

Exploiting the dynamic input-output framework to calibrate a time-series of social accounting matrices to external forecasts

Topic: Industry Structure in Time

Author: Jared Woollacott

This work exploits the dynamic input-output Leontief model to calibrate a baseline set of social accounting matrices (SAM) to external forecasts of intensive and extensive properties of the economy. Once calibrated, the SAMs can be used to support either an inter-temporal IO or CGE model. IO data are assembled for a base year using Bureau of Economic Analysis (BEA) accounts. I then use Energy Information Administration (EIA) Annual Energy Outlook (AEO) forecasts on industrial, commercial, and residential energy intensities to project the benchmark year's direct requirements matrix forward 25 years. The structure of the dynamic Leontief model imposes the necessary accounting identities to identify a set of feasible output vectors for each period. These vectors will not generally comport with the AEO output forecasts. I use numerical methods to minimally revise the intensive properties of the economy (e.g. production technology, investment, or consumption shares) such that the implied output vectors align with their AEO forecasts. The key challenges here are the evolving economic structure (intensive) and imbalanced growth (extensive) properties specified by the forecasts. I conduct sensitivity analyses to assess to which properties of the economy the output solution vectors are most sensitive.