

# Multifactor productivity growth estimates and industry productivity database, 2021

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Multifactor productivity, measured as output per unit of combined labour and capital inputs, declined 2.1% in the Canadian business sector in 2021. The decline in 2021 resulted from the growth of combined inputs (+7.2%) outpacing the growth of gross domestic product (+5.0%).

Multifactor productivity measures the extent to which inputs are used efficiently in the production process. Growth in multifactor productivity is often associated with technological change, organizational change or economies of scale.

Multifactor productivity growth is best viewed as a long-run measure. In the short run, the changes could be volatile and may reflect fluctuations due to recessions and other economic shocks.

The 2.1% decline in multifactor productivity in 2021 reflects the effect of disruptions and economic shocks due to the COVID-19 pandemic. The decline is expected to reverse as businesses further recover and adapt to the economic shock.

Multifactor productivity is one of the three components of labour productivity, the other two being capital intensity and labour skill upgrading. An increase in capital intensity arises from investment in equipment, structures and intellectual property that contributes to growth in labour productivity. Skill upgrading is measured by labour compositional changes toward those workers who are more educated and more experienced. It captures the effect of an increase in worker skills from education and experience on labour productivity.

## The decline in multifactor productivity in 2021

The 2.1% decline in multifactor productivity in 2021 was among the largest since 1980, similar in magnitude to the large decline experienced in 1991 during the deep recession of the early 1990s and in 2008 and 2009 during the financial crisis.

In 2021, both gross domestic product (GDP) and labour input recovered from the sharp decline in 2020 due to the pandemic, while the growth in capital input remained low in 2021.

The decline in multifactor productivity in 2021 resulted from combined input growth outpacing the growth of output. In 2021, GDP rose 5.0%, recovering from a decline of 6.6% in 2020.

Labour input also recovered in 2021, rising 11.5% after a 12.4% decline in 2020. The growth in labour input is the combined effect of an 11.6% growth in hours worked and a 0.1% decline in labour compositional changes.

Capital input increased 1.6% in 2021. While the capital input growth in 2021 was higher than its growth in 2020, the capital input growth in 2021 is still below the average capital input growth before the pandemic, which was 2.5% per year for the period from 2010 to 2019. The business expenditures on structures and machinery and equipment have trended lower since oil prices fell sharply in the mid-2010s. [These expenditures have also been slow to recover from the COVID-19 pandemic.](#)

## The decline in labour productivity and capital intensity in 2021

Labour productivity in the business sector declined 5.9% in 2021, the largest decline since the series began in 1961. The decline in 2021 follows the historic increase in labour productivity in 2020 (+8.6%).

The decline in labour productivity in 2021 reflected a decrease in the contribution of capital intensity (-3.9 percentage points) and a decline in multifactor productivity (-2.1 percentage points). There was no change in labour composition in 2021.



The 2021 decline in the contribution of capital intensity was driven by growth in hours worked of 11.6% which is higher than capital input growth of 1.6%.

Labour composition was unchanged in 2021, following a large positive contribution to labour productivity growth in 2020 which was the highest since 1980. The large increase in the productivity effect of labour compositional changes in 2020 resulted from an increase in the average experience and education of workers in that year, which arose from the relatively large contraction in employment in the service sectors that tend to employ workers who are younger and less educated, such as accommodation and food services.

The hours worked increased in all major sectors in 2021, following a large decline in 2020. But the growth in hours worked in those sectors hit the hardest, such as accommodation and food services, was relatively modest. As a result, the recovery in hours worked in 2021 has not led to an increase in the composition of workers towards the less educated and less experienced workers in those sectors hit the hardest, and [there was no decline in labour composition in 2021](#).

While labour productivity growth and its three components (capital intensity, skill upgrading, and multifactor productivity) have been volatile during the first two years of the pandemic, the average labour productivity growth during those two years shows a similar growth to the 2010-2019 period before the pandemic. However, multifactor productivity growth for the period from 2019 to 2021 was much slower, while the productivity effects of capital deepening and labour compositional changes were higher during that period.

**Table 1**  
**Sources of labour productivity growth in the business sector (average annual basis)**

	1980 to 2000	2000 to 2010	2010 to 2019	2019 to 2021	2020	2021
	percentage points					
Gross domestic product	3.2	1.5	2.4	-1.0	-6.6	5.0
Combined labour and capital inputs	2.8	2.1	2.0	-0.3	-7.2	7.2
Labour input	2.1	1.3	1.6	-1.2	-12.4	11.5
Hours worked	1.5	0.8	1.2	-2.1	-14.0	11.6
Labour composition	0.6	0.5	0.4	0.9	1.9	-0.1
Capital input	3.9	3.2	2.5	1.0	0.4	1.6
Labour productivity	1.7	0.7	1.2	1.1	8.6	-5.9
Contributions to labour productivity growth from:						
Capital intensity	0.9	1.0	0.5	1.3	6.7	-3.9
Labour composition	0.4	0.3	0.2	0.5	1.1	0.0
Multifactor productivity growth	0.5	-0.6	0.5	-0.7	0.7	-2.1

**Note(s):** The growth rates represent annual compound growth rates. Numbers may not add up because of rounding.

**Source(s):** Table [36-10-0208-01](#).

### Note to readers

Multifactor productivity estimates by major business sector for 1961 to 2021 are now available. The detailed industry productivity database for 1961 to 2019 is also now available.

### Revisions

Data in this release reflect the latest supply-use tables for 2018, published in *The Daily* on [November 8, 2022](#); data on fixed capital, published in *The Daily* on [November 17, 2022](#); data on real gross domestic product, published in *The Daily* on [November 29, 2022](#); data on hours worked, published in *The Daily* on [February 10, 2023](#).

### Multifactor productivity measures

Multifactor productivity measures at Statistics Canada are derived from a growth accounting framework that allows analysts to isolate the effects of increases in input intensity and skills upgrading on the growth in labour productivity.

The residual portion of labour productivity growth that is not attributable to gains in input intensity and skills upgrading is called growth in multifactor productivity. It measures the efficiency with which the inputs are used in production. Growth in this area is often associated with technological change, organizational change or economies of scale.

**Available tables:** [36-10-0208-01](#) and [36-10-0217-01](#).

**Definitions, data sources and methods:** survey number [1402](#).

A description of the method used to derive productivity measures can be found in the "[User Guide for Statistics Canada's Annual Multifactor Productivity Program](#)," part of *The Canadian Productivity Review* series ([15-206-X](#)), available on our website.

The documentation about revisions to multifactor productivity growth estimates can be found in "[Revisions to the Multifactor Productivity Accounts](#)," part of *The Canadian Productivity Review* series ([15-206-X](#)), also available on our website.

For more information, or to enquire about the concepts, methods or data quality of this release, contact us (toll-free 1-800-263-1136; 514-283-8300; [infostats@statcan.gc.ca](mailto:infostats@statcan.gc.ca)) or Media Relations ([statcan.mediahotline-ligneinfomedias.statcan@statcan.gc.ca](mailto:statcan.mediahotline-ligneinfomedias.statcan@statcan.gc.ca)).