Import tariff transmission in a production network

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In recent years, import tariffs have become an increasingly important instrument of trade policy, particularly in the United States. While tariffs are often motivated by the objective of protecting domestic industries, their broader macroeconomic effects remain less well understood, especially in economies where industries are tightly interconnected. This paper examines how tariff shocks affect domestic economic activity when industries are linked through production networks, using a panel of 71 US manufacturing sectors over the period 2004-2020.

A network-based empirical framework traces tariff transmission across sectors

To quantify the transmission of tariffs, the paper combines detailed product-level tariff data with information from input-output tables. This allows the construction of sector-specific tariff shocks and measures of industries' exposure to these shocks through production linkages to be captured. In particular, the analysis distinguishes between backward exposure – the extent to which industries rely on imported intermediate inputs – and forward exposure – the extent to which industries depend on demand from customer sectors affected by tariffs. The empirical strategy relies on a panel local projection framework to estimate the dynamic effects of tariff changes on industrial production and producer prices. This approach allows responses to be traced over time while simultaneously controlling for industry-specific characteristics and aggregate shocks, thereby isolating the role of sector-specific tariff changes.

Tariffs propagate as supply shocks downstream and demand shocks upstream

The findings point to two distinct transmission channels through which tariffs affect the production network. First, tariffs on imported intermediate goods raise input costs for industries that use these goods in production. This backward exposure channel operates like a negative supply shock: higher costs are associated with increases in producer prices and declines in output. Second, tariffs also affect industries through their forward linkages. When sectors directly affected by tariffs experience rising costs and reduce their production, this lowers demand for the goods of their suppliers. As a result, upstream industries face negative demand spillovers, leading to declines in both output and prices. These results highlight the fact that tariffs can simultaneously generate supply-side and demand-side effects, depending on an industry's position in the production network.

Network spillovers contribute to a broad-based decline in manufacturing output

Empirically, both transmission channels are associated with a contraction in manufacturing activity. Tariff increases affecting input suppliers lead to higher producer prices and, with some delay, to lower output in downstream industries. At the same time, the reduction in production in tariff-affected sectors propagates upstream, amplifying the decline in output across the network. The

evidence suggests that these indirect effects are economically significant and contribute to a broad-based decline in manufacturing production. The results further indicate that the transmission of tariff shocks is not limited to direct exposure, but is also shaped by the structure of inter-industry linkages. With regard to prices, the findings indicate that tariffs exert upward pressure through cost channels, but this effect is partly offset by demand-side spillovers that reduce price pressures in upstream sectors. Consequently, the overall effect of tariffs on producer prices depends on the relative importance of the different transmission mechanisms.

A stylized production network model rationalizes amplification and transmission patterns

To interpret the empirical findings, the paper develops a stylized production network model with complementarities in production. In this framework, tariff shocks can be represented as cost-push disturbances affecting specific sectors. The model shows how such shocks propagate through input-output linkages, generating supply-side effects in downstream industries and demand-side effects in upstream industries. It further illustrates how these mechanisms can amplify the initial impact of tariff shocks. The theoretical results are consistent with empirical evidence and provide a conceptual framework for understanding the role of production networks in shaping the effects of trade policy.

Overall, the analysis underscores the importance of input-output linkages for understanding the macroeconomic consequences of tariffs. It suggests that the effects of trade policy cannot be assessed solely by focusing on directly affected sectors, but rather that the way in which shocks propagate through the production network also needs to be taken into account.

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