THE MICROECONOMICS OF TECHNOLOGY SPILLOVERS: THEORY AND EVIDENCE FROM HUNGARIAN PRODUCT-LEVEL DATA

NONTECHNICAL SUMMARY

LÁSZLÓ HALPERN, MIKLÓS KOREN AND ÁDÁM SZEIDL

What is the effect of imports on productivity? To answer this question, the paper introduces a theoretical model of producers who purchase intermediate inputs from both domestic and international markets, and then estimates it structurally using product-level import data for a panel of Hungarian manufacturing firms from 1992 to 2001.

The authors makes use of trade-flow data at the firm level for very disaggregated product categories (at the 6-digit Harmonized System level) from the Hungarian Customs Statistics. This data were merged with balance sheet information from firms' financial statements. Information on product level inputs allows us to observe the number of imported varieties, which is a key variable in the model, making the data particularly suitable for analyzing the question of productivity enhancing imports. Another advantage of the data is the 10-year-long panel dimension.

A preliminary exploration of the data reveals substantial heterogeneity in the import patterns of firms. The interquartile range of the share of imports in total intermediate inputs is $7 - 57\%$. Firms importing a large share of their intermediate inputs (1) tend to be larger, (2) grow faster, and (3) are less likely to exit than firms with low import shares. Additionally, (4) firms almost never cease to import any given input variety even if they shrink rapidly.

Motivated by these observations, the authors introduce a model where the decision to import a given variety from abroad involves paying a sunk cost. Firms also differ in their productivity levels, and hence will make different choices about the number of varieties they import. As a result, the model exhibits cross-firm heterogeneity in both the number of imported varieties and the share of imports in intermediate inputs. The model explicitly identifies two channels through which imports impact firm level productivity: (1) access to foreign inputs can improve the product mix of intermediate inputs (horizontal differentiation); and (2) domestic inputs may be of inferior quality relative to foreign inputs (vertical differentiation). In addition, (3) imports can increase aggregate productivity through reallocation of capital and labor to importers.

1

The estimation procedure accounts for the endogeneity in input usage, the decision of entry into import markets and the decision of exiting the industry. The results suggest that imports have a statistically as well as economically significant effect on firm level productivity. A 10 percentage point increase in the share of imports increases firm productivity by 1.8%. To gauge the magnitude of this effect, note that the average firm in the data increased its import share from 23% to 50% between 1992 and 2001, implying that the effect of imports on productivity for the average firm has been 4.9% during this time. This finding suggests that imports have a powerful effect on productivity at the level of the firm.

What is the effect of imports on aggregate productivity? To answer this question, the paper then aggregates the firm-level measures to compute an aggregate productivity index for manufacturing. This index indicates that imports account for about 30% of the growth in aggregate productivity during 1992-2001. A decomposition of the index shows that approximately 50% of this growth is due to increased importing activity. The remaining 50% is coming from the reallocation of capital and labor to importing firms.