Manufacturing TFP Decomposition and Convergence amongst Indian States

Research Proposal towards Internal Assessment for 405: Applied Production Analysis

Ananya Venkatesan Iyengar (Roll No. 21227707034)
Maneet Kaur (Roll No. 21227702138)
Muskan Mohan (Roll No. 21227707146)
Rahul Sharma (Roll No. 21227707187)

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1 Proposal

Total Factor Productivity (or TFP) is typically evaluated as the residual term of a Hicks Neutral neoclassical production technology and is widely considered as a measure of an economy's productive capacity not explained by the use of factor inputs. In particular, it measures the economic efficiency of production with respect to the production possibility frontier of the economy. An economy can improve performance in two ways: in moving towards its own frontier (Technical Efficiency) and in the frontier itself shifting outwards (Technical Change). Determining this frontier by means of a distance function serves as an "idealised yardstick to evaluate the performance of actual organisations and industries" (Worthington, 2000).

TFP has oft been used as a measure of manufacturing productivity in India, especially in the post-reform period. Gulati et al. (2020) measure sectoral aggregate TFP from 1981 to 2016, observing an overall increase in productivity driven by the services sector, while the manufacturing sector showed a more dampened change. Of course, this data veils the inter-state heterogeneity in manufacturing efficiency. Deb and Ray (2014) use ASI data for 1970-71 to 2007-08 and observe an increase in manufacturing in most states in the post-reform period while some states registered a decline in TFP. They note that TFP is the major driver of growth in Indian manufacturing. Moreover, Kumar (2004) finds that state-level post-reform TFP growth is predominantly bolstered by technical

change (i.e. outward shift of the production frontier) rather than technical efficiency, and finds evidence of convergence between states.

In light of the Financial Crisis in 2007-08, and the subsequent twin-balance sheet problem plaguing in the Indian economy, extension of the above analysis to the post-crisis period is necessary. Furceri et al. (2021) use cross-country KLEMS data from advanced economies to note that deep recessionary shocks can permanently and detrimentally impact TFP by 3 to 5 percent owing to resource misallocation. Gulati et al. (2020) note a 0.1% aggregate TFP decline in the 2008-09 to 2013-24 period, turning positive thereafter. The comparatively smaller decline in TFP can be attributed to the relatively larger degree to which portions of the Indian economy were insulated from the 2008 Recession. In line with existing literature, this paper aims to exploit data from the Annual Survey of Industries (ASI) from 1983-84 to 208-19 to decompose state-level TFP into its technical change and technical efficiency components by means of the Malmquist Productivity Index. This index makes use of the Distance Function and also moves away from solely assuming a Hicks Neutral technology, allowing for a technological bias that is either capital-deepening or labour-deepening. This paper also aims at looking at absolute and conditional convergence of the components of manufacturing TFP at the state-level in the post-crisis period and explain observed trends.

2 References

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