most reliable indices and a more precise indicator of the current global business environment. It helps to describe the existing market conditions and provides the signals of the following terms' potential price instabilities. It is based on a survey and consists the variables such as manufacturing, backlogs of work, output and input prices, suppliers' delivery times, stocks of finished goods, and employment. As for PPI data, it has more representative power compared to Consumer Price Index (CPI) because it also considers the costs to the industry. The data covers the period of 2011 - 2022 on a monthly basis. The data source for PMI is S&P Global (2022).

The chapter examines the relationship between these two variables by considering co-movement and association between the countries. The empirical method of the chapter is based on Bayesian Vector Autoregression (BVAR) modeling. BVAR models contribute to detecting the interdependent relationships in the series and consider the effect of their lagged values (see Koop and Korobilis (2010) for the details

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