

Annex

Definition of technical terms

Below is the definition of certain terms based on the ILO Glossary of Statistical Terms¹ and the World Bank Enterprise survey.

Capital share: Total rental cost of machinery, vehicles and equipment and total rental cost of land and buildings divided by the total annual sales of the firm in the last fiscal year.

Employment elasticities: Employment growth divided by output growth using the mid-point formula.

Employment growth: The growth in the number of permanent full-time employees between three fiscal years and the last fiscal year before the survey.

Employment: Persons in employment are defined as all those of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit. They comprise employed persons “at work”, namely those who worked in a job for at least one hour; and employed persons “not at work” due to temporary absence from a job, or to working-time arrangements (such as shift work, flexitime and compensatory leave for overtime).

Labour force participation: The labour force participation rate expresses the labour force as a percentage of the working-age population.

Labour force: The labour force comprises all persons of working age who furnish the supply of labour for the production of goods and services during a specified time-reference period. It refers

to the sum of all persons of working age who are employed and those who are unemployed.

Labour productivity: Total annual sales in current dollars divided by total employment in the last fiscal year.

NEET: Youth not in education, employment or training.

Output growth: The growth in sales between three fiscal years and the last fiscal year before the survey.

Process innovations: If a firm introduced new/ significantly improved process during the last three years, it is considered to have done process innovations.

Product innovations: If a firm introduced new products/services during the last three years, it is considered to have done product innovations.

Total factor productivity: The difference between total outputs and factor inputs. We use firms’ sales for total production, while we use wages, capital replacement of machinery and intermediate goods as production inputs.

Unemployment: Persons in unemployment are defined as all those of working age who were not in employment, carried out activities to seek employment during a specified recent period and were currently available to take up employment given a job opportunity.

Unemployment rate: The unemployment rate expresses the number of unemployed as a percentage of the labour force.

¹ <https://ilostat.ilo.org/resources/concepts-and-definitions/glossary/>.

Wage share: Total labour cost divided by the total annual sales of the firm in the last fiscal year.

Working-age population: The working-age population is commonly defined as persons aged 15 years and older, although the age limits can vary from country to country.

Calculations of factor shares elasticities and total factor productivity

We use a Cobb-Douglas production function to estimate total factor productivity (TFP). Using the natural logarithm of the following equation:

$$Y_t = A_{it} K_{it}^{\alpha} L_{it}^{\beta} I_{it}^{1-\alpha-\beta}$$

where K_{it} is capital of firm i in country t , L_{it} is labour of firm i in country t and I_{it} is intermediate goods of firm i in country t .

This production function theoretically explains which factor inputs determine outputs in manufacturing. For our calculations, we use firms' sales for total production, while we use wages, capital replacement of machinery and intermediate goods as production inputs. TFP is calculated as the difference between total outputs and factor inputs. As a first step, we calculate factor input elasticities through differentiating the following equation over time:

$$\ln Y_{it} = \ln A_{it} + \alpha \ln K_{it} + \beta \ln L_{it} + (1 - \alpha - \beta) \ln I_{it}$$

where α , β and $(1 - \alpha - \beta)$ are output elasticities to capital, labour and intermediate goods, respectively.

These elasticities are calculated by regressing the log of output on the log of capital, labour and intermediate goods. Predicted output values are calculated for each firm in each country while including country dummies. Following previous work, all monetary values are converted into US dollars and then weighted by the United States 2010 GDP deflator. As mentioned previously, we also excluded outliers beyond 3.0 standard deviations away from the mean to avoid bias. We also dropped countries that have less than 120 manufacturing firms with TFP data. It is worth noting that other research attempts, such as Saliola and Seker² and the World Bank enterprise note number 23,³ used different regression specifications. However, our results do not deviate in terms of the ordering of factor-input elasticities, while little variation in magnitude was observed compared to their findings. Based on our calculations below, we see that regional capital elasticities are the lowest among other factor inputs due to higher capital intensity relative to labour intensity in manufacturing.

After calculating the elasticities of output-to-factor shares, we calculate TFP A_{it} as follows:

$$\ln A_{it} = \ln Y_{it} - \alpha \ln K_{it} - \beta \ln L_{it} - (1 - \alpha - \beta) \ln I_{it}$$

² Saliola, F. and M. Seker, 2012. Measuring Total Factor Productivity Using Micro-level Data from Enterprise Surveys.

³ Saliola, F. and M. Seker, 2011. Total Factor Productivity Across the Developing World. Enterprise Note Series Working Paper 23.