

## Sources of Growth and Structural Change in Input Output System in India: Estimating Temporal Leontief Inverse

Topic: Structural change and dynamics 3

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The Indian economy reached at the phase of high growth in the mid 1980s with some major as well as minor fluctuations. After experiencing income deceleration in the late 1990s, it again returned to the path of high growth in 2003-04 with average growth rate of real GDP at 8.9 percent per annum for the next five years. The growth rate dipped down to 6.7 percent in 2008-09 partly because of the global financial and economic crises, and increased marginally to 7.4 percent in 2009-10. The objective of this study is to look into the sources of high growth and the pattern of structural changes as observed during the post-reform period in India with input output data provided by Central Statistical Organisation (CSO), government of India. The contributions of final demand, technological progress, and the synergistic interaction of final demand and technological progress to output growth have been examined by analysing temporal Leontief inverse.

The input output transactions tables in India have been constructed by following the principles of the System of National Account (SNA) suggested by the United Nations (UN). The intermediate transactions are valued at factor costs. The final demand consists of private final consumption expenditure, government final consumption expenditure, gross fixed capital formation, changes in stocks, exports and imports. The value added has two components: net indirect taxes and gross value added. Gross value added includes the compensation to employees, the operating surplus, and depreciation of fixed capital. The two basic matrices provided in the IOTT are the absorption or use matrix (commodity-by-industry) and make or supply matrix (industry-by-commodity). The absorption matrix provides allocation of commodities as inputs into industries while each row of the make matrix gives distribution of output of different commodities produced by the industry of that row.

Leontief's (1986) open model, , has been used to locate the key sectors, among the 115 sectors incorporated in India's input output table, affecting significantly the economic growth in India. The Leontief inverse,  $(I-A)^{-1}$ , a derived matrix from an input output table, is based on input requirement matrix,  $A$ . The formulation of temporal Leontief inverse includes a sequence of input coefficient matrices  $A_0, A_1, A_2...$  for different periods. The backward and forward linkage effects of different sectors affecting output growth have been estimated with the temporal Leontief inverse by following the methodology developed in Rasmussen (1956). The sectors with linkage coefficient more than unity have been treated as key sectors in India in stimulating economic growth.

The sources of output growth are decomposed into three components as suggested in Sonis et al. (1996): the first component is originated from the growth in final demand; the second component pertains to the output growth due to technological progress; and the third part is output growth due to the synergistic interaction between final demand and technological change. Each part of the output growth has been decomposed further by tracing out whether the change is self generated, originated from the sector itself, or non-self generated, originated from other sectors in the economy. We have measured structural change by the multiplier product matrix that can be derived from the Leontief inverse.

Schumpeter (1947) hypothesised that technical advance is the major driver of creative destruction in industries. This study of the growth and structural change with input output data in post-reform India only partially supports that hypothesis.

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