UNIVERSITY OF CAMBRIDGE

Cambridge Industrial Innovation Policy

Insights from the United States

Understanding sectoral sources of aggregate productivity growth: a cross-country analysis

About this report

This report analyses sectoral sources of labour productivity growth in the United States during the 1998–2019 period. The overall project includes an overview report of eight economies, a summary report and eight economy-specific studies for China, France, Germany, the Republic of Korea, Taiwan, Singapore, the United Kingdom and the United States. Together, they seek to inform policies aimed at boosting productivity by improving the understanding of how sectors account for aggregate productivity gains and losses and how this differs across economies.

Contributors

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Insights from the United States

Key messages

How does the US' productivity performance compare with that observed in other economies?

- The US has the second-highest productivity level, from the sample of economies analysed, after Singapore. However, the US experienced the second-lowest rate of labour productivity growth, after the UK, with an annual average growth rate of 1.6% (output per worker) during the period of 1998–2017. The US' productivity growth accelerated in the 1990s but declined from 2004, growing at an annual rate of 0.6%, on average, in 2011–17.

Which sectors are the main sources of the US' aggregate labour productivity growth?

- The sectors that contributed the most to the US' aggregate productivity growth in 1998–2019 include: real estate and rental and leasing (16.3%); professional, scientific and technical activities (11.7%); human health and social work activities (10.6%); public administration and defence (10.4%); and financial and insurance activities (10%).
- Important differences are found in the sectors' contribution between the pre- and post-financial crisis periods. During the global financial crisis, and in its aftermath, public administration and defence accounted for one-third of the aggregate productivity growth observed in 2008–10, more than twice the contribution seen in the pre-crisis period.
- In the post-crisis period (2011–19), a productivity growth slowdown was experienced across sectors. The market sectors that saw the largest declines in their contributions include: mining and quarrying; professional, scientific and technical activities; construction; information and communication; and wholesale trade. In comparison, financial and insurance activities and real estate and rental and leasing saw the largest increases in their relative contributions in the post-crisis period.

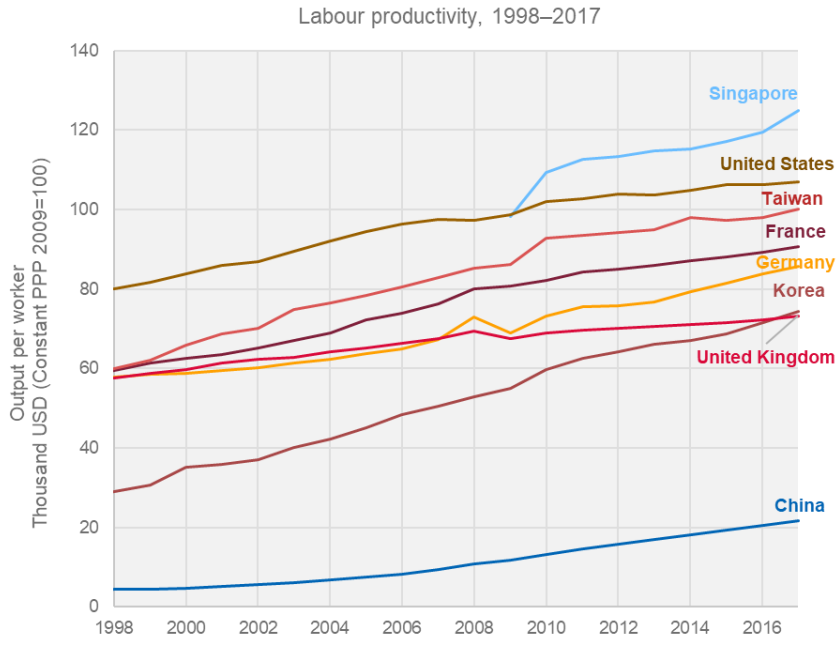
How do sectoral dynamics explain recent trends in aggregate productivity growth?

- Professional, scientific and technical activities and financial and insurance activities are the sectors that contribute to aggregate productivity growth through their high productivity growth rates. In addition, professional, scientific and technical activities make up a sector that has been expanding in the last two decades.
- The contribution of human health and social work activities is also explained by its expansion, including increases in relative output prices.
- The US' manufacturing sector has experienced a decline in size, resulting in a negative impact on the aggregate productivity growth, particularly between 1998 and 2010. This structural change resulted in a negative allocation effect of 0.50 (annual average) in 1998-2019, which means a reduction of 0.50 percentage points in the overall growth rate, a third of the productivity growth experienced in 1998–2019.
- Other sectors that saw relatively large declines in their employment shares, and thus negative allocation effects, include: retail trade, wholesale trade, and information and communication. In the post-crisis period (2011–19), declines in the employment shares of administration and defence also slowed down aggregate productivity growth.

1. How does the US' productivity performance compare with that observed in other economies?

The United Sates (US) has the second-highest productivity level, from the sample of economies analysed in this report,[1] after Singapore. In 2017 the output per worker in the US was US$107,075 at 2009 constant prices (Figure 1). However, the US experienced the second-lowest labour productivity growth, after the United Kingdom (UK), with an annual average growth rate of 1.6% (output per worker) during the period of 1998–2017.

FIGURE 1: WHOLE ECONOMY LABOUR PRODUCTIVITY GROWTH, 1998–2017, SELECTED ECONOMIES



Economy	Output per worker in 2017 (thousand USD, constant PPP, 2009 = 100)
Singapore	124,967
United States	107,075
Taiwan	100,075
France	90,791
Germany	85,815
Korea	74,431
United Kingdom	73,258
China	21,706

Economy	Growth rate, 1998–2017 (annual average)
China	8.9%
Korea	5.1%
Singapore[1/]	3.1%
Taiwan	2.7%
France	2.2%
Germany	1.7%
US	1.6%
UK	1.1%

Note: [1/] The 2010–17 period for Singapore.

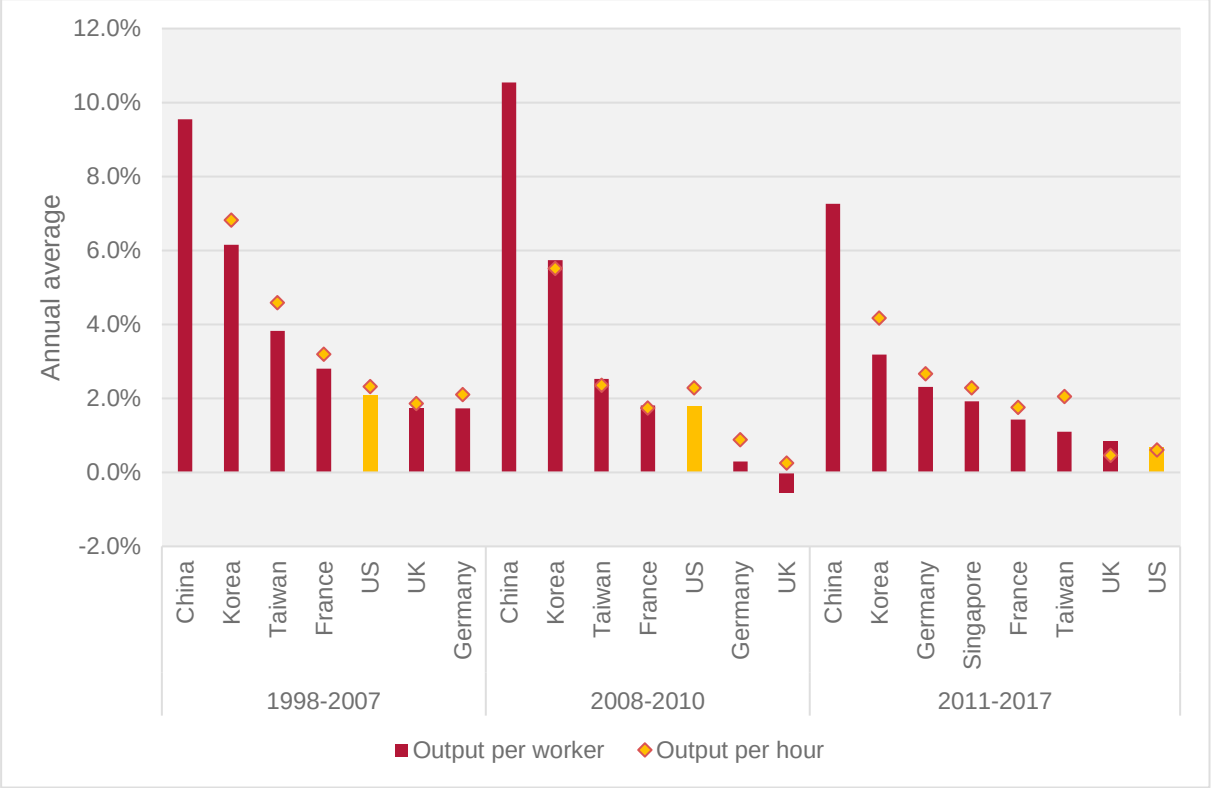
Source: Authors' computation, based on data from Asian Productivity Organization (APO) Productivity Database 2020 Ver.1 (5 August 2020); OECD Structural Analysis Database (2020 ed.); Singapore Department of Statistics; Singapore Ministry of Trade and Industry; Manpower Research & Statistics Department; Taiwan Statistical Bureau UK Office for National Statistics; US Bureau of Economic Analysis and US Bureau of Labor Statistics.

The US' productivity growth accelerated in the decade of the 1990s as it reaped the benefits of the ICT revolution, but productivity growth declined from 2004,[2] growing at an annual rate of 0.6%, on average, in 2011–17 (Figure 2).

Myriad factors have contributed to the slowdown of US aggregate productivity growth, including: lower capital investments; reductions in research and development expenditure with larger impacts on basic research; weak public investment in infrastructure; market concentration; slower growth in human capital and the labour force; and declining value-added growth.[3]

[1] China, France, Germany, Korea, Taiwan, Singapore, the United Kingdom and the United States.
[2] Moss, E., Nunn, R. and Shambaugh, J. (2020). The slowdown in productivity growth and policies that can restore it. The Hamilton Project.
[3] Manyika, J., Remes, J. Mischke, J. and Krishnan, M. (2017). The productivity puzzle: a closer look at the United States. McKinsey Global Institute; Moss, E., Nunn, R. and Shambaugh, J. (2020). Op. cit.

FIGURE 2: WHOLE ECONOMY LABOUR PRODUCTIVITY GROWTH, 1998–2017, SELECTED ECONOMIES



Source: Authors' computation, based on data from the Asian Productivity Organization (APO) Productivity Database 2020 Ver.1 (5 August 2020); OECD Structural Analysis Database (2020 ed.); Singapore Department of Statistics; Singapore Ministry of Trade and Industry; Manpower Research & Statistics Department; Taiwan Statistical Bureau UK Office for National Statistics; US Bureau of Economic Analysis and US Bureau of Labor Statistics.

2. Which sectors are the main sources of the US' aggregate labour productivity growth?

The sectors that made positive contributions to the US aggregate productivity growth rate during 1998–2019 include (in brackets, average contribution in absolute and relative terms): real estate and rental and leasing (0.27 percentage points, 16.3%); professional, scientific and technical activities (0.20 percentage points, 11.7%); human health and social work activities (0.18 percentage points, 10.6%); public administration and defence (0.18 percentage points, 10.4%); and financial and insurance activities (0.17 percentage points, 10%) (Figure 3).

Important differences are found in the sectors' contributions between the pre- and post-financial crisis periods. During the global financial crisis, and in its aftermath, public administration and defence accounted for one-third of the aggregate productivity growth observed in 2008–10, more than twice the contribution seen in the pre-crisis period.

In the post-crisis period (2011–19), the productivity growth slowdown was pervasive across sectors, which is mirrored by lower contributions to aggregate productivity growth in absolute terms. The market sectors that saw the largest declines in their contributions include: mining and quarrying; professional, scientific and technical activities; construction; information and communication; and wholesale trade. In relative terms, financial and insurance activities, and real estate and rental and leasing, saw the largest increases in their contributions in the post-crisis period (Figure 3).

FIGURE 3: TOP FIVE SECTORS CONTRIBUTING TO US AGGREGATE PRODUCTIVITY GROWTH (1998–2019)

United States: top five sectors
(based on their contribution to aggregate productivity growth measured as output per hour)

Pre-crisis (1998–2007)
Aggregate productivity growth rate: 2.32%

Sector	% of aggregate productivity growth	Percentage points
Real estate and rental and leasing	14.6	0.34
Public administration and defence	11.9	0.28
Professional, scientific and technical activities	10.7	0.25
Financial and insurance activities	9.0	0.21
Information and communication	6.2	0.14

Crisis (2008–2010)
Aggregate productivity growth rate: 2.29%

Sector	% of aggregate productivity growth	Percentage points
Public administration and defence	28.6	0.66
Human health and social work activities	21.0	0.48
Real estate and rental and leasing	18.2	0.42
Professional, scientific and technical activities	11.2	0.26
Information and communication	6.9	0.16

Post-crisis (2011–2019)
Aggregate productivity growth rate: 0.76%

Sector	% of aggregate productivity growth	Percentage points
Financial and insurance activities	23.4	0.18
Real estate and rental and leasing	20.3	0.15
Professional, scientific and technical activities	15.5	0.12
Electricity, gas and water supply	13.6	0.10
Accommodation and food service activities	9.3	0.07

Whole period (1998–2019)
Aggregate productivity growth rate: 1.68%

Sector	% of aggregate productivity growth	Percentage points
Real estate and rental and leasing	16.3	0.27
Professional, scientific and technical activities	11.7	0.20
Human health and social work activities	10.6	0.18
Public administration and defence	10.4	0.18
Financial and insurance activities	10.0	0.17

Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

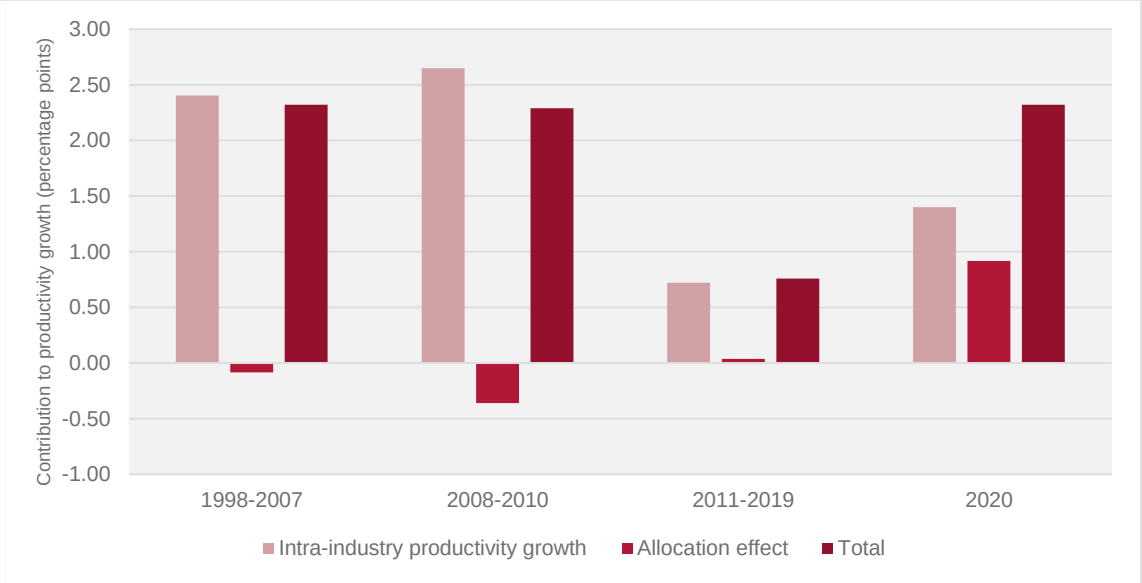
3. How do sectoral dynamics explain recent trends in aggregate productivity growth?

Overall labour productivity growth can be explained by an intra-industry productivity growth effect (or 'within' effect), which captures the productivity growth of each industrial sector and its relative weight in the overall economy; and by an allocation effect (or 'between-industries' effect), which captures the impacts on aggregate productivity growth because of the expansion or contraction of sectors with different levels of productivity.

In order to understand how different sectors have contributed to either aggregate productivity growth or slowdown, labour productivity (measured as output per worker) growth rates by sector were decomposed into these components using the Generalised Exactly Additive Decomposition (GEAD) methodology, as described in Tang and Wang.[4] Appendix II explains this decomposition in more detail.

Aggregate productivity in the US is mainly explained by intra-industry productivity growth, while structural change has led to negative contributions to aggregate productivity, as Figure 4 shows. Allocation effects were sizeable during the financial crisis (2008–10), representing 16% of the productivity growth experienced in that period (2.29%). In 2020, however, allocation effects turned positive and accounted for 40% of the productivity growth observed that year.

FIGURE 4: DECOMPOSITION OF US AGGREGATE PRODUCTIVITY GROWTH (1998–2020)



Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

The decomposition was also conducted excluding sectors that involve a large non-market component (real estate, public administration and defence, education, human health and social activities). Table 10 presents the results of this decomposition for the 1998–2019 period. Key highlights include a larger aggregate intra-industry productivity growth effect (2.27 percentage

[4] Tang, J. and Wang, W. (2004). Sources of aggregate labour productivity growth in Canada and the United States. *Canadian Journal of Economics*, Volume 37, Number 2.

points) and a negative aggregate allocation effect in 1998–2019 (-0.31 percentage points), both largely explained by the manufacturing and information and communication sectors.

As discussed in Section 2, the sectors that contributed positively to the US aggregate productivity growth rate during 1998–2019 include: real estate and rental and leasing; professional, scientific and technical activities; human health and social work activities; public administration and defence; and financial and insurance activities.

The positive contributions made by these sectors are explained by both high productivity growth and allocation effects because of expansions in the employment shares of high-productivity sectors (professional, scientific and technical activities) and increases in relative output prices in labour-intensive sectors (human health and social work activities) (Figure 5, Table 6).

Focusing only on the intra-industry productivity growth effect (industry productivity growth weighted by output share), we find that the sectors that make the largest contributions to aggregate productivity are (in brackets, average contribution in 1998–2019): manufacturing (0.49 percentage points) and information and communication (0.33 percentage points). These are among the sectors that experienced the fastest productivity growth between 1998 and 2019: 6.8% information and communication services and 3.6% manufacturing (Table 2).

Within manufacturing, the sub-sectors that have the largest intra-industry productivity growth effects include: the manufacture of computer, electronic and optical products (0.27 percentage points); the manufacture of transport equipment (0.07 percentage points); and the manufacture of chemical products (0.03 percentage points) (Table 8).

Market sectors that explain, to a larger extent, the slowdown in US productivity growth in the post-crisis period include: mining and quarrying; manufacturing; financial and insurance activities; and information and communication. Manufacturing, financial and insurance activities, and information and communication have seen the worse productivity growth performance. Although during the global financial crisis of 2008–9 manufacturing and information and communication sustained positive productivity growth rates and experienced a strong recovery in 2010, these sectors saw the largest reductions in productivity growth in the post-crisis period. Manufacturing reduced its productivity growth from an average rate of 6.3% in 1998–2007 to an average rate of only 0.4% during the period of 2011–19. Information and communication slowed down from 7.8% in 1998–2007 to 5.5% in 2011–19 (Table 1).

For manufacturing, this is amplified by lower output shares. In the case of mining and quarrying, the declining contribution is mainly explained by a reduction in employment shares and relative output prices.

Manufacturing employment in the US has declined in absolute and relative terms in the last two decades. Manufacturing employment shares contracted 4.8 percentage points in 1998–2019, a reduction of nearly five thousand jobs in absolute terms. Relative output prices of manufacturing also fell by 33.8 percentage points between 1998 and 2019. However, manufacturing employment has grown in absolute terms since 2011, although at low growth rates, by 1% on average per year (Table 6).

Factors that help to explain the shrinking of the manufacturing sector include, from a policy perspective, the adoption of neoliberal policies in the 1980s, which prioritised financial and

business services sectors over manufacturing.[5] From an industry perspective, rent-seeking behaviour motivated the offshoring of manufacturing operations to lower-cost countries. However, the offshoring of manufacturing operations, which were regarded as low-value-added activities, was followed by the offshoring of high-value-added services, such as research and development, eroding the US' 'industrial commons' and thus its capacity to attract and retain manufacturing companies.[6]

The decline of the manufacturing sector in the US has had a negative impact on aggregate productivity, particularly between 1998 and 2010. These structural changes resulted in a negative allocation effect of 0.50 (annual average) in 1998–2019, which means a reduction of 0.50 percentage points in the overall growth rate, one-third of the productivity growth experienced in that period (Figure 5, Table 6).

The manufacturing sub-sectors with the largest negative allocation effects in the 1998–2019 period include: the manufacture of computer, electronic and optical products (-0.28 percentage points); the manufacture of transport equipment (-0.06 percentage points.); other manufacturing (-0.02 percentage points); the manufacture of basic metals (-0.02 percentage points); and the manufacture of machinery and equipment (-0.02 percentage points). All of these industries experienced a decline in their employment shares between 1998 and 2019, ranging from -0.2 percentage points in the manufacture of basic metals to -0.6 percentage points in computer, electronic and optical products. Large declines in relative output prices are also observed in computer, electronic and optical products (-614 percentage points) and the manufacture of transport equipment (-72 percentage points) (Table 8 and Table 9). The loss of competitiveness in computer, electronic and optical products linked to offshoring, and the resulting loss of critical knowledge and suppliers, are well documented in the literature.[7]

Other sectors that saw relatively large declines in their employment shares and negative allocation effects include (in brackets, decline in employment shares 1998–2019): retail trade (-1.34 percentage points); wholesale trade (-0.63 percentage points); and information and communication (-0.58 percentage points). In the post-crisis period (2011–19), declines in the employment shares (-1.33 percentage points) of administration and defence also slowed down aggregate productivity growth.

As the manufacturing sector has contracted, there has been a reallocation of resources towards the service sectors, but this process is not homogeneous. The service activities with the largest expansion in terms of employment shares (1998–2019) include: human health and social work activities (3.40 percentage points); accommodation and food service activities (1.70 percentage points); professional, scientific and technical activities (1.33 percentage points); and education (0.75 percentage points) (Table 6).

Throughout 2020, the impact of social distancing measures led to demand contraction, business closures and a wide range of supply chain disruptions, which was felt differently across sectors of the economy. The sectors that suffered a more severe productivity collapse include (in brackets, annual growth rate of output per hour): the arts, entertainment and recreation (-16.8%); transportation and storage (-11.0%); accommodation and food service activities (-4.8%); the management of companies and enterprises (-2.8%); and human health and social work activities (-2.8%). In contrast, the sectors that saw a stronger productivity growth performance include: mining and quarrying (9.0%); agriculture, forestry and fishing (6.3%); construction (4.6%); and real estate and rental and leasing (4.3%) (Table 1).

In 2020 the sectoral contributions to aggregate productivity growth were negative (subtracting from overall growth) in: accommodation and food service activities (-0.55 percentage points);

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[5] Strachan, R. and Shehadi, S. (2021). Who killed US manufacturing? Investment Monitor.
[6] Pisano, G. and Shih, W. (2012). *Producing Prosperity: Why America Needs a Manufacturing Renaissance*. Cambridge (MA): Harvard Business Review Press.
[7] Ibid.

mining and quarrying (-0.50 percentage points); and transportation and storage (-0.34 percentage points). In comparison, the sectors that continued to drive aggregate productivity gains include: real estate and rental and leasing (0.92 percentage points); financial and insurance activities (0.67 percentage points); public administration and defence (0.61 percentage points); retail trade (0.45 percentage points); and information and communication services (0.42 percentage points) (Table 7).

TABLE 1: UNITED STATES: PRODUCTIVITY LEVELS AND GROWTH RATES BY SECTOR, 1998–2020

Economic sector	Output per hour									
	1998–2007		2008–2010		2011–2019		1998–2019		2020	
	Average absolute value (2012 chained US dollars)	Annual average growth	Average absolute value (2012 chained US dollars)	Annual average growth	Average absolute value (2012 chained US dollars)	Annual average growth	Average absolute value (2012 chained US dollars)	Average annual growth	Average absolute value (2012 chained US dollars)	Annual average growth
Agriculture, forestry and fishing	25.4	3.2%	28.7	2.5%	32.8	3.2%	28.9	3.1%	40.0	6.3%
Mining and quarrying	227.2	0.7%	226.0	2.7%	260.9	5.3%	240.8	2.9%	362.1	9.0%
Manufacturing	57.0	6.3%	78.7	4.0%	81.5	0.4%	70.0	3.6%	88.7	4.0%
Electricity, gas and water supply; sewerage, waste management and remediation activities	209.8	1.8%	231.8	4.2%	257.5	0.9%	232.3	1.7%	278.7	4.1%
Construction	44.9	-1.6%	40.1	0.3%	38.6	-1.0%	41.7	-1.1%	38.5	4.6%
Wholesale trade	78.2	4.0%	89.2	1.3%	96.4	0.6%	87.2	2.3%	99.4	2.2%
Retail trade	34.7	3.0%	37.3	0.6%	39.8	1.8%	37.2	2.2%	44.8	0.8%
Transportation and storage	41.1	1.4%	46.1	2.9%	46.6	-0.6%	44.1	0.8%	40.6	-11.0%
Accommodation and food service activities	28.4	0.9%	27.3	-0.7%	27.3	-0.3%	27.8	0.2%	25.8	-4.8%
Information and communication	85.6	7.8%	140.9	7.2%	193.7	5.5%	137.3	6.8%	267.0	9.0%
Financial and insurance activities	86.5	3.3%	94.2	3.7%	103.5	0.3%	94.5	2.1%	102.2	-0.8%
Real estate and rental and leasing	395.6	1.9%	487.2	5.9%	519.5	-0.2%	458.8	1.6%	527.6	4.3%
Professional, scientific and technical activities	64.3	1.4%	72.8	3.1%	76.7	1.1%	70.5	1.5%	82.8	1.5%
Management of companies and enterprises	92.8	-0.1%	78.9	-1.6%	90.3	3.1%	89.9	1.0%	102.3	-2.8%
Administrative and waste management services	24.8	2.7%	30.6	3.5%	31.1	0.6%	28.2	2.0%	33.9	2.6%
Public administration and defence; compulsory social security	54.5	-0.1%	55.0	0.6%	54.9	-0.1%	54.7	0.0%	55.5	1.4%
Education	37.2	-0.2%	40.3	3.6%	38.2	-1.2%	38.0	-0.1%	37.3	0.5%
Human health and social work activities	38.5	0.5%	41.2	1.8%	42.3	0.6%	40.4	0.7%	42.3	-2.8%
Arts, entertainment and recreation	45.1	0.9%	50.6	3.8%	54.8	1.0%	49.8	1.3%	48.2	-16.8%
Other service activities	36.9	-0.5%	33.5	-2.9%	32.4	0.1%	34.6	-0.6%	32.1	-2.0%
Whole economy	55.0	2.3%	62.4	2.3%	66.1	0.8%	60.5	1.7%	70.3	2.3%

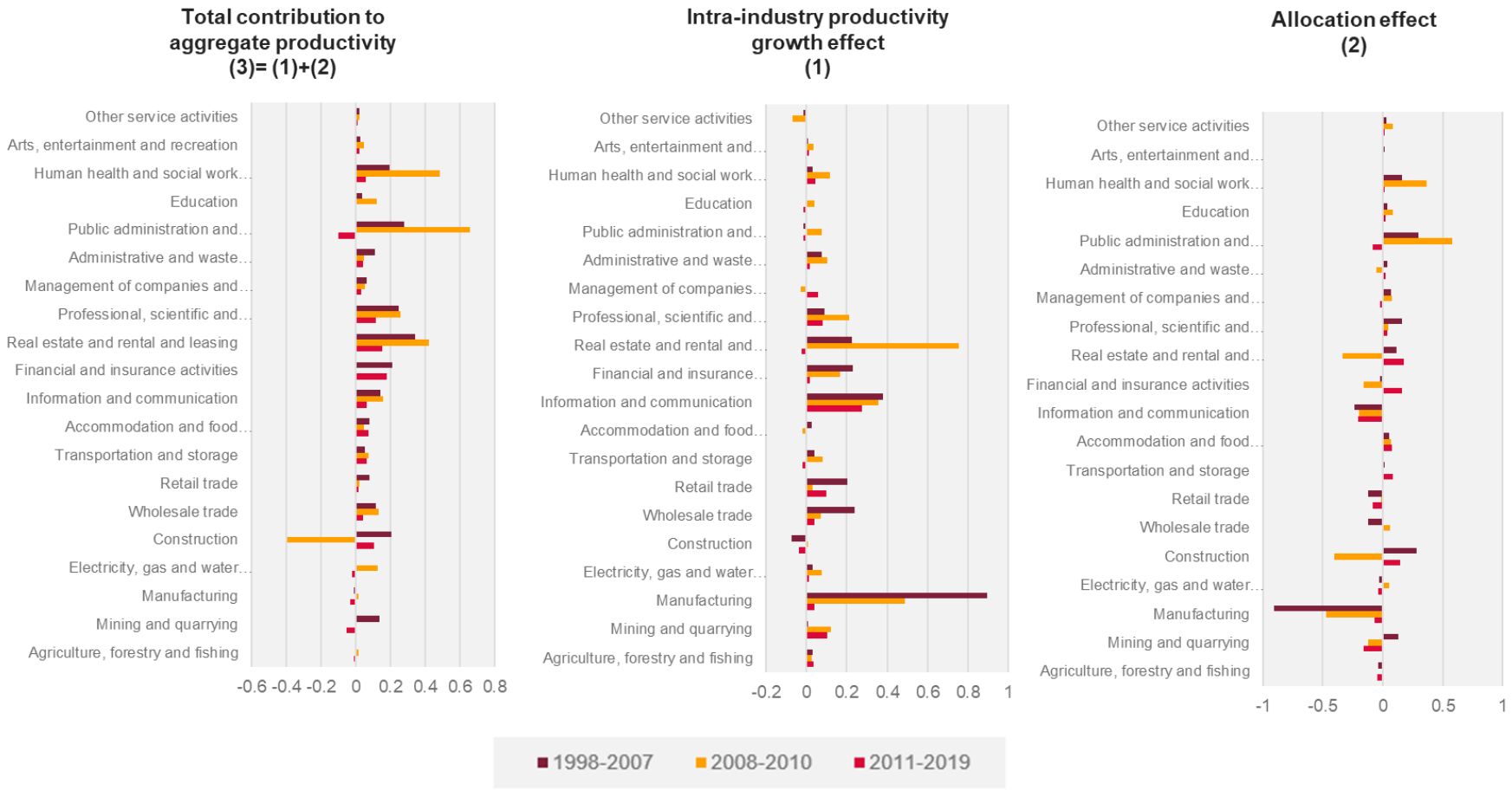
Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

TABLE 2: UNITED STATES: PRODUCTIVITY LEVELS AND GROWTH BY MANUFACTURING SUB-SECTORS, 1998–2020

Manufacturing sub-sector	Output per hour									
	1998–2007		2008–2010		2011–2019		1998–2019		2020	
	Average absolute value (2012 chained US dollars)	Average annual growth	Average absolute value (2012 chained US dollars)	Average annual growth	Average absolute value (2012 chained US dollars)	Average annual growth	Average absolute value (2012 chained US dollars)	Average annual growth	Average absolute value (2012 chained US dollars)	Annual growth
Manufacture of food products, beverages and tobacco	68.1	1.6%	73.6	-1.6%	64.8	-1.4%	67.5	-0.1%	61.4	-2.2%
Manufacture of textiles	27.5	5.4%	33.7	-1.0%	34.7	0.7%	31.3	2.6%	33.3	-3.3%
Manufacture of wearing apparel	24.1	3.1%	29.4	7.3%	33.2	1.7%	28.5	3.1%	42.8	17.5%
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	21.4	2.8%	29.7	7.7%	33.5	0.9%	27.5	2.7%	36.7	6.9%
Manufacture of paper and paper products	62.4	2.1%	69.5	0.2%	69.6	0.7%	66.3	1.3%	76.1	4.0%
Manufacture of printing and reproduction of recorded media	28.3	5.2%	37.5	3.1%	43.1	1.6%	35.6	3.4%	47.9	8.4%
Manufacture of coke and refined petroleum products	965.7	6.1%	1,054.5	-4.0%	799.2	0.9%	909.7	2.6%	1,010.1	7.8%
Manufacture of chemical products	168.1	4.8%	207.9	0.3%	190.9	-1.5%	182.8	1.6%	198.6	5.8%
Manufacture of rubber and plastics products	44.4	3.6%	50.3	3.7%	51.2	-0.3%	48.0	2.0%	54.9	5.3%
Manufacture of other non-metallic mineral products	45.4	0.7%	47.2	1.6%	54.5	1.4%	49.4	1.1%	57.3	5.0%
Manufacture of basic metals	54.2	3.6%	66.4	7.0%	87.3	4.7%	69.4	4.5%	134.2	35.9%
Manufacture of fabricated metal products, except machinery and equipment	44.9	1.6%	47.3	-0.8%	46.4	-0.3%	45.9	0.5%	45.9	-1.5%
Manufacture of computer, electronic and optical products	33.3	24.8%	90.5	15.5%	133.6	4.9%	82.1	15.4%	166.1	3.8%
Manufacture of electrical equipment	55.3	4.1%	73.1	3.4%	74.0	0.5%	65.3	2.5%	77.2	1.4%
Manufacture of machinery and equipment n.e.c.	48.7	4.2%	61.3	3.1%	62.4	-0.8%	56.0	2.0%	59.7	0.5%
Manufacture of transport equipment	56.0	5.8%	70.3	3.0%	80.7	0.4%	68.1	3.4%	83.3	-1.0%
Manufacture of furniture	30.2	1.6%	30.8	-1.6%	32.8	0.9%	31.3	0.9%	34.3	1.8%
Other manufacturing	45.9	4.7%	67.1	9.0%	67.4	-0.4%	57.6	3.2%	83.2	19.4%
Total manufacturing	57.0	6.3%	78.7	4.0%	81.5	0.4%	70.0	3.6%	88.7	4.0%

Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

FIGURE 5: SECTORAL CONTRIBUTION TO THE US AGGREGATE PRODUCTIVITY GROWTH, 1998–2019



Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

TABLE 3: UNITED STATES: SECTORAL CONTRIBUTIONS TO OVERALL PRODUCTIVITY GROWTH,1998–2007

Economic sector	Output shares		Employment shares		Structural change (1998–2007, percentage points)			Contribution to productivity growth (1998–2007, average, percentage points)			Labour productivity growth (1998–2007)
	1998	2007	1998	2007	Output	Employment	Relative output prices	Intra-industry productivity growth (1)	Allocation effect (2)	Total (3) = (1) + (2)	
Agriculture, forestry and fishing	1.10%	1.00%	3.23%	2.93%	-0.10	-0.29	-8.59	0.03	-0.04	0.00	3.24%
Mining and quarrying	0.90%	2.17%	0.41%	0.45%	1.27	0.04	68.03	0.01	0.13	0.13	0.72%
Manufacturing	15.79%	12.76%	12.69%	9.31%	-3.02	-3.38	-31.29	0.89	-0.90	-0.01	6.32%
Electricity, gas and water supply; sewerage, waste management and remediation activities	1.81%	1.60%	0.43%	0.36%	-0.20	-0.07	7.14	0.03	-0.03	0.00	1.80%
Construction	4.19%	4.95%	5.59%	6.27%	0.76	0.68	34.09	-0.08	0.28	0.21	-1.55%
Wholesale trade	6.22%	5.94%	4.26%	4.01%	-0.28	-0.25	-9.39	0.24	-0.12	0.11	4.03%
Retail trade	6.92%	6.01%	11.25%	10.86%	-0.90	-0.39	-10.36	0.20	-0.12	0.08	3.01%
Transportation and storage	3.09%	2.86%	3.81%	3.71%	-0.23	-0.11	6.82	0.04	0.01	0.05	1.41%
Accommodation and food service activities	2.64%	2.74%	7.02%	7.68%	0.10	0.66	8.46	0.02	0.06	0.08	0.92%
Information and communication	4.80%	4.89%	2.41%	2.09%	0.10	-0.33	-38.74	0.38	-0.23	0.14	7.84%
Financial and insurance activities	7.04%	7.13%	4.18%	4.27%	0.09	0.09	-7.63	0.23	-0.02	0.21	3.27%
Real estate and rental and leasing	11.83%	12.58%	1.70%	1.79%	0.75	0.09	3.30	0.23	0.11	0.34	1.86%
Professional, scientific and technical activities	5.99%	6.82%	5.23%	5.88%	0.82	0.65	6.78	0.09	0.16	0.25	1.40%
Management of companies and enterprises	1.53%	1.74%	1.24%	1.22%	0.20	-0.02	29.84	0.00	0.07	0.07	-0.11%
Administrative and waste management services	2.56%	2.98%	5.94%	6.14%	0.42	0.20	0.10	0.08	0.03	0.11	2.75%
Public administration and defence; compulsory social security	13.15%	13.06%	13.40%	13.98%	-0.09	0.58	13.27	-0.02	0.29	0.28	-0.13%
Education	0.88%	1.05%	1.72%	2.08%	0.17	0.36	16.12	0.00	0.04	0.04	-0.19%
Human health and social work activities	5.91%	6.48%	9.48%	10.90%	0.57	1.42	5.91	0.03	0.16	0.19	0.53%
Arts, entertainment and recreation	0.91%	0.95%	1.50%	1.61%	0.04	0.11	11.05	0.01	0.02	0.02	0.93%
Other service activities	2.74%	2.29%	4.52%	4.48%	-0.46	-0.04	13.06	-0.01	0.03	0.02	-0.46%
Whole economy	100.0%	100.0%	100.0%	100.0%	N/A	N/A	N/A	2.40	-0.08	2.32	2.32%

Note: N/A, not applicable.

Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

TABLE 4: UNITED STATES: SECTORAL CONTRIBUTIONS TO OVERALL PRODUCTIVITY GROWTH, 2008–2010

Economic sector	Output shares		Employment shares		Structural change (2008–10, percentage points)			Contribution to productivity growth (2008–10, average, percentage points)			Labour productivity growth (2008–10)
	2008	2010	2008	2010	Output	Employment	Relative output prices	Intra-industry productivity growth (1)	Allocation effect (2)	Total (3) = (1) + (2)	
Agriculture, forestry and fishing	1.00%	0.98%	3.14%	3.57%	-0.02	0.43	-8.10	0.03	-0.01	0.01	2.50%
Mining and quarrying	2.67%	2.04%	0.48%	0.47%	-0.63	-0.01	-33.24	0.12	-0.12	0.00	2.70%
Manufacturing	12.24%	11.99%	9.03%	8.17%	-0.25	-0.87	2.15	0.49	-0.47	0.01	4.00%
Electricity, gas and water supply; sewerage, waste management and remediation activities	1.64%	1.86%	0.37%	0.38%	0.22	0.01	6.71	0.08	0.05	0.13	4.20%
Construction	4.41%	3.50%	5.90%	4.92%	-0.91	-0.97	-2.60	0.01	-0.40	-0.39	0.32%
Wholesale trade	6.01%	5.93%	4.00%	3.83%	-0.08	-0.17	5.35	0.07	0.06	0.13	1.33%
Retail trade	5.77%	5.68%	10.70%	10.58%	-0.09	-0.12	0.60	0.03	-0.01	0.02	0.57%
Transportation and storage	2.90%	2.89%	3.68%	3.55%	-0.01	-0.13	0.96	0.08	-0.01	0.07	2.92%
Accommodation and food service activities	2.72%	2.69%	7.71%	7.84%	-0.02	0.12	3.28	-0.02	0.07	0.05	-0.71%
Information and communication	5.05%	5.02%	2.06%	1.97%	-0.03	-0.09	-3.81	0.36	-0.20	0.16	7.17%
Financial and insurance activities	5.94%	6.69%	4.21%	4.14%	0.76	-0.06	-3.78	0.16	-0.16	0.01	3.65%
Real estate and rental and leasing	12.84%	12.94%	1.73%	1.65%	0.09	-0.08	-0.98	0.75	-0.34	0.42	5.86%
Professional, scientific and technical activities	7.36%	7.10%	5.98%	5.96%	-0.26	-0.02	-0.44	0.21	0.05	0.26	3.10%
Management of companies and enterprises	1.74%	1.77%	1.25%	1.29%	0.03	0.04	2.61	-0.03	0.08	0.05	-1.55%
Administrative and waste management services	2.98%	2.92%	5.93%	5.79%	-0.06	-0.13	-0.47	0.10	-0.06	0.05	3.46%
Public administration and defence; compulsory social security	13.47%	14.06%	14.29%	15.03%	0.59	0.74	3.60	0.07	0.58	0.66	0.56%
Education	1.14%	1.33%	2.17%	2.35%	0.19	0.18	4.19	0.04	0.08	0.12	3.56%
Human health and social work activities	6.91%	7.42%	11.24%	12.24%	0.50	1.00	3.49	0.11	0.37	0.48	1.77%
Arts, entertainment and recreation	0.97%	1.02%	1.63%	1.64%	0.04	0.01	0.61	0.04	0.01	0.04	3.83%
Other service activities	2.24%	2.19%	4.50%	4.62%	-0.06	0.12	5.14	-0.07	0.08	0.02	-2.93%
Whole economy	100.0%	100.0%	100.0%	100.0%	N/A	N/A	N/A	2.65	-0.36	2.29	2.29%

Note: N/A, not applicable.

Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

TABLE 5: UNITED STATES: SECTORAL CONTRIBUTIONS TO OVERALL PRODUCTIVITY GROWTH, 2011–2019

Economic sector	Output shares		Employment shares		Structural change (2011–19, percentage points)			Contribution to productivity growth (2011–19, average, percentage points)			Labour productivity growth (2011–19)
	2011	2019	2011	2019	Output	Employment	Relative output prices	Intra-industry productivity growth (1)	Allocation effect (2)	Total (3) = (1) + (2)	
Agriculture, forestry and fishing	1.16%	0.82%	3.47%	2.72%	-0.35	-0.75	-34.81	0.04	-0.05	-0.01	3.23%
Mining and quarrying	2.29%	1.44%	0.52%	0.42%	-0.85	-0.10	-58.56	0.11	-0.16	-0.05	5.29%
Manufacturing	12.02%	10.94%	8.20%	7.93%	-1.07	-0.27	-3.80	0.04	-0.07	-0.03	0.38%
Electricity, gas and water supply; sewerage, waste management and remediation activities	1.85%	1.56%	0.38%	0.33%	-0.29	-0.04	-1.63	0.01	-0.04	-0.02	0.87%
Construction	3.37%	4.16%	4.83%	5.55%	0.79	0.72	20.42	-0.04	0.14	0.10	-1.04%
Wholesale trade	6.02%	5.89%	3.86%	3.64%	-0.13	-0.22	4.22	0.04	0.00	0.04	0.61%
Retail trade	5.61%	5.42%	10.63%	9.91%	-0.19	-0.72	-5.96	0.10	-0.09	0.01	1.81%
Transportation and storage	2.90%	3.25%	3.58%	4.13%	0.35	0.55	9.66	-0.02	0.08	0.06	-0.65%
Accommodation and food service activities	2.72%	3.12%	7.98%	8.71%	0.40	0.73	15.98	-0.01	0.08	0.07	-0.25%
Information and communication	4.89%	5.26%	1.93%	1.83%	0.37	-0.10	-21.02	0.27	-0.21	0.06	5.55%
Financial and insurance activities	6.60%	7.77%	4.10%	4.03%	1.17	-0.07	25.20	0.02	0.16	0.18	0.31%
Real estate and rental and leasing	12.99%	13.42%	1.62%	1.73%	0.43	0.11	5.13	-0.02	0.18	0.15	-0.17%
Professional, scientific and technical activities	7.24%	7.64%	6.09%	6.56%	0.41	0.46	-4.54	0.08	0.04	0.12	1.10%
Management of companies and enterprises	1.79%	1.92%	1.32%	1.46%	0.13	0.14	-15.78	0.06	-0.03	0.03	3.13%
Administrative and waste management services	2.92%	3.08%	5.95%	6.18%	0.16	0.23	2.05	0.02	0.02	0.04	0.58%
Public administration and defence; compulsory social security	13.75%	12.31%	14.63%	13.31%	-1.43	-1.33	5.34	-0.01	-0.09	-0.10	-0.10%
Education	1.33%	1.26%	2.42%	2.47%	-0.07	0.05	8.55	-0.02	0.02	0.00	-1.24%
Human health and social work activities	7.39%	7.44%	12.28%	12.88%	0.05	0.59	-1.01	0.04	0.02	0.06	0.60%
Arts, entertainment and recreation	1.02%	1.11%	1.64%	1.81%	0.09	0.17	6.43	0.01	0.01	0.02	0.99%
Other service activities	2.14%	2.15%	4.55%	4.40%	0.01	-0.15	10.82	0.00	0.01	0.01	0.06%
Whole economy	100.0%	100.0%	100.0%	100.0%	N/A	N/A	N/A	0.72	0.04	0.76	0.76%

Note: N/A, not applicable.

Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

TABLE 6: UNITED STATES: SECTORAL CONTRIBUTIONS TO OVERALL PRODUCTIVITY GROWTH, 1998–2019

Economic sector	Output shares		Employment shares		Structural change (1998–2019, percentage points)			Contribution to productivity growth (1998–2019, average, percentage points)			Labour productivity growth (1998–2019)
	1998	2019	1998	2019	Output	Employment	Relative output prices	Intra-industry productivity growth (1)	Allocation effect (2)	Total (3) = (1) + (2)	
Agriculture, forestry and fishing	1.10%	0.82%	3.23%	2.72%	-0.28	-0.51	-32.68	0.03	-0.04	0.00	3.13%
Mining and quarrying	0.90%	1.44%	0.41%	0.42%	0.54	0.01	15.15	0.06	-0.02	0.04	2.86%
Manufacturing	15.79%	10.94%	12.69%	7.93%	-4.84	-4.76	-33.75	0.49	-0.50	-0.01	3.57%
Electricity, gas and water supply; sewerage, waste management and remediation activities	1.81%	1.56%	0.43%	0.33%	-0.24	-0.10	6.11	0.03	-0.02	0.01	1.75%
Construction	4.19%	4.16%	5.59%	5.55%	-0.03	-0.04	49.87	-0.05	0.13	0.08	-1.09%
Wholesale trade	6.22%	5.89%	4.26%	3.64%	-0.33	-0.63	2.42	0.13	-0.05	0.09	2.26%
Retail trade	6.92%	5.42%	11.25%	9.91%	-1.49	-1.34	-16.18	0.14	-0.09	0.04	2.19%
Transportation and storage	3.09%	3.25%	3.81%	4.13%	0.16	0.32	19.69	0.02	0.04	0.06	0.77%
Accommodation and food service activities	2.64%	3.12%	7.02%	8.71%	0.48	1.70	28.83	0.01	0.07	0.07	0.22%
Information and communication	4.80%	5.26%	2.41%	1.83%	0.46	-0.58	-69.75	0.33	-0.22	0.11	6.81%
Financial and insurance activities	7.04%	7.77%	4.18%	4.03%	0.73	-0.15	11.56	0.13	0.04	0.17	2.11%
Real estate and rental and leasing	11.83%	13.42%	1.70%	1.73%	1.59	0.03	5.87	0.20	0.08	0.27	1.57%
Professional, scientific and technical activities	5.99%	7.64%	5.23%	6.56%	1.65	1.33	1.07	0.10	0.09	0.20	1.51%
Management of companies and enterprises	1.53%	1.92%	1.24%	1.46%	0.38	0.22	14.63	0.02	0.03	0.05	1.02%
Administrative and waste management services	2.56%	3.08%	5.94%	6.18%	0.53	0.24	-0.18	0.06	0.02	0.07	1.96%
Public administration and defence; compulsory social security	13.15%	12.31%	13.40%	13.31%	-0.83	-0.10	22.83	0.00	0.18	0.18	-0.02%
Education	0.88%	1.26%	1.72%	2.47%	0.38	0.75	31.50	0.00	0.04	0.03	-0.11%
Human health and social work activities	5.91%	7.44%	9.48%	12.88%	1.53	3.40	7.85	0.05	0.13	0.18	0.73%
Arts, entertainment and recreation	0.91%	1.11%	1.50%	1.81%	0.20	0.31	18.11	0.01	0.01	0.02	1.35%
Other service activities	2.74%	2.15%	4.52%	4.40%	-0.59	-0.12	31.00	-0.01	0.03	0.02	-0.59%
Whole economy	100.0%	100.0%	100.0%	100.0%	N/A	N/A	N/A	1.75	-0.07	1.68	1.68%

Note: N/A, not applicable.

Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

TABLE 7: UNITED STATES: SECTORAL CONTRIBUTIONS TO OVERALL PRODUCTIVITY GROWTH, 2019–2020

Economic sector	Output shares		Employment shares		Structural change (2019–20, percentage points)			Contribution to productivity growth (2020, percentage points)			Labour productivity growth (2020)
	2019	2020	2019	2020	Output	Employment	Relative output prices	Intra-industry productivity growth (1)	Allocation effect (2)	Total (3) = (1) + (2)	
Agriculture, forestry and fishing	0.82%	0.84%	2.72%	2.83%	0.02	0.11	-3.96	0.05	-0.01	0.04	6.26%
Mining and quarrying	1.44%	0.92%	0.42%	0.38%	-0.52	-0.04	-16.78	0.13	-0.63	-0.50	8.95%
Manufacturing	10.94%	10.84%	7.93%	8.02%	-0.11	0.09	-1.55	0.44	-0.29	0.14	4.01%
Electricity, gas and water supply; sewerage, waste management and remediation activities	1.56%	1.61%	0.33%	0.35%	0.04	0.02	-4.34	0.06	0.02	0.08	4.11%
Construction	4.16%	4.29%	5.55%	5.65%	0.12	0.10	1.50	0.19	0.03	0.22	4.56%
Wholesale trade	5.89%	5.82%	3.64%	3.71%	-0.07	0.07	-0.77	0.13	-0.07	0.06	2.20%
Retail trade	5.42%	5.74%	9.91%	10.01%	0.31	0.10	4.63	0.04	0.40	0.45	0.82%
Transportation and storage	3.25%	2.85%	4.13%	4.31%	-0.40	0.18	-3.31	-0.36	0.02	-0.34	-11.05%
Accommodation and food service activities	3.12%	2.51%	8.71%	7.55%	-0.60	-1.16	2.78	-0.15	-0.40	-0.55	-4.77%
Information and communication	5.26%	5.55%	1.83%	1.83%	0.29	0.00	-1.10	0.47	-0.06	0.42	8.97%
Financial and insurance activities	7.77%	8.25%	4.03%	4.35%	0.48	0.32	0.94	-0.06	0.73	0.67	-0.78%
Real estate and rental and leasing	13.42%	14.01%	1.73%	1.79%	0.59	0.06	1.37	0.57	0.34	0.92	4.26%
Professional, scientific and technical activities	7.64%	7.77%	6.56%	6.82%	0.12	0.27	-0.29	0.12	0.19	0.30	1.52%
Management of companies and enterprises	1.92%	1.94%	1.46%	1.51%	0.02	0.05	-2.37	-0.05	0.11	0.06	-2.77%
Administrative and waste management services	3.08%	3.07%	6.18%	6.01%	-0.02	-0.17	1.20	0.08	-0.03	0.05	2.64%
Public administration and defence; compulsory social security	12.31%	12.64%	13.31%	13.69%	0.32	0.38	1.21	0.17	0.45	0.61	1.36%
Education	1.26%	1.22%	2.47%	2.41%	-0.04	-0.06	1.20	0.01	-0.01	-0.01	0.49%
Human health and social work activities	7.44%	7.41%	12.88%	13.22%	-0.03	0.34	1.66	-0.21	0.35	0.14	-2.81%
Arts, entertainment and recreation	1.11%	0.73%	1.81%	1.41%	-0.38	-0.40	2.14	-0.19	-0.18	-0.36	-16.78%
Other service activities	2.15%	2.02%	4.40%	4.17%	-0.14	-0.23	3.76	-0.04	-0.05	-0.09	-1.99%
Whole economy	100.0%	100.0%	100.0%	100.0%	N/A	N/A	N/A	1.40	0.92	2.32	2.32%

Note: N/A, not applicable.

Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

TABLE 8: UNITED STATES: CONTRIBUTIONS OF MANUFACTURING SUB-SECTORS TO OVERALL PRODUCTIVITY GROWTH, 1998–2020

Manufacturing sub-sector	1998–2007 (average, percentage points)			2008–2010 (average, percentage points)			2011–2019 (average, percentage points)			1998–2019 (average, percentage points)			2020 (percentage points)		
	Intra-industry productivity growth effect	Allocation effect	Total	Intra-industry productivity growth effect	Allocation effect	Total	Intra-industry productivity growth effect	Allocation effect	Total	Intra-industry productivity growth effect	Allocation effect	Total	Intra-industry productivity growth effect	Allocation effect	Total
Manufacture of food products, beverages and tobacco	0.02	-0.01	0.01	-0.03	0.11	0.08	-0.02	-0.07	-0.09	0.00	0.01	0.01	-0.03	0.13	0.10
Manufacture of textiles	0.01	-0.02	-0.01	0.00	-0.01	-0.01	0.00	0.00	0.00	0.01	-0.01	-0.01	0.00	0.00	0.00
Manufacture of wearing apparel	0.01	-0.02	-0.02	0.01	-0.01	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.01	-0.01	0.00
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	0.01	-0.01	0.00	0.01	-0.03	-0.01	0.00	0.00	0.00	0.01	-0.01	0.00	0.01	0.01	0.02
Manufacture of paper and paper products	0.01	-0.02	-0.01	0.00	0.01	0.01	0.00	0.00	0.01	0.00	-0.01	-0.01	0.01	0.00	0.01
Manufacture of printing and reproduction of recorded media	0.02	-0.02	0.00	0.01	-0.03	-0.02	0.00	-0.01	-0.01	0.01	-0.02	-0.01	0.02	-0.01	0.00
Manufacture of coke and refined petroleum products	0.02	0.04	0.07	-0.03	-0.04	-0.06	0.00	-0.01	-0.01	0.01	0.01	0.02	0.06	-0.26	-0.21
Manufacture of chemical products	0.09	-0.06	0.03	0.01	0.09	0.10	-0.03	0.00	-0.03	0.03	-0.01	0.02	0.11	0.03	0.14
Manufacture of rubber and plastics products	0.02	-0.03	-0.01	0.01	-0.01	0.00	0.00	0.02	0.02	0.01	-0.02	0.00	0.02	0.00	0.02
Manufacture of other non-metallic mineral products	0.00	0.00	0.00	0.00	-0.03	-0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.01	0.02
Manufacture of basic metals	0.02	-0.02	0.00	0.03	-0.06	-0.03	0.02	0.00	0.02	0.02	-0.02	-0.01	0.11	-0.12	-0.01
Manufacture of fabricated metal products, except machinery and equipment	0.02	-0.03	-0.01	-0.01	-0.02	-0.03	0.00	-0.02	-0.02	0.00	-0.01	-0.01	-0.01	0.00	-0.01
Manufacture of computer, electronic and optical products	0.45	-0.48	-0.03	0.24	-0.20	0.04	0.07	0.00	0.08	0.27	-0.28	-0.01	0.05	0.05	0.10
Manufacture of electrical equipment	0.01	-0.02	-0.01	0.01	-0.01	0.00	0.00	-0.08	-0.08	0.01	-0.01	0.00	0.00	0.00	0.00
Manufacture of machinery and equipment n.e.c.	0.04	-0.05	-0.01	0.03	-0.02	0.00	-0.01	0.00	-0.01	0.02	-0.02	0.00	0.00	-0.01	0.00
Manufacture of transport equipment	0.12	-0.11	0.01	0.02	-0.07	-0.06	0.03	0.01	0.04	0.07	-0.06	0.01	-0.07	-0.05	-0.12
Manufacture of furniture	0.00	-0.01	0.00	0.00	-0.02	-0.02	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00
Other manufacturing	0.03	-0.02	0.00	0.05	-0.02	0.03	0.00	0.00	0.00	0.02	-0.02	0.00	0.09	-0.01	0.07
Total manufacturing	0.89	-0.90	-0.01	0.49	-0.47	0.01	0.04	-0.01	0.03	0.49	-0.50	-0.01	0.44	-0.29	0.14

Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

TABLE 9: UNITED STATES: CHANGES IN THE RELATIVE SIZE OF MANUFACTURING SUB-SECTORS, 1998–2020

Manufacturing sub-sector	Change, 1998–2007, percentage points			Change, 2008–2010, percentage points			Change, 2011–2019, percentage points			Change, 1998–2019, percentage points			Change, 2019–2020, percentage points		
	Output shares	Employment shares	Relative output prices	Output shares	Employment shares	Relative output prices	Output shares	Employment shares	Relative output prices	Output shares	Employment shares	Relative output prices	Output shares	Employment shares	Relative output prices
Manufacture of food products, beverages and tobacco	-0.20	-0.16	-0.51	0.14	0.02	12.12	-0.11	0.04	3.30	-0.31	-0.08	14.63	0.07	0.06	5.20
Manufacture of textiles	-0.18	-0.25	-41.17	-0.02	-0.04	9.19	-0.02	-0.03	-7.67	-0.23	-0.34	-35.43	-0.01	0.00	0.04
Manufacture of wearing apparel	-0.18	-0.30	-39.10	-0.01	-0.02	-1.95	-0.02	-0.04	4.53	-0.22	-0.38	-43.00	0.00	-0.01	-2.32
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	-0.10	-0.10	-28.51	-0.02	-0.07	-1.55	0.04	0.02	23.88	-0.11	-0.19	-25.83	0.02	0.00	6.55
Manufacture of paper and paper products	-0.23	-0.14	-10.48	0.03	-0.02	10.74	-0.06	-0.04	0.31	-0.33	-0.22	-1.21	0.00	0.01	-5.36
Manufacture of printing and reproduction of recorded media	-0.11	-0.19	-28.29	-0.04	-0.05	-2.42	-0.06	-0.07	-5.29	-0.25	-0.36	-49.83	0.00	-0.01	1.00
Manufacture of coke and refined petroleum products	0.52	-0.02	32.38	-0.23	0.00	0.07	-0.28	-0.01	-33.15	0.18	-0.03	25.50	-0.22	0.00	-14.56
Manufacture of chemical products	-0.14	-0.14	-13.69	0.21	-0.01	7.50	-0.14	-0.02	11.82	-0.17	-0.18	16.48	0.09	0.03	-1.40
Manufacture of rubber and plastics products	-0.24	-0.17	-31.99	0.03	-0.05	3.07	-0.02	0.01	0.38	-0.29	-0.22	-26.65	0.01	0.01	0.03
Manufacture of other non-metallic mineral products	-0.10	-0.05	-2.37	-0.05	-0.05	1.71	0.05	0.00	18.83	-0.15	-0.13	4.85	0.02	0.00	3.16
Manufacture of basic metals	-0.09	-0.16	22.61	-0.13	-0.04	-31.76	-0.10	-0.03	-40.79	-0.24	-0.22	-41.22	-0.02	0.00	-17.36
Manufacture of fabricated metal products, except machinery and equipment	-0.30	-0.21	-11.05	-0.11	-0.11	5.89	-0.07	-0.03	5.27	-0.48	-0.34	-0.12	-0.03	0.00	2.57
Manufacture of computer, electronic and optical products	-0.54	-0.47	-547.49	0.02	-0.06	-15.70	-0.11	-0.10	-23.83	-0.70	-0.65	-614.12	0.07	0.04	-0.93
Manufacture of electrical equipment	-0.10	-0.14	-19.42	-0.04	-0.03	4.13	0.00	-0.01	1.16	-0.14	-0.17	-17.05	0.00	0.00	-0.86
Manufacture of machinery and equipment n.e.c.	-0.36	-0.30	-16.19	-0.05	-0.09	4.88	-0.17	-0.04	8.85	-0.50	-0.40	-7.26	-0.02	0.00	2.72
Manufacture of transport equipment	-0.45	-0.35	-66.47	0.00	-0.14	12.95	0.05	0.10	2.07	-0.57	-0.43	-72.52	-0.15	-0.03	-0.97
Manufacture of furniture	-0.10	-0.11	-9.41	-0.04	-0.07	4.94	0.00	-0.01	4.81	-0.18	-0.23	-4.22	0.00	0.00	1.99
Other manufacturing	-0.11	-0.10	-25.20	0.04	-0.03	1.54	-0.07	-0.02	-2.11	-0.16	-0.16	-32.39	0.06	0.00	0.87
Total manufacturing	-3.02	-3.38	-31.29	-0.25	-0.87	2.15	-1.07	-0.27	-3.80	-4.84	-4.76	-33.75	-0.11	0.09	-1.55

Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

TABLE 10: UNITED STATES: PRODUCTIVITY GROWTH DECOMPOSITION OF 'MARKET SECTORS', 1998–2019

Economic sector	All sectors			'Market' sectors		
	Contribution to productivity growth (1998–2019, average, percentage points)			Contribution to productivity growth (1998–2019, average, percentage points)		
	Intra-industry productivity growth effect (1)	Allocation effect (2)	Total (3) = (1) + (2)	Intra-industry productivity growth effect (1)	Allocation effect (2)	Total (3) = (1) + (2)
Agriculture, forestry and fishing	0.03	-0.04	0.00	0.05	-0.05	0.00
Mining and quarrying	0.06	-0.02	0.04	0.10	-0.03	0.07
Manufacturing	0.49	-0.50	-0.01	0.73	-0.67	0.06
Electricity, gas and water supply; sewerage, waste management and remediation activities	0.03	-0.02	0.01	0.05	-0.02	0.02
Construction	-0.05	0.13	0.08	-0.07	0.22	0.15
Wholesale trade	0.13	-0.05	0.09	0.20	-0.03	0.17
Retail trade	0.14	-0.09	0.04	0.21	-0.10	0.11
Transportation and storage	0.02	0.04	0.06	0.03	0.08	0.11
Accommodation and food service activities	0.01	0.07	0.07	0.01	0.12	0.13
Information and communication	0.33	-0.22	0.11	0.50	-0.30	0.20
Financial and insurance activities	0.13	0.04	0.17	0.20	0.10	0.30
Real estate and rental and leasing	0.20	0.08	0.27	N/A	N/A	N/A
Professional, scientific and technical activities	0.10	0.09	0.20	0.16	0.18	0.34
Management of companies and enterprises	0.02	0.03	0.05	0.03	0.06	0.08
Administrative and waste management services	0.06	0.02	0.07	0.08	0.04	0.13
Public administration and defence; compulsory social security	0.00	0.18	0.18	N/A	N/A	N/A
Education	0.00	0.04	0.03	N/A	N/A	N/A
Human health and social work activities	0.05	0.13	0.18	N/A	N/A	N/A
Arts, entertainment and recreation	0.01	0.01	0.02	0.02	0.02	0.04
Other service activities	-0.01	0.03	0.02	-0.02	0.06	0.04
Whole economy	1.75	-0.07	1.68	2.27	-0.31	1.96

Note: N/A, not applicable.

Source: Authors' computation, based on data from the US Bureau of Economic Analysis and Bureau of Labor Statistics.

Appendix I. Definitions of variables and data sources

Variable	Measure, units	Source
Labour (hours)	Hours, millions	U.S. Bureau of Labor Statistics. Labor Productivity and Costs
Labour (people)	Employment, total number of wage and salary workers, self-employed workers, and unpaid family workers, thousands	
Output (real values)	Value added, millions dollars	Bureau of Economic Analysis. GDP by Industry
Output (nominal values)	Value added, millions of 2012 chain dollars	

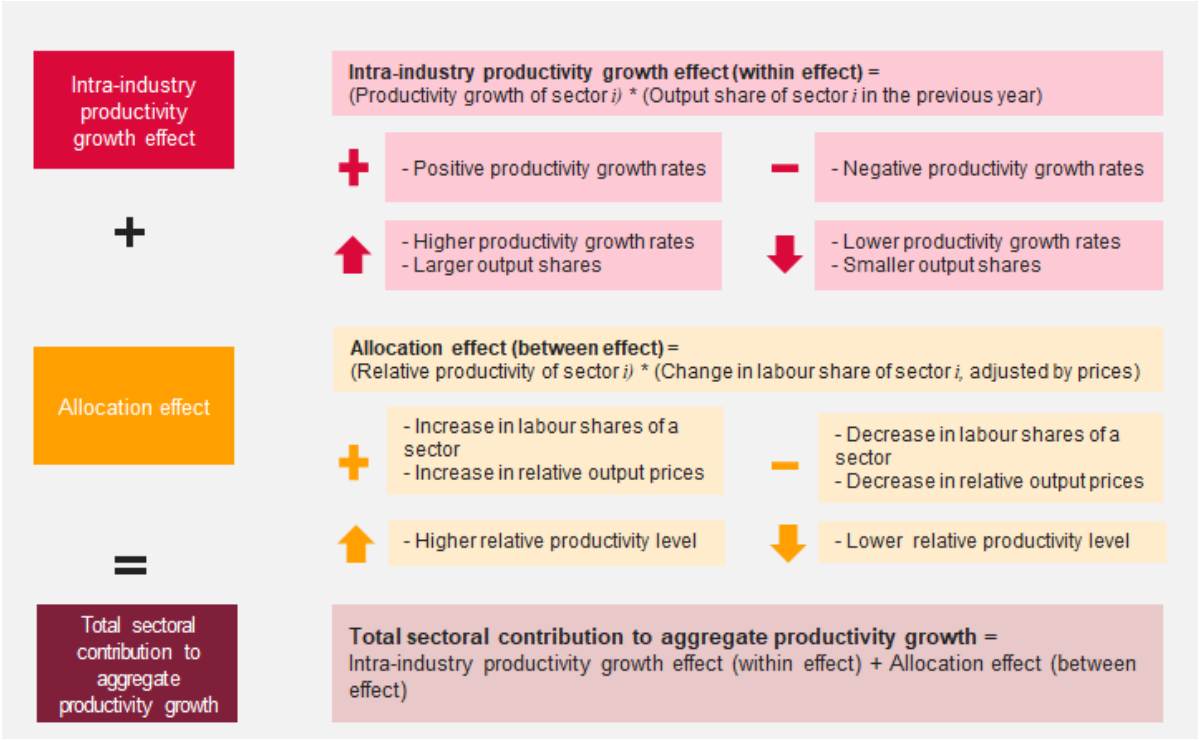
Appendix II. Decomposition of productivity growth

Economic sectors contribute disparately to aggregate productivity growth, depending on their productivity gains over time, as well as their weight in the total economy and relative productivity differences.

In order to understand the extent and nature of these contributions, we decompose the economy-wide labour productivity growth rates into sectoral contribution effects, as described in Tang and Wang:[8] (i) an intra-industry effect that captures the productivity growth of each economic sector given the relative importance in the economy (within effect); and (ii) an allocation effect (between-industries effect) that captures the effects of changes in the relative size of sectors.

The *intra-industry productivity growth effect* of a given sector i takes positive (negative) values whenever the sector shows positive (negative) productivity growth. Its magnitude depends on the productivity growth rate and how large the sector is in relation to other sectors in the economy. Assuming that a sector i shows a productivity level above the national average, then the *allocation effect* will take positive (negative) values if the sector increases (decreases) in size. The relative size is determined by changes in the labour shares and relative output prices of sector i. By changes in relative output prices, we mean how much the output prices in sector i change in relation to changes in the output prices of the whole economy.

FIGURE A.1: DECOMPOSITION OF SECTORAL CONTRIBUTION TO AGGREGATE PRODUCTIVITY GROWTH



Source: Authors, based on Tang and Wang (2004).

[8] Tang, J. and Wang, W. (2004). Sources of aggregate labour productivity growth in Canada and the United States. *Canadian Journal of Economics*, Volume 37, Number 2.

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