

Risk Spillover of the Real Estate Sector Through the Input-Output Network Based on Inter-Sectoral Production Linkage

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Production linkage is one of the most prevalent interconnections between economic agents, and thus one of the most important risk transmission channels between companies and sectors. Due to the existence of inter-sectoral or inter-company linkages, the risk spillover effect from one company being in default to its related sectors is highly likely to occur through direct financial transactions, information dissemination, sentiment contagion and so on, and in some extreme cases even lead to nearly complete collapse of the whole industrial chain. As a pillar sector of the national economy, the real estate sector has a long industrial chain where there are many companies in various sectors, from upstream building materials to downstream home appliances, furnishings and decorations, penetrating almost every corner of the economic system. These companies in the industrial chain have established complex production linkage due to the credit-and-debt relationship in business transactions, joint cooperation in development or sales of the same product, which have generated financial interconnections, information dissemination and sentiment contagion. These complex production relationships potentially spill over the default risks in the real estate sector to its related sectors, and even further trigger systemic risks, which poses a great threat to the stable development of the entire economic system. The outbreak of several financial crises in history has been highly related to the risk spillover of the real estate sector. Therefore, it is important and urgent to explore the risk spillover effects of the real estate sector from the perspective of input-output production linkage.

Therefore, this paper constructs an input-output network between the real estate sector and other sectors based on the inter-sectoral production linkage illustrated by input-output tables, and quantitatively analyzes the impact of real estate sector risks on its related sectors based on the input-output network, specifically, the influence on sectors in the input-output network, such as the construction sector, when the real estate sector generates default risks or when real estate prices fluctuate drastically. Strategies for preventing and alleviating risk spillover in the real estate sector are provided based on the analysis of the input-output network. In this paper, the input-output table of 42 sectors in China from 1998 to 2018 are used to calculate the coefficients and other indicators of the real estate sector and other sectors, and then a directed input-output network of the real estate sector and other sectors is constructed with these indicators. Accordingly, we analyze the spillover effects and risk transmission paths of the real estate sector on other sectors and find that: (1) the real estate sector does not have strong risk spillover effect on all industrial sectors, but has significant risk spillover through the input-output network to the financial sector, the typical upstream sector -- construction sector, and the typical downstream sector -- wholesale and retail trade sector; (2) the risk spillover of the real estate sector to other upstream and downstream sectors through the input-output network is affected by the real estate industrial cycle. This paper integrates input-output analysis and complex network analysis to study the risk spillover effect of the real estate sector from the perspective of production linkage, which expands the application of input-output analysis methods and enriches the theories and methodologies in financial risk research, and is of great theoretical significance.