

PhD Thesis: Lumpy Investment, Productivity, and Quantitative Models

by

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Abstract

Firms play a pivotal role in the real economy and are a fundamental part of Economics. The reliability of the findings of economic models depends on how well their assumptions capture the true nature of firms. Moreover, in light of the growing significance of microfoundations in Macroeconomics, it becomes necessary to keep expanding our understanding of the complexities of firm dynamics and sources of heterogeneity, which can influence aggregate trends and behaviors. Therefore, it is imperative that researchers constantly examine the fundamental patterns related to firms and adapt their model hypotheses accordingly. Currently, it is standard practice to assume that productivity is a process completely exogenous to the firm. However, the existing literature on lumpy investment has demonstrated that large spikes of investment in physical capital are often accompanied by disruptions in productivity. This thesis is concerned with this inconsistency between these findings and common practice in applied research, and aims to measure its effects for model results and to amend possible issues discovered. First of all, we provide additional evidence of spike-induced productivity disruptions, found in a novel dataset. Thus, strengthening the existing findings of the lumpy investment literature, and motivating the analyses that follow. We, then, extend the standard framework for production function estimation, to control for investment spikes and compare with the original approach. The resulting production function input elasticities and returns to scale are found to be significantly different. Additionally, estimates and analyses related to productivity at the firm level are also affected. More importantly, the impact of investment spikes extends to macroeconomic analyses. We construct estimates of aggregate productivity growth from the data and decompose them into their technical and reallocation efficiency components. The decompositions differ noticeably, depending on the model specification. This effect is most pronounced in periods with a greater frequency of investment spikes, thereby reaffirming their significance for the findings of the exercise. Finally, we provide simulation-based evidence supporting our proposed modification. By simulating and re-estimating a structural model of heterogeneous firms, we show that the decision to include or exclude investment spikes significantly influences the estimates and subsequent conclusions.