

Growth and the Fragmentation of Production*

Johannes Boehm

Sciences Po & CEPR

johannes.boehm@sciencespo.fr

Ezra Oberfield

Princeton University & NBER

edo@princeton.edu

May 12, 2022

First draft, preliminary

Abstract

How much do changes in the fragmentation of production contribute to growth? Using detailed plant-level data on the manufacturing sector in India between 1990 and 2014, we study a version of Smithian growth, the link between greater fragmentation of supply chains and productivity. We propose a measure of a plant's vertical span, which corresponds roughly to the number of stages in a supply chain that the plant performs in-house; when plants have smaller vertical spans, production is more fragmented. We find that fragmentation increases with development in both the cross-section and time series. Further, within locations at a point in time, larger plants tend to have smaller vertical spans, and those that increase sales tend to decrease vertical span. Using changes in demand during the tariff liberalization in the 1990s, we provide evidence that increased demand causes specialization. We find evidence from economies of scale in specialization. We construct a general equilibrium model to rationalize these findings and estimate the sources and magnitude of scale economies. Goods are produced in a succession of steps, each combining labor and a set of intermediate inputs, giving rise to a tree-like structure. Firms exert effort to find suppliers for inputs, and choose the set of production stages (and thereby inputs) to produce the output at lowest cost. The structure implies that the returns to searching are more strongly diminishing for inputs that are further upstream. Firms with high productivity draws are therefore more likely to choose to be more vertically specialized.

KEYWORDS: Growth, Organization, Intermediate Inputs, Productivity, Production Networks, Specialization

JEL: O11, O14, L23, L25

*