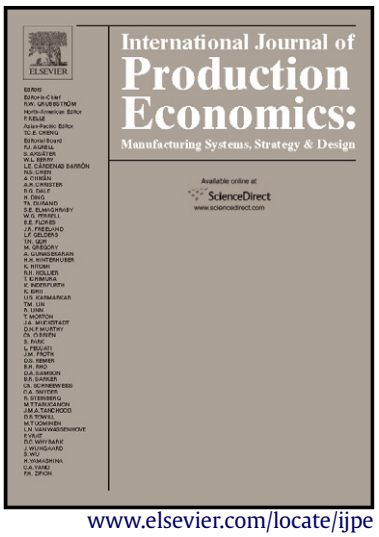

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Economic Implications of 3D Printing: Market Structure Models in Light of Additive Manufacturing Revisited

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Abstract

Additive manufacturing (AM), colloquially known as 3D printing, is currently being promoted as the spark of a new industrial revolution. The technology allows one to make customized products without incurring any cost penalties in manufacturing as neither tools nor molds are required. Moreover, AM enables the production of complex and integrated functional designs in a one-step process, thereby also potentially reducing the need for assembly work. In this article, we discuss the impact of AM technology at both firm and industry level. Our intention is to discern how market structures will be affected from an operations management perspective. Based on an analysis of established economic models, we first identify the economic and technological characteristics of AM and distill four key principles relevant to manufacturers at firm level. We then critically assess the effects of AM at industry level by analyzing the validity of earlier assumptions in the models when these four principles apply. In so doing, we derive a set of seven propositions which provide impetus for future research. In particular, we propose that in a monopoly, the adoption of AM allows a firm to increase profits by capturing consumer surplus when flexibly producing customized products. Meanwhile in competitive markets, competition is spurred as AM may lower barriers to market entry and offers the ability to serve multiple markets at once. This should ultimately result in lower prices for consumers.

Keywords: 3D Printing, Additive Manufacturing, Market Structure, Flexible Manufacturing, Economic Modeling
JEL classification: L11; O14