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The multiplier effect of industrial jobs

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Abstract

Industrialization has historically been regarded as the main avenue to move upwards in the income ladder due to its potential to create a large number of well-paid, high-quality jobs. In recent years, rapid technological change and the automation of many industrial processes have questioned the potential of industry to drive development and create productive jobs. This policy brief challenges this pessimistic view. It provides fresh estimates on the multiplier effect of different sectors of the economy on job creation and shows that manufacturing industries have the largest employment generation potential. For every job directly created in manufacturing, 2.2 jobs are created in other sectors. This multiplier effect doubles that of the non-manufacturing industry and is three times higher than the average multiplier of modern services. This is true for advanced countries and developing ones. Strengthening local industrial ecosystems is key to creating jobs and accelerating economic development, particularly in the current context of rapid technological change associated with the Fourth Industrial Revolution.

Key Messages

1. The developmental impact of productive policies heavily depends on the potential of targeted sectors to create jobs.
2. Despite recent scepticism, the manufacturing sector has the largest potential to create jobs compared to other economic sectors.
3. Most jobs created today by manufacturing are outside the factory floor. Industrial policies intended to create jobs should focus on the whole industrial ecosystem.

Industrialization, productive jobs and economic development

One of the most critical challenges for economic development is creating a sufficient number of productive jobs to absorb a large and growing labour population. Historically, industrialization has been the primary path to address bottlenecks in development. The industrial sector has been instrumental in building a skilled workforce, providing well-paid jobs, fostering unionization, and thus creating a robust middle class. This process sustained economic growth and contributed to significant social and political transformations.¹ Industrialization, by fostering urbanization and creating new social categories and habits, has enabled a virtuous cycle between productivity growth, wage increments and expanded consumption that shape and sustain modern economic growth in today's richest nations.

In recent years, the power of the industrial sector to fuel this virtuous cycle has been questioned by rapid technological advancements and global economic shifts. Automation and the rise of new labour-saving manufacturing technologies have reduced the demand for low-skilled labour, curtailing developing countries' current comparative advantage. Additionally, China's remarkable success with export-oriented industrialization

has led to intense competition, making it difficult for other developing countries to replicate this model and plug into global manufacturing value chains.²

In this brief, we argue that the manufacturing industry continues to be a major source of job creation, though most of these jobs are created outside the factory floor. One of the key characteristics of the manufacturing sector is its extensive forward and backward economic linkages, which place it at the centre of a country's productive system. To accurately measure the job-creating potential of the manufacturing sector, it is essential to consider the direct jobs in manufacturing, as well as the jobs "activated" in other sectors that support the production of a final manufactured good. That is, the focus of the analysis should move from the factory floor to the "industrial ecosystem".

To account for the "industrial ecosystem" at large, including all other activities that indirectly support the production of manufacturing goods, this brief uses Input-Output techniques over a comprehensive dataset of 76 countries, covering 84 per cent of all world employment in 2023.³

Job creation depends on linkages within value chains

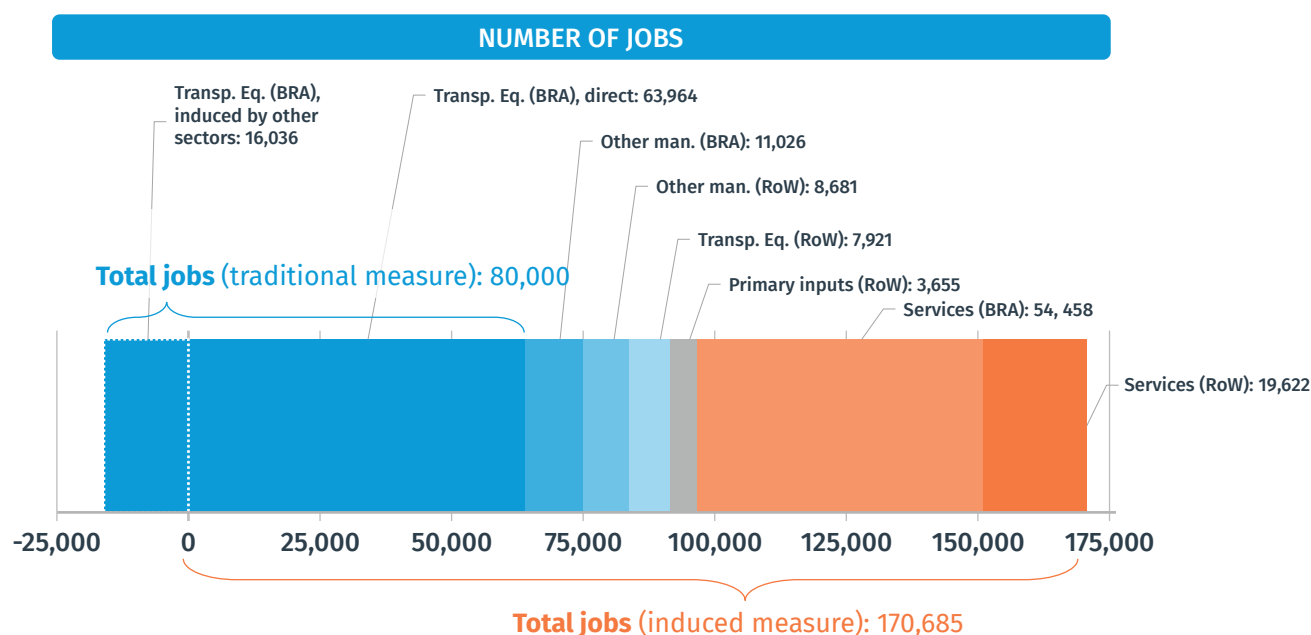
The most commonly used indicator for analysing employment generated by different sectors of the economy is the actual number of workers employed in a particular sector, at a specific point in time. While this statistic is factually correct, it does not capture the full story.

Traditional statistics count jobs in a sector based only on workers directly employed in it. However, many jobs are connected to a sector and are created in another sector, such as with supply materials or services to that industry. These related jobs are not fully reflected in traditional job counts. Ultimately, the total number of jobs created by one specific activity at a given time, depends on the complex chain of productive interlinkages connecting different sectors of the economy.

To illustrate this, consider the transport equipment sector in a specific country, such as Brazil (see Figure 1). The transport equipment sector does not just employ workers directly on the factory floor. It also generates a significant number of jobs indirectly in other sectors through its demand for inputs and services. For example, producing a

car involves not just assembly line workers but also those in the steel, rubber, electronics, and service industries. According to the latest available comparable data for the year 2020, the transport equipment sector of Brazil employed 80,000 workers. From this total, 16,000 are regarded as “activated” jobs in other sectors in Brazil as well as in other countries, as they mainly produce inputs for different sectors. The remaining 64,000 workers were directly employed in the production of goods directly sold to final consumers or investors. Additionally, 28,000 workers delivered inputs from other manufacturing activities in Brazil and abroad (including, 3,250 Brazilian workers from the plastic industry and 2,700 workers from the transport equipment sector in China), 5,000 workers extracted primary materials to create components and equipment, and 74,000 domestic and foreign workers provided services to conduct all these tasks. In total, 171,000 workers were directly or indirectly involved in the final production of the transport equipment sector of Brazil in 2020. This is more than double compared to the number of workers accounted for in traditional statistics.

Figure 1. Jobs created by the Brazilian transport equipment industry: direct, indirect, domestic and foreign.



Source: Authors elaboration based on OECD Inter-Country Input-Output tables, OECD Trade in Employment database and ILO Modelled Estimates data.

Looking at Figure 1, the “observed employment” is the total number of workers employed in a particular sector (i.e., the dark blue part of the bar in Figure 1). The “induced employment” is the employment created by the final production of a sector, including both the observed employment and the indirect jobs created due to productive linkages to other sectors (i.e., the positive part of the bar in Figure 1).

The difference in total employment between these two measures becomes clear when comparing the shares of one sector in total employment. Using data from OECD and ILO, Figure 2 presents the observed and induced shares of manufacturing in total employment globally, and distinguishes between advanced and developing countries. The results are telling: in 2020 (most recent data), the manufacturing observed share at the global level was 13.4 per cent, while the induced share was 23.2 per cent, accounting for ten percentage points higher. Similar differences are also evident for advanced and developing countries.

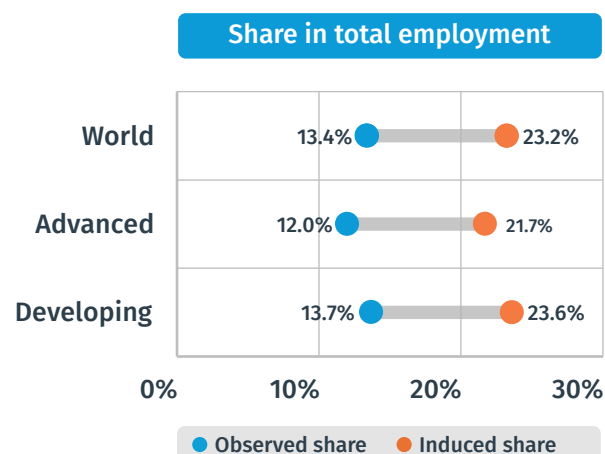
Given these differences, tracking indirect job creation across different sectors is essential. Traditional statistics, which only account for direct employment, fail to capture the bigger picture of job creation and its potential across sectors. Including indirect employment provides a more comprehensive understanding of manufacturing in job creation. From a policy perspective, what really matters is the multiplier effect that one job creates in one particular economic activity and how it will impact the rest of the economy.

Manufacturing jobs have the largest multiplier effects on an economy

The impact of different sectors on job creation is assessed by looking at the relative job multipliers. These multipliers are defined as the number of jobs created in other sectors of the economy by each worker employed in a particular sector under consideration.⁴ A distinction is made between jobs created in the same country (domestic multipliers) and those generated in other

The following section analyses these multipliers and presents fresh empirical evidence on the current role of industry in employment creation.

Figure 2 Observed and induced jobs in manufacturing in 2020.



Note: The points in the figure show the average share of manufacturing in total employment using two indicators: the traditional or observed share (blue points) and the induced share (orange points). The orange induced share points are estimated using Input-Output techniques and include all jobs directly and indirectly created by the final demand of a manufacturing good divided by all jobs in the economy. The data covers 76 countries in 2020. Advanced countries are defined as those classified as high-income industrial economies by UNIDO. Developing countries include all other economies. The average shares are calculated using countries' weights in global employment.

Source: Authors elaboration based on OECD Inter-Country Input-Output tables, OECD Trade in Employment database and ILO Modelled Estimates data.

countries (foreign multipliers). Foreign multipliers occur when inputs or services are imported from abroad to produce a sector's main product.

The analysis conducted combines data from the OECD Inter-Country Input-Output tables,⁵ the OECD Trade in Employment database⁶ and the ILO Modelled Estimates data,⁷ and it evaluated the number

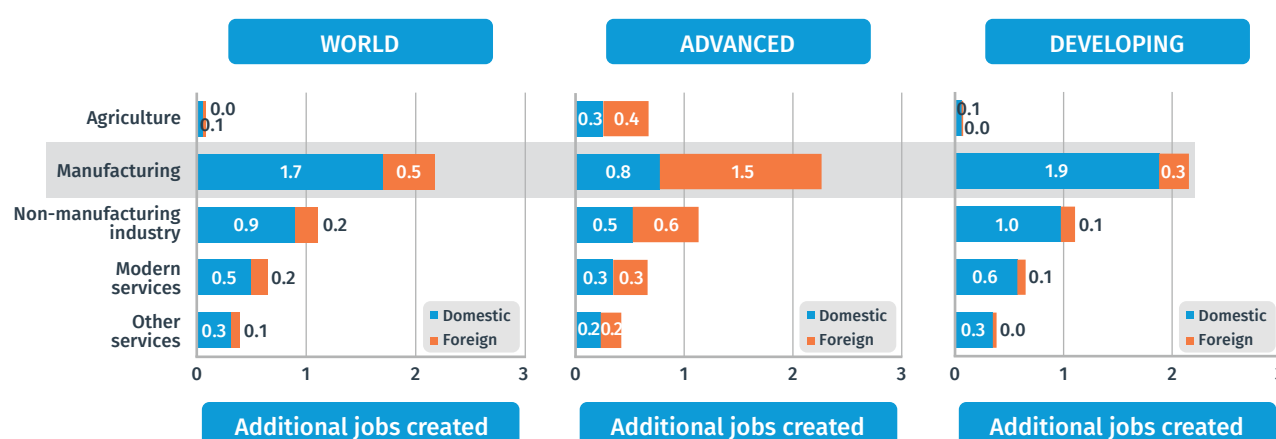
of jobs needed to produce the goods and services delivered by different sectors of the economy in a total of 76 economies (33 advanced, 43 developing).⁸

The analysis focuses on five macro-sectors of the economy, reports on the average multipliers for each sector at the world level, and distinguishes between advanced and developing countries (see Figure 3). The results clearly demonstrate that the manufacturing sector has the largest potential to generate jobs compared to other economic sectors. Globally, 2.2 jobs are created in other sectors for every job directly created in manufacturing. On average, 1.7 jobs are generated domestically,

while 0.5 are created outside the country. These multipliers double those in non-manufacturing industries, and are three times higher than the average multiplier of modern services.

The same is true when looking at the subsets of advanced and developing countries. In these cases, large differences emerge between domestic and foreign multipliers. In advanced countries, most of the multiplying effect tends to create jobs internationally, while in developing countries, most jobs are created domestically. In this case, every direct job created in manufacturing generates almost two jobs in other sectors of the same economy.

Figure 3 Manufacturing has the largest potential to create jobs



Note: The bars in the graphs represent the total employment multipliers, which indicate how many additional jobs are created in other sectors for each direct job generated within a given sector. The colours distinguish between the jobs created in the same economy (blue) and those made in foreign economies (orange). The multipliers cover 76 countries in 2020, and are estimated by using Input-Output techniques. Advanced countries are defined as those classified as high-income industrial economies by UNIDO. Developing countries include all other economies. Non-manufacturing industry includes mining, utilities and construction (ISIC codes B, D and E); and modern services includes transport, communication, finance and business services (ISIC codes H, J, K, L, M and N).

Source: Authors elaboration based on OECD Inter-Country Input-Output tables, OECD Trade in Employment database and ILO Modelled Estimates data.

Policy implications

The results in this brief demonstrate that manufacturing remains a major source of productive jobs. Developing countries are unlikely to absorb an increasing labour force without a strong and dynamic industrial sector. In a context of rapid technological change, where jobs are increasingly shifting away from the factory floor, it is essential to

focus on the entire industrial ecosystem. Industrial policies aimed at creating jobs should emphasize strengthening the backward and forward linkages of the manufacturing sector with the rest of the economy and be tailored to each country's current and expected capabilities.

Endnotes

1. Rodrik, D. (2016). [Premature deindustrialization](#). Journal of Economic Growth 21(1), 1–33. 189.
2. Rodrik, D. and Sandhu, R. 2024. “[Servicing Development: Productive Upgrading of Labor-Absorbing Services in Developing Economies](#)” (NBER Working Papers 32738). National Bureau of Economic Research, Inc.
3. This share was estimated using ILO Modelled Estimates (ILOEST), November 2024.
4. It is worth emphasizing that the focus in this brief when calculating the multipliers is placed on the physical number of workers in a given sector rather than the units of final demand. See Miller, E. and Blair P. (2022) “[Input-Output analysis](#)”. Chapter 6 for a technical discussion on the difference between “income multipliers” and “physical employment multipliers”.
5. OECD. *Input-output tables*. Organisation for Economic Co-operation and Development. <https://www.oecd.org/en/data/datasets/input-output-tables.html>
6. OECD. *Trade in employment*. Organisation for Economic Co-operation and Development. <https://www.oecd.org/en/data/datasets/trade-in-employment.html>
7. International Labour Organization (ILO). *ILO modelled estimates: Concepts and definitions* <https://ilostat.ilo.org/methods/concepts-and-definitions/ilo-modelled-estimates/>
8. The following economies are included: Argentina, Australia, Austria, Belgium, Brazil, Brunei Darussalam, Bulgaria, Cambodia, Canada, Chile, China (People's Republic of), Colombia, Costa Rica, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, China, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Kazakhstan, Republic of Korea, Lao People's Democratic Republic, Latvia, Lithuania, Luxembourg, Malaysia, Malta, Mexico, Morocco, Myanmar, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Saudi Arabia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Tunisia, Turkey, United Kingdom, United States and Viet Nam.



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