Japan: Productivity

Productivity is of particular importance to the Japanese economy. With structurally falling labour inputs due to population ageing, productivity improvement remains Japan’s only growth channel. Yet, aggregate labour productivity was more than a quarter below the top half of the OECD countries in 2017 and growing at a slower pace (OECD, 2019a, 2019b). Consequently, the productivity gap between Japan and other major economies has widened. Lagging productivity has translated into relatively low wages compared to other OECD countries. Beyond macroeconomic culprits, such as the industrial shifts towards relatively low-productivity services, recent OECD work shows that slowing productivity growth is linked to rising productivity differences between firms. Against this backdrop, the present issue of OECD Insights on Productivity and Business Dynamics investigates within-industry productivity patterns in Japan in comparison with other OECD economies. The analysis relies on data from the OECD MultiProd project to help understand the micro-drivers of aggregate productivity growth in Japan (Box 1).

Aggregated firm-level data from MultiProd mirror the macroeconomic picture: average firm-level labour productivity in manufacturing industries grew at a slower pace than in other OECD countries over the period 2000-14, while the average services firm experienced negative productivity growth (Figure 1). These trends come with large productivity gaps: between industries (Figure 2), within industries (Figure 3) and across firm size groups (Figure 4A). Moreover, the data reveal substantial wage gaps across firm size, in particular with respect to large manufacturing firms (Figure 4B).

Highlights

- Average labour productivity among large services firms in Japan has declined substantially in Japan since 2000, while in manufacturing average labour productivity has increased but more slowly than in other OECD economies.
- Productivity disparities between industries, within industries and across firm size groups are larger in Japan than in other OECD economies.
- Productivity disparities come with substantial wage disparities.
- Better technology diffusion could both enhance productivity performance and share productivity gains more broadly.
Box 1. The MultiProd project

MultiProd provides a unique comprehensive overview of within-industry productivity patterns across countries over the last two decades. It extends productivity analyses beyond aggregate industry performance and focuses on the underlying dynamics and developments within industries.

The MultiProd project relies on a distributed microdata approach to access representative firm-level data while respecting the confidentiality of the underlying data sources, in collaboration with experts from National Statistical Offices within the MultiProd network. The resulting micro-aggregated database is harmonised across countries and over time, and hence is suitable for international comparisons.

MultiProd focuses on manufacturing and non-financial market services (“services” for brevity) in order to enhance cross-country comparability. The definition of these two macro-sectors (“sectors” for brevity) follows a customised 7-sector aggregation of ISIC Rev.4/NACE Rev.2 industrial classification. Detailed industries within sectors (“industries” for brevity) follow the SNA A38 classification. The analysis excludes the Coke and Refined Petroleum industry and the Real Estate industry.

The present analysis compares Japan to a “benchmark” group of countries for which MultiProd data are available, namely Australia, Austria, Belgium, Canada, Chile, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Luxembourg, the Netherlands, Norway, New Zealand, Portugal, Slovenia, Sweden and Switzerland.

Figures are for the period for which data are available for Japan, namely 2000-14; benchmark statistics are not reported after 2012 due to limited data availability. Results presented here are from the MultiProd database as of February 2020. There are two data sources for Japan: the Basic Survey of Japanese Business Structure and Activities, which covers the entire business sector with at least 50 employees, and the Census of Manufactures, which is establishment-level data aggregated at firm level, for units in the manufacturing sector with least 4 employees. Both data sources come from the Ministry of Economy, Trade and Industry (METI) and cover the period 2000-14. Owing to methodological differences, figures may deviate from officially published national statistics.

The analysis of the manufacturing sector relies on the population of manufacturing firms with at least ten workers (“10+”) due to some data limitations with firms with less than ten workers, and the analysis of the market services sector relies on the population of market services firms with at least 50 employees (“50+”), for Japan and at least 10 employees for the set of reference countries. In some instances, the analysis of the manufacturing sector also shows the statistics for the population of firms with at least 50 workers for both Japan and the benchmark countries.

See Desnoyers-James, Calligaris and Calvino (2019) for further details on the MultiProd data; see Berlingieri et al. (2017) for details on the methodology.

Productivity growth

The average productivity growth of Japanese firms was slower than in other OECD countries over the period 2000-14 (Figure 1). The MultiProd data show that the cumulative growth in average labour productivity within industries was significantly lower in Japan than in the benchmark group of countries in both manufacturing and services. In manufacturing, within-industry labour productivity grew 16% from 2000 to 2014. In the services sector, within-industry productivity declined 9% over the period for the firms with more than 50 employees. Productivity slowdown of the services sector is a difficult challenge given the industrial shift from manufacturing to services in Japan.
Trends at the macro-sectoral level hide large disparities between industries. In manufacturing, productivity disparities between industries are larger in Japan than in other OECD economies (Figure 2). For instance, the textile industry – the least productive industry in both Japan and in other OECD countries, and shrinking rapidly in Japan in employment terms – is roughly half as productive as the average manufacturing industry, while it is only 32% less productive in other OECD countries. In contrast, chemical and pharmaceutical industries, where the size of employment remained almost the same between 2000 and 2016, show very high within-industry average labour productivity. For example, labour productivity in the pharmaceutical industry is more than twice the manufacturing average, whereas it is only about 50% higher in other OECD countries. The heterogeneity in industry productivity is less significant in non-financial market services. However, among the industries, the labour productivity in the accommodation and food services industry is particularly low at about 60% below the services average, while it is 54% below in other OECD industries.
Figure 2. Within-industry average labour productivity relative to macro-sector average
Manufacturing and non-financial market services
Japan vs benchmark countries, 2000-14

Note: This figure reports average log labour productivity relative to macro-sector average within industries in Japan and within country-industry pairs in a set of benchmark countries. Results for manufacturing and services based on detailed industries, following the SNA A38 classification.

Source: OECD calculations based on MultiProd database, February 2020. See Box 1 for details.

In the context of these significant cross-industry differences in within-industry average labour productivity, one positive observation for productivity in Japan has been a favourable reallocation of labour across industries within each macro-sector. While manufacturing sector employment as a whole has fallen, stable employment in high-productivity industries such as pharmaceuticals, and a falling share in lower productivity industries such as textiles and electrical equipment appear to have enhanced within-sector productivity. Not all inter-industry reallocations have been ideal, however, with food manufacturing also showing a growing share of employment over recent decades. Similarly, in the services sector, the share of employment in hospitalities and in the wholesale and retail trade industries fell between 2000 and 2015, while the share in some higher labour productivity industries such as ICT has increased (see SMEA, 2015 p.374 for manufacturing and MIAC, 2015 table 5.3 for services). Large gaps in labour productivity, whether across industries or across firms within the same industry, remain something of a concern however, as these are associated with wider earnings gaps, and hence can contribute to widening inequality.

Productivity dispersion and technology diffusion

The productivity gap between the least and most productive firms within industries – a measure of inequality in corporate performance – is large in OECD countries, even within narrowly defined industries. Laggards – defined here as firms at the 10th percentile of the labour productivity distribution – are substantially less productive than frontier firms – defined as firms at the 90th percentile of the productivity distribution. Within-industry productivity disparity is an important benchmark because it is linked to cross-country differences in aggregate productivity (Bartelsman, Haltiwanger and Scarpetta, 2013; Hsieh and Klenow, 2009). Furthermore, the widening productivity gaps between top firms and the others has been coupled with slow-down in aggregate productivity growth (Andrews, Criscuolo and Gal, 2016).

Productivity dispersion between frontier firms and laggards within industries tends to be larger in Japan than in other OECD countries. In manufacturing, the gap is larger in all industries (Figure 3). For example, the average productivity of frontier pharmaceutical manufacturers is about 13 times the productivity of laggard firms in that industry, compared to around 6 times in other OECD countries. Pharmaceutical manufacturing is known for its high R&D intensity, which translates into productivity gains.
The slow diffusion of technology, especially digital, is a key factor explaining productivity dispersion between frontier firms and laggards. Harnessing the digital transformation, including the diffusion and adoption of advanced technologies across all firms and consumers, has the potential to enhance the efficiency of business processes productivity. Japan has already implemented various strategies to support digital technology development. However, despite the potential of the digital transformation to boost productivity across industries, the diffusion of technology to older workforce and consumers remains a major challenge. Most advanced technologies are concentrated in large incumbent firms and have not trickled-down to SMEs. Low employee turnover due to the “permanent employment” model also slows down the diffusion of technologies across firms. Population ageing also contributes to slowing the adoption of new technologies, as many SME owners are relatively old and have no designated successor, which reduces the incentive to invest in efficiency enhancement (OECD, 2019a; Umeda et al., 2017).

**Figure 3. Within-industry productivity dispersion**

Manufacturing and non-financial market services

<table>
<thead>
<tr>
<th></th>
<th>Manufacturing</th>
<th>Market services</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benchmark</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. This figure reports average labour productivity dispersion within industries in Japan and within country-industry pairs in a set of benchmark countries. Dispersion is measured as the ratio of the 90th percentile to the 10th percentile of the productivity distribution. Results for manufacturing and services based on detailed industries, following the SNA A38 classification. Within-industry dispersion not reported for services in Japan due to 50 employee threshold for data coverage.

Source: OECD calculations based on MultiProd database, February 2020. See Box 1 for details.

**The productivity-inclusiveness nexus**

There exists a robust productivity-wage premium in OECD economies (Berlingieri, Calligaris and Criscuolo, 2018) and in Japan (Fukao et al., 2014). Therefore, the productivity disparities identified for the Japanese economy in the previous section come with wage gaps. Reducing productivity disparities by promoting the convergence of low-productivity firms can contribute to closing the wage gaps and creating a more inclusive society.

The MultiProd data show particularly large productivity and wage disparities across firm size in Japanese manufacturing. Figures 4A and 4B show relative productivity levels and average wages, respectively, comparing by sector and size group against large (500+ employee) manufacturing firms. While this group has the highest productivity, in both Japan and the benchmark, the productivity gap between large and smaller firms is larger in Japan than other OECD countries on average. In services, productivity is lower than in manufacturing for all size classes. Moreover, the productivity-size relationship is decreasing in Japanese services, while it is flat in other countries. Wages follow the same pattern, although it is less severe than size-productivity premium for manufacturing sector (Figure 4B). This evidence on the substantial productivity disadvantages of the smaller firms corroborates studies showing the relatively greater market exit of small firms than that of large firms (OECD, 2020; SMEA, 2017). Although it contributes to higher aggregate productivity in a static sense, the inability of small firms to grow slows down business dynamism, as fewer start-ups means less competition, innovation and resource reallocation.
New technologies, such as cloud computing, big data analytics and general IT software can help improve the performance of small firms. However, the IT investment gap remains substantial between large firms and SMEs (SMEA, 2019). Moreover, the gap in IT software investment per employee has been widening since the 2000s between manufacturing and services (RIETI, 2015). Given the increasing weight of the service sector in Japan, higher and more broadly-shared productivity gains can be achieved by enhancing service firms’ productivity (Fukao, 2010; OECD, 2019a).

**Figure 4.** Average productivity and wages relative to large manufacturing firms, by size class
Manufacturing and non-financial market services
Japan vs benchmark countries, 2000-14

(a) Labour productivity

(b) Wages

Notes

1 In this note, trends reflect the change in the average across firms within a macro-sector. Contrary to aggregate productivity measures, these trends focus on the firm level and abstract from compositional effects, as they do not capture shares of activity or reallocation.

2 For example, the AI Strategy 2019 is designed to support the entrepreneurial ecosystem in Japan and to increase number of professionals in innovative industries.

Source: OECD calculations based on MultiProd database, February 2020. See Box 1 for details.
References


OECD Insights on Productivity and Business Dynamics

The global productivity slowdown and the simultaneous decline in business dynamism has prompted widespread policy concern. Productivity is the ultimate driver of living standards improvements in the long run, whereas a dynamic business environment is key in enabling job creation. Persisting negative trends can increase earnings inequalities and exacerbate pressures on governments’ budgets, thus threatening social cohesion and political stability.

While most existing analysis of productivity and business dynamics rely on macro-aggregated data, the OECD MultiProd and DynEmp projects utilise a distributed microdata methodology to construct unique sets of harmonised micro-aggregated statistics from confidential firm-level data. The resulting databases allow studying the role of individual firms in driving aggregate outcomes and explaining the observed macro trends across countries and over time.

OECD Insights on Productivity and Business Dynamics is a series of country profiles with a focus on the microdrivers of aggregate productivity and job creation. It makes available, to wider audiences, analytical material from the MultiProd and DynEmp databases that was prepared for use within the OECD.

Comment on this country profile is invited, and may be sent to OECD, 2 rue André Pascal, 75775 Paris Cedex 16, France, or by e-mail to multiprod@oecd.org.

Please cite this country profile as: