Estimating an extended informal sector Input-Output Table for India with an employment account based on workforce characteristics

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In many developing countries, over two-thirds of total employment is engaged in the informal sector. The workforce in the informal sector can be characterized by increased vulnerability and lower wage rates compared to workers in the formal sector. Additionally, production activities involving informal employment are not fully regulated by the government. Therefore, aggregating formal and informal employment activities within each Input-Output Table (IOT) sector could result in the loss of critical information on the economic structure in developing countries. In particular, this could introduce biases in employment impacts estimated from conventional IO analysis. To reduce such aggregation biases, this study introduces a "two-dimensional extended input-output analytical tool" with a distinction between the formal and the informal sector for the Indian economy. The first dimension of the extension is the transaction flows in input-output table, and the other extension is employment by workforce characteristics. We develop an informal sector extended IOT for India for multiple years as a case study using constraints from National Accounts statistics and the Periodic Labour Force Survey (workforce characteristics-extended microdata). Using this extended model, we analyse the relationship between final demand (by households and business) for different products and, the type of employment (formal or informal) used in their production.

Many economic studies have modeled national economies to explore the impact of the informal sector on value added, employment, and pollution. However, these studies do not fully pay attention to the evolution of industrial heterogeneity, which is critical information for developing policies. An extended input-output framework can provide statistical information on the significance of variations in the informal sector by industry and the interdependency between the formal and informal sectors. Some studies have estimated input-output tables considering the informal sector; however, the coverage of industries was not comprehensive, and they assumed the same intermediate input production structure for both the formal and informal sectors. To the best of our knowledge, this study is the first to attempt to develop informal sector extended input-output tables at a relatively detailed level of industry, with different production structures for the two sectors, and providing a time series of tables. This study is divided into the following three steps.

[1] Separating the production activities for all 45 industries of OECDâ€™s harmonised Input-Output Table for India into the formal and informal sectors using data on output and value-added from the informal sector (household sector) obtained from National Account statistics of India. We employed the proportionally assumption as well as estimates from previous studies (e.g., Rada, 2010 and Mitoma, 2023).

[2] Estimating the number of persons employed by industry belonging to formal and informal sectors and by characteristics of workers (e.g., gender, education, occupation, wage, whether they have social security or not) using microdata from the Periodic Labour Force Survey (PLFS), which recently became publicly available, covering the years from 2017 to 2023.

[3] Building a two-dimension extended input-output analytical tool by combining the input-output table estimated in step 1 and the employment matrix by industry and characteristics estimated in step 2.
Based on the informal sector extended time series input-output table, we further provide a

decomposition analysis to break down the factors of economic growth into employment by characteristics in formal and informal sectors.

In general, the share of the informal sector decreases with national economic growth. However, in India, we found that the share of the informal sectorâ€™s contribution to output only decreased slightly between 2011 and 2020. In some industries, the annual growth rate of informal employment was higher than formal employment. We also found that the impact of the informal sector varies among industries. In some labour-intensive industries such as agriculture, textiles and land transport, the informal sector made a major contribution to employment and gross value added, and the informal sector shares have risen. On the other hand, other labour-intensive sectors in services industries (e.g., wholesale and retail, business services and other personal services) have slightly decreased their informal shares.
We believe that a set of time-series informal-sector extended input-output tables is a useful tool to provide new insights into how economic growth is influenced by the complex interplay between the formal and informal sectors in India.