

Foreign Demand Shocks to Production Networks: Firm Responses and Worker Impacts

Based on BFI Working Paper 2022-126, “[Foreign Demand Shocks to Production Networks: Firm Responses and Worker Impacts](#),” by Emmanuel Dhyne, National Bank of Belgium; Ayumu Ken Kikkawa, Sauder School of Business; Toshiaki Komatsu, University of Chicago; Magne Mogstad, University of Chicago; and Felix Tintelnot, University of Chicago

Firms pass on a large share of foreign demand shocks to their domestic suppliers, face upward-sloping labor supply curves, and have sizable, fixed overhead costs in labor; these findings argue for a reassessment of conventional economic models, which likely grossly understate the decline in real wages due to an increase in foreign tariffs.

When most people consider foreign trade, they likely imagine direct trade among international firms, say a firm from Germany trading with a company in Spain, or a US firm trading with a Japanese company, and so on. However, international trade is not limited to direct trading among firms; rather, indirect trade also occurs, wherein smaller and often less productive firms buy and sell from domestic firms that import or export.

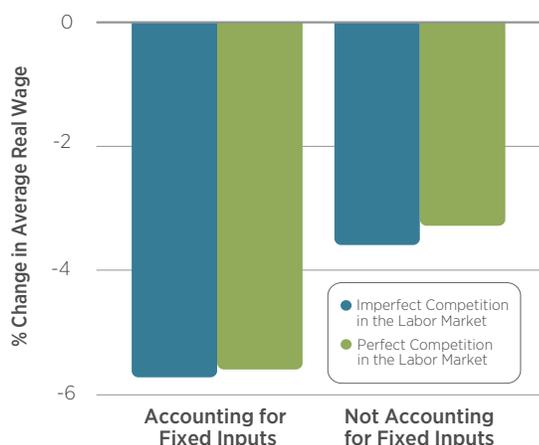
While more is known about direct foreign trade, important questions remain about domestic transactions that are indirectly related to international trade, for example: How

do changes in foreign demand transmit from one firm to the next in the domestic production network? How are firms responding to and workers affected by foreign demand shocks to direct exporters and their domestic suppliers? What are the aggregate implications of foreign demand shocks for output, input costs, and real wages?

To study these questions, the authors employ a rich dataset of firms and workers from Belgium from 2002-2014. The data include input factors and output, customs records, imports and exports, and a value-added tax (VAT) registry with information on domestic firm-to-firm transactions, as well as social security records and employer-employee data worker earnings, hourly wages, and work hours. This dataset allows the authors to determine how firms and workers are connected to foreign markets, whether directly, indirectly, or both, and they uncover three key facts about the Belgian economy:

- The authors characterize the relationships in the data between (changes in) firm-level sales, labor costs, and intermediate input purchases, to find that *input purchases respond nearly proportionally to changes in sales*. In contrast, changes in sales are associated with less than proportionate changes in labor costs, which is consistent with firms facing *fixed* overhead costs in labor inputs, whereas intermediate inputs (such as energy and materials) are predominantly *variable* costs in production.
- Even though direct exporters are rare, *most firms are indirectly exporting*, a finding that stresses the importance of incorporating indirect exports when measuring firms’ ultimate exposure to foreign demand.

Figure 1 • Changes in Average Real Wage in Response to a 5% Increase in Foreign Tariffs



Notes: This figure presents the authors’ estimate of how the increase in foreign tariffs on Belgian exports would affect the average real wage when (or when not) accounting for fixed inputs or imperfect competition in the labor market. This figure illustrates the changes in average real wage due to a uniform 5 percent increase in foreign tariffs on Belgian exports. Please see working paper for more details.

- *Firms that are more exposed to foreign markets are larger, more productive, and pay higher wages, and these wage differentials are not entirely explained by observed or unobserved differences across workers. This finding suggests that canonical models of competitive labor markets, where wages depend only on the marginal product of workers and not the firm for which they work, are incomplete.*

Having established these empirical findings, the authors employ a small open economy model to investigate the relationships between the variables among the data. Please see the working paper for a detailed description of the model, but it is worth noting here that on top of what standard models assume, their model allows for imperfect competition in the form of monopsonistic competition in the labor market (where firms exercise labor market power). The authors' model also allows for the production of goods to require fixed overhead inputs in terms labor and intermediate goods purchased from other producers.

How then, do firms respond to changes in sales induced by foreign demand, and what are the impacts on workers? The authors' estimates of firm responses suggest that Belgian firms pass on a large share of a foreign demand shock to their domestic suppliers, face upward-sloping labor supply curves and, thus, have wage-setting power, and have sizable, fixed overhead costs in labor.

When the authors analyze the aggregate effects of a 5 percent increase in foreign tariffs on Belgian exports, they find that the increase in foreign tariffs produces a substantial 5.7 percent drop in the average real wage. By comparison, based on the assumption that the economy had no fixed costs and perfectly elastic labor supply, the predicted reduction in real wages would be as low as 3.3 percent—a substantial difference.

Bottom line: The way that economists typically model foreign demand shocks on the labor market—with no fixed costs and perfectly elastic labor supply—may grossly understate the decline in real wages due to an increase in foreign tariffs.

READ THE WORKING PAPER

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