

An Empirical Analysis of the Decline in the Labor Share of Income in Japan

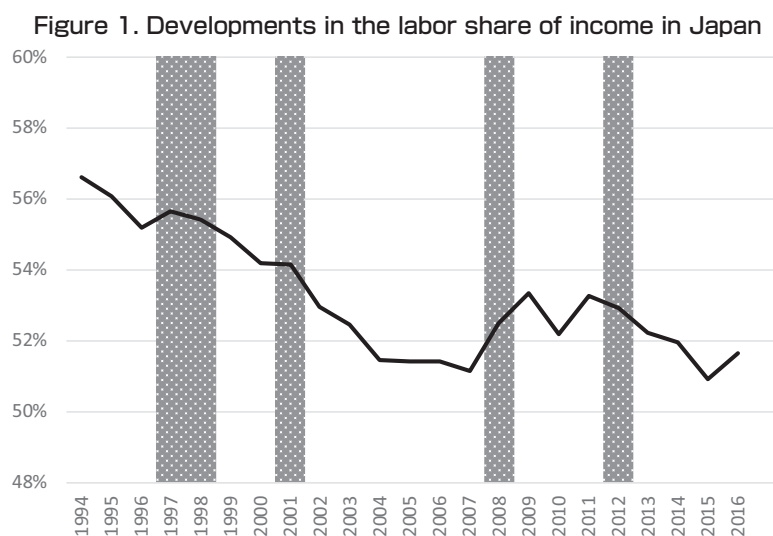
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1. Introduction

A large number of studies have highlighted that the labor share of income has been declining since the 2000s in countries around the world, including Japan. Against this background, the aim of this study is to examine industry-level developments in the labor share of income in Japan and analyze the factors driving these developments.

One of the “stylized facts” with regard to the labor share highlighted by Kaldor (1957) is that although the labor share fluctuates in the short run with the business cycle, it is generally constant over the long run¹⁾. However, since the 2000s, the labor share has shown a clear downward trend in many countries, including Japan. In fact, a look at Japan's labor share shows that it has been on a downward trend since 1994, albeit with some fluctuations reflecting the business cycle (Figure 1).

This decline in the labor share is a phenomenon observed not only in Japan but also in many other countries, and numerous studies have examined the nature and causes of this decline. For example, Karabarbounis and Neiman (2014), using cross-country data for more than 50 countries, show that the decline in the labor share since the 1980s is due to decline in the price of investment goods relative to consumption goods. Meanwhile, Dao et al. (2017)



Source: Author's calculations based on data from the National Accounts of Japan, Cabinet Office.

show that while the relative price of investment goods has played a role in developed countries, as pointed out by Karabarbounis and Neiman (2014), in emerging market economies changes in industrial structure accompanying the decline in the share of agriculture have played a role.

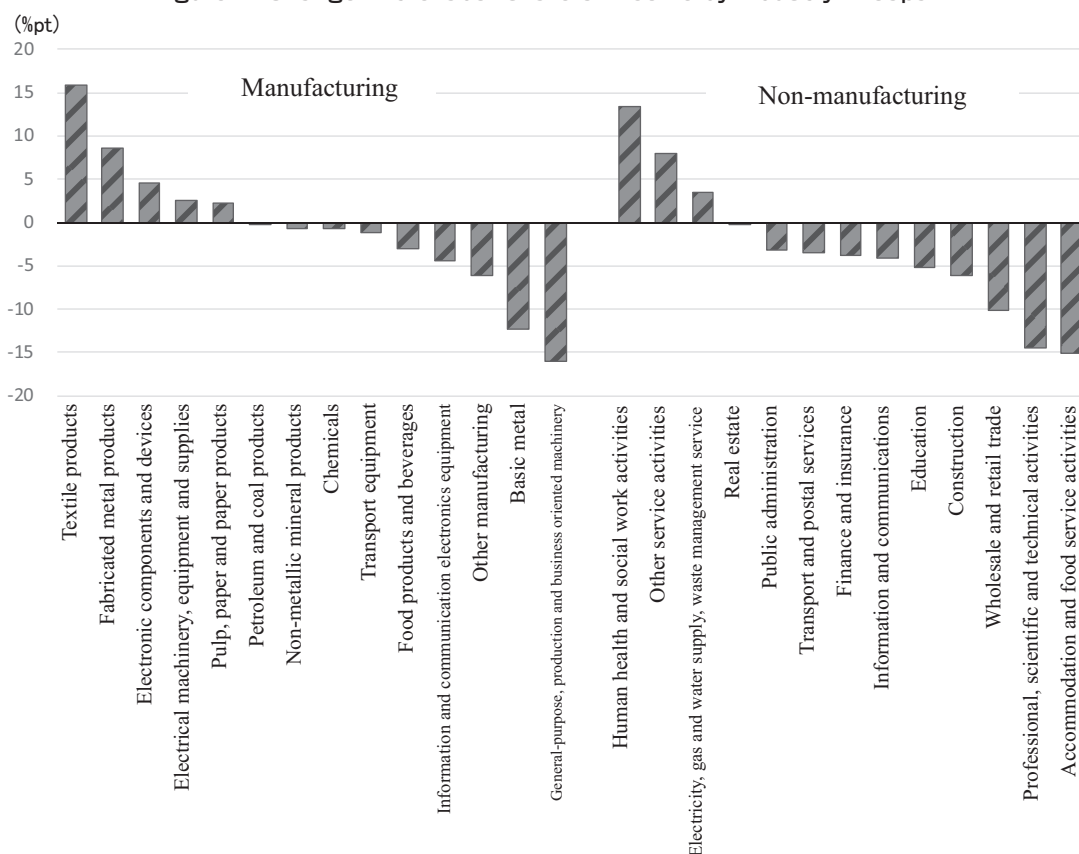
On the other hand, for the labor share to decline due to changes in the relative price of investment goods, as shown by Karabarbounis and Neiman (2014), the elasticity of substitution between capital and labor must be greater than one. However, some studies indicate that the elasticity of substitution is not always greater than one. For this reason, many studies have looked at explanations other than the relative price of investment goods. For instance, using industry-level data for the United States, Elsby et al. (2013), show that an increase in imports of products from China and other countries (import exposure) reduces the labor share through the relocation of domestic labor-intensive industries. Meanwhile, Abdih and Danninger (2017) and Dao et al. (2017), among others, construct measures of routine task intensity - i.e., the extent to which routine tasks can be automated through the use of information and communication technology (ICT) - and show that larger routinization is associated with a greater decline in the labor share. Other studies in recent years have focused on firm-level data, with Autor et al. (2020), for instance, linking the decline in the labor share in the United States with the increasing market share of “superstar firms” that have a low labor share.

Studies examining the labor share within individual industries, such as the aforementioned studies by Elsby et al. (2013) and Abdih and Danninger (2017) focusing on the United States as well as studies by Abe (2017), Bank of Japan (2018), Cabinet Office (2018), and Miyoshi (2018) on Japan, have conducted analyses using domestic firm-level data. However, no studies have been conducted that analyze in detail the differences in changes in the labor share at the industry level within Japan and the factors that determine these differences.

Against this background, this study examines developments in the labor share at the industry level in Japan, taking the results of previous studies into account. In fact, looking at changes in the labor share by industry in Japan shows that while the labor share has declined in more than half of the industries, it has increased in some industries, indicating that there are large differences between industries (Figure 2). Examining what factors are responsible for these differences across industries is important from the perspective of industrial and labor policy.

The remainder of the study is organized as follows. Section 2 discusses the measurement of the labor share used in the analysis. Developments in the labor share may vary depending on how it is calculated, especially how the labor income of sole proprietorships such as the self-employed is treated, and it is necessary to consider the appropriate calculation method to be used in the industry-level analysis. Section 3 then examines developments in industry-level labor shares in Japan using data from the National Accounts of Japan. The section shows that while a decline in the labor share is observed in more than half of industries in both the manufacturing and the non-manufacturing sector, there are large differences across industries. Moreover, the analysis shows that the decline in the labor share is attributable to the fact that in many industries wages have not risen in line with productivity growth. Section 4 examines the factors contributing to the decline in the labor share. The analysis shows that the differences in industry-level labor shares in Japan cannot be explained by a decline in the relative price of investment goods or an increase in imports but are entirely due to differences in the share of non-regular employees.

Figure 2. Change in the labor share of income by industry in Japan



Source: Author's calculations based on the National Accounts of Japan, Cabinet Office.

2. Calculation of the labor share of income

Before developments in the labor share of income at the industry level in Japan are examined, methods to calculate the labor share should be considered. In calculating the labor share, differences arise depending on the calculation method and the data used, and particular attention needs to be paid to the treatment of the income of sole proprietorships.

According to the Japan Institute for Labour Policy and Training (2017), the labor share of income is defined as “an indicator that shows the percentage of value added received by workers out of the value added generated through production activities.” In general, national accounts are used to calculate the labor income share within a country or industry, since the national accounts provide systematic accounts of the data necessary.

When using the national accounts, it is possible to use gross domestic product²⁾ as the “value added generated through production activities” and compensation of employees as “value added received by workers.” However, compensation of employees in the national accounts includes only the labor compensation of employees working for companies and does not include the labor compensation of individual business owners or family employees in sole proprietorships. On the other hand, since gross domestic product (GDP) is the gross value added of a country

as a whole, including sole proprietorships, the labor share, when measured as compensation of employees divided by GDP, will be lower than the actual level of the labor share.

In addition, if there is a clear downward trend in the number of employees and per capita income of sole proprietorships over time, the labor share calculated as compensation of employees/GDP will have an upward bias over time in the sense that only the denominator will gradually shrink. In fact, since the number of sole proprietorships in developed countries including Japan has been declining over time, such a bias cannot be ignored.

This means that when calculating the labor share, the labor income of sole proprietorships should be added to the compensation of employees in the numerator; however, in practice, it is difficult to clearly identify the labor income of sole proprietorships in the statistics. In Japan's national accounts, the income of sole proprietorships is published only as "mixed income," i.e., as a combination of labor income and business profits.

To deal with this issue, this study uses a calculation method called the "economy-wide basis" method, which is described below, to examine the labor share of employees only, excluding sole proprietorships³⁾.

Labor share of income (on an economy-wide basis):

$$\text{Labor share} = \text{Compensation of employees} / (\text{GDP} - \text{Mixed income})$$

While recent studies on Japan, such as Abe (2017), Bank of Japan (2018), Cabinet Office (2018), and Miyoshi (2018), have used firm-level data in their analyses, they do not include sole proprietorships. Other than on an economy-wide basis, the labor share is often also measured on a "payroll share basis" and "labor basis."⁴⁾

Labor share (on a payroll share basis):

$$\text{Labor share} = \text{Compensation of employees} / \text{GDP}$$

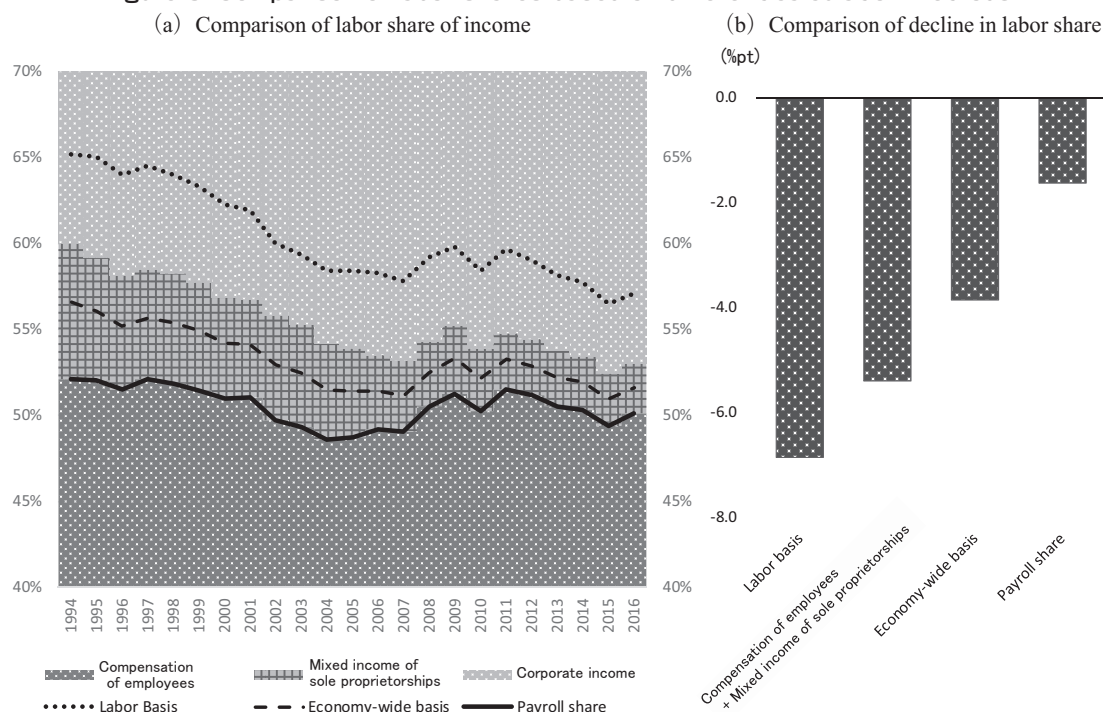
Labor share (on a labor basis)

$$\text{Labor share} = \text{Compensation of employees} \times (\text{Number of employed person} / \text{Number of employees}) / \text{GDP}$$

In the calculation of the labor share on a payroll share basis, it is assumed that all the entrepreneurial income of sole proprietorships accrues to capital, so that the labor share of income is underestimated. Meanwhile, in the calculation of the labor share on a labor basis, it is assumed that the labor income of sole proprietorships is equal to that of employees, and added to the numerator. If the level of labor income differs between employers and sole proprietorships, this calculation method results in a deviation from the actual labor share.

Let us compare these calculation methods. If we look at the labor share in a stacked graph with gross domestic product as 100% (Figure 3(a)), the true labor share in this case lies somewhere between the line for the compensation of employees and the line for the mixed income of sole proprietorships. Since the labor share on a payroll share basis includes only the compensation of employees and not the mixed income of sole proprietorships, the labor share on a payroll share basis is lower than the true labor share. On the other hand, the labor share on a labor basis is higher than the compensation of employees plus the mixed income of sole proprietorships throughout the period, which is clearly above the actual labor income share. This is because, especially in Japan, the income of sole proprietorships is much lower than that of employees. The level of the labor share on an economy-wide basis is

Figure 3. Comparison of labor shares based on different calculation methods



Source: Author's calculations based on the National Accounts of Japan, Cabinet Office.

Note: Panel (b) shows the difference between the average for 2012-2016 and the average for 1994-1998.

between the level of “the compensation of employees” and “the compensation of employees + the mixed income of sole proprietorships,” and is generally regarded to be in line with the actual situation.

Next, Figure 3(b) compares the decline in the labor share based on each indicator between the average for the five-year period from 1994-1998 and the average for the five-year period from 2012-2016. The largest decline, of 6.9%, is observed on a labor basis, while the smallest decline, of 1.6%, is observed on a payroll share basis, meaning that the difference is substantial. The reason for this difference is that both the number of workers and the per capita income of sole proprietorships have declined more substantially since the 1990s than those of employees. In the case of the labor share on a payroll share basis, since the labor income of sole proprietorships is assumed to be constant (= 0) throughout the period, it plays no role in the decline in the numerator of the labor share, so that the decline in the labor share is smaller than the actual situation. Conversely, on a labor basis, since the per capita labor income of sole proprietorships is assumed to be the same as that of employers, the labor income of sole proprietorships is overestimated to a considerable extent in the 1990s, when the number of sole proprietors was high, but over time the number of sole proprietors decreased and the degree of overestimation diminished. For this reason, when the labor share is calculated on a labor basis, the decrease is likely to be overestimated. Since in the calculation on an economy-wide basis, the labor share is calculated without making any assumptions on the labor income per capita for sole proprietorships, it is likely to be more in line with the actual situation than in the other two cases.

Similar observations apply to the United States. According to Elsby et al. (2013), one-third of the decline in the

labor share of income on a labor basis, which is the headline labor share published by the U.S. Bureau of Labor Statistics, is due to the impact of measurement issues (namely, the labor income of the self-employed in the 1980s and 1990s was overestimated).

Based on these considerations, this study - especially when looking at industry-level labor shares -will mainly use the labor share on an economy-wide basis, since it is necessary to accurately identify trends in industries with a large share of sole proprietorships, such as retail trade and food services.

3. Developments in industry-level labor shares

This section examines changes in industry-level labor shares. In order to calculate labor shares on an economy-wide basis, data for the compensation of employees, GDP, number of employees, and number of workers by economic activity from the National Accounts of Japan by the Cabinet Office are used. However, as the National Accounts do not provide data on the mixed income of sole proprietorships by industry, data from the Unincorporated Enterprise Survey by the Ministry of Internal Affairs and Communications are used⁵⁾.

Moreover, for the industry classification, the classification by economic activity in the National Accounts (2011 benchmark year) is used. Agriculture and mining are excluded from the analysis, while all 27 other industries (14 manufacturing and 13 non-manufacturing) are included. For simplicity, in the figures below the names of industries will be abbreviated as shown in Table 1.

3.1 Comparison of labor shares across industries

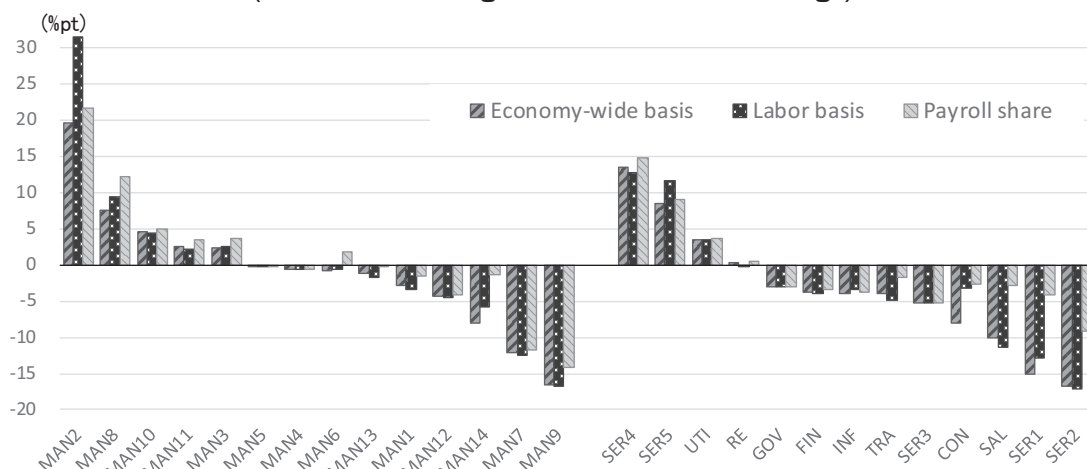
Let us start by looking at changes in industry-level labor shares over the past two decades using the three indicators introduced above, i.e., the labor shares on an economy-wide basis, a labor basis, and a payroll share

Table 1. Abbreviation of industry classifications

Manufacturing (14 industries)		Non-manufacturing (13 industries)	
MAN1	Food products and beverages	UTI	Electricity, gas and water supply, waste management service
MAN2	Textile products	CON	Construction
MAN3	Pulp, paper and paper products	SAL	Wholesale and retail trade
MAN4	Chemicals	TRA	Transport and postal services
MAN5	Petroleum and coal products	SER1	Accommodation and food service activities
MAN6	Non-metallic mineral products	INF	Information and communications
MAN7	Basic metal	FIN	Finance and insurance
MAN8	Fabricated metal products	RE	Real estate
MAN9	General-purpose, production and business oriented machinery	SER2	Professional, scientific and technical activities
MAN10	Electronic components and devices	GOV	Public administration
MAN11	Electrical machinery, equipment and supplies	SER3	Education
MAN12	Information and communication electronics equipment	SER4	Human health and social work activities
MAN13	Transport equipment	SER5	Other service activities
MAN14	Other manufacturing		

Source: Compiled by the author based on the National Accounts of Japan, Cabinet Office

Figure 4. Change in industry-level labor shares
(2012-2016 average minus 1994-1998 average)



Source: Author's calculations based on the National Accounts of Japan, Cabinet Office, and the Unincorporated Enterprise Survey, Ministry of Internal Affairs and Communications.

basis. Figure 4 shows the differences in the labor share between the 2012-2016 average and the 1994-1998 average for each industry.

On an economy-wide basis, the labor share has fallen by 10 percentage points or more in general-purpose, production, and business oriented machinery (MAN9) and basic metals (MAN7) in the manufacturing sector and in professional, scientific, and technical activities (SER2), accommodations and food service (SER1), wholesale and retail trade (SAL), and construction (CON) in the non-manufacturing sector. In more than half of the other industries the labor share also declined.

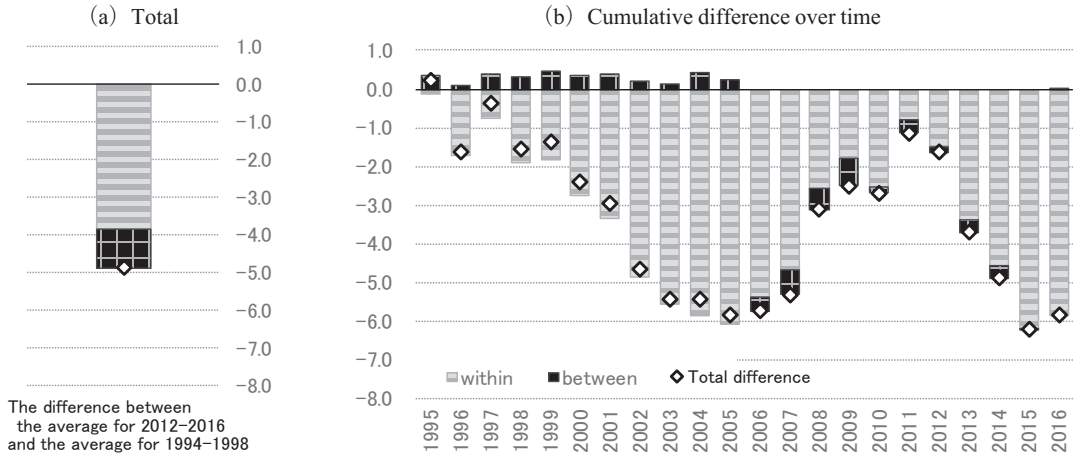
On the other hand, the labor share increased by more than 5 percentage points in the textile products (MAN2) and fabricated metal products (MAN8) industries in the manufacturing sector, and in human health and social work activities (SER4) and other service activities (SER5) in the non-manufacturing sector.

Moreover, comparing the labor shares on an economy-wide basis, labor basis, and payroll share basis shows that the measure on an economy-wide basis is in between the other two measures in most industries.

The differences between the labor share on an economy-wide basis and the other two labor shares are particularly large in the textile products (MAN2), fabricated metal products (MAN8), professional, scientific, and technical activities (SER2), accommodations and food services (SER1), wholesale and retail trade (SAL), and construction (CON) industries. A likely explanation is that the differences in these industries are the result of the exit of businesses with low wage levels in the reference period (i.e., 1994-1998), and that the change in the labor share is overestimated when the payroll share approach normally employed is used.

Overall, while the labor share has declined in many industries, there is considerable heterogeneity in the extent of change across industries. Before considering the reasons for these differences across industries in the next section, let us first examine the impact of these industry-level differences on the labor share at the macro level. In the following, unless otherwise noted, labor shares calculated on an economy-wide basis will be used.

Figure 5. Contribution of the within and between effects to changes in the labor share



Source: Author’s calculations based on the National Accounts of Japan, Cabinet Office, and the Unincorporated Enterprise Survey, Ministry of Internal Affairs and Communications.

Note: Panel (a) shows the difference between the 2012–2016 average and the 1994–1998 average. Panel (b) shows the cumulative difference from 1994.

3.2 Decomposition into within and between industry changes

If there are large differences in the labor share across industries, it is possible that the decline in the labor share in Japan as a whole is simply due to a shift to industries with a low labor share. Therefore, let us decompose changes in the labor share in Japan overall (excluding agriculture, forestry, and mining) into the within effect (i.e., changes in the labor share within each industry) and the between effect (i.e., changes in the labor share overall due to changes in the industry composition of employment).

The decomposition into these two factors is based on the following equation, where LS represents the labor share in Japan as a whole, LS_i represents the labor share in industry i , and σ_i represents the GDP share of industry i , and the first term on the right-hand side is the within effect and the second term is the between effect:

$$\Delta LS = \sum_i \sigma_i \Delta LS_i + \sum_i \Delta \sigma_i \cdot LS_i$$

The decomposition results are presented in Figure 5, where panel (a) for the period overall shows that the within effect accounts for 3.8 of the 4.9 percentage point decline, or almost 80%, over the roughly two decades. Panel (b) showing the annual results indicates that the within effect accounts for most of the change in the labor share.

The finding that the within effect accounts for most of the decline in the labor share is in line with the results obtained in many previous studies, such as Elsby et al. (2013) using industry-level data for the United States and Karabarbounis and Neiman (2014) using EU KLEMS for a range of countries.

3.3 Decomposition into the contribution of changes in labor productivity and nominal wages

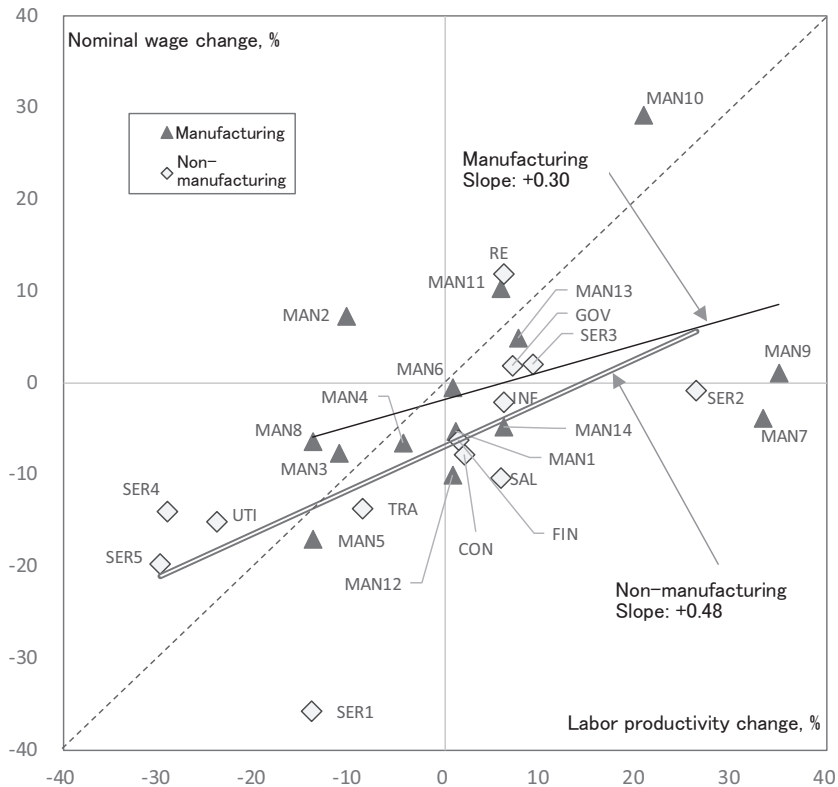
Next, let us decompose the rate of change in the labor share in each industry into two components: wages per capita and labor productivity. The following equation is used for the decomposition:

$$\begin{aligned} \ln(LS_i) &= \ln(W_i L_i / Y_i) \\ &= \ln(W_i) - \ln(Y_i / L_i) \\ \frac{\Delta LS_i}{LS_i} &= \frac{\Delta(W_i)}{W_i} - \frac{\Delta(Y_i / L_i)}{Y_i / L_i} \end{aligned}$$

where LS_i denotes the labor share in industry i , W_i denotes the nominal wage per worker, L_i denotes the number of employees, and Y_i denotes nominal gross value added. Using this equation, changes in the labor share can be decomposed into the contribution of changes in labor productivity (Y_i/L_i) and changes in nominal wages (W_i).

The results are shown in Figure 6, which plots the rate of change in nominal wages on the vertical axis and the rate of labor productivity growth on the horizontal axis. The figure indicates that 14 of the 17 industries that saw an increase in labor productivity (i.e., those in the right quadrants) are distributed in the region below the 45-degree line. This means that while labor productivity increased in these industries, wages did not rise commensurately, leading to a decline in the labor share. On the other hand, six of the ten industries that saw a decline in labor productivity (i.e., those in the left quadrants) are above the 45-degree line, indicating that wages did not decline as

Figure 6. Changes in labor productivity and in nominal wages



Source: Author's calculations based on the National Accounts of Japan, Cabinet Office, and the Unincorporated Enterprise Survey, Ministry of Internal Affairs and Communications.

Note: The distance between each point and the 45-degree line (dotted line) indicates the rate of change (in %) in the labor share. Industries below the 45-degree line have a negative rate of change, while industries above the 45-degree line have a positive rate of change.

much as labor productivity.

These results indicate that while there are differences in productivity growth across industries, wages have not adjusted commensurately, resulting in a decline in the labor share. In fact, the slope of the line obtained when estimating the correlation between changes in labor productivity and wages is below 1 both for the manufacturing and the non-manufacturing sector. The widening productivity differences due to advances in ICT may be responsible for this phenomenon.

Such divergence between labor productivity and wage growth is a phenomenon observed not only in Japan but also in other countries, as highlighted by Schwellnus et al. (2018) and OECD (2018) using cross-country data. These studies show that, in countries experiencing a decline in the labor share, there has been a large divergence between labor productivity and wages in firms with high labor productivity.

This finding is also consistent with the “superstar hypothesis” proposed by Autor et al. (2020). Using U.S. firm-level data to measure the within effect (changes in the labor share overall due to changes in the labor share within individual firms) and the between effect (changes in the labor share overall due to changes in the composition of firms), they showed that the main reason for the decline in the labor share in the United States was the between effect, i.e., changes in the composition of firms. They argue that this decline in the labor share is the result of the increase in the market share of some superstar firms with a low labor share such as Google and Amazon.

In Japan, on the other hand, the decline in the labor share cannot necessarily be explained by this “superstar firm” hypothesis. Conducting analyses using firm-level data for Japan and employing the same methodology as Autor et al. (2020), Bank of Japan (2018) and Cabinet Office (2018) find that only about half of the decline in the labor share can be explained by changes in the composition of firms, and that the decline in the labor share within individual firms also played a substantial role.

In light of this, it is highly likely that the divergence between labor productivity and wages within industries (i.e., the decline in the labor share) cannot be explained simply by the increased share of a few highly productive firms. The next section therefore examines the reasons for differences in changes in the labor share within individual industries.

4. Determinants of industry-level labor shares

The previous section showed that most of the decline in Japan’s labor share is attributable to the decline in the labor share within industries, and that the extent of the decline in the labor share varies across industries. This raises the question what factors are responsible for changes in the labor share within individual industries.

To examine this issue, this section presents regression analyses using changes in industry-level labor shares (the difference between the 2012-2016 average and the 1994-1998 average) as the dependent variable and the four variables listed below as independent variables. Following Elsby et al. (2013), weighted least squares regression using the nominal value-added share of each industry in 1994-2016 is employed for the estimation due to the small sample size. The following is a detailed description of each of the independent variables used.

Relative price of capital goods:

As Karabarbounis and Neiman (2014) show, if the elasticity of substitution is greater than 1, then a decline in the price of capital goods relative to that of consumer goods is expected to lead to labor being substituted in the

production process by less costly investment goods.

To examine this effect, the fixed capital formation deflator by economic activity obtained from the “Fixed Capital Formation Matrix” in the National Accounts of Japan is used as the capital goods deflator. To obtain the relative price vis-à-vis consumption goods, this capital goods deflator is divided by the consumption expenditure deflator. Finally, to see the change of the relative price of capital goods, the percentage change from the 1994-1998 average to the 2012-2016 average is used in the regression.

Moreover, the analysis is conducted using three different definitions of capital formation for the calculation of relative prices: (1) total fixed capital formation, (2) fixed capital formation excluding housing and construction, and (3) machinery and equipment only in fixed capital formation.

Import share:

To look at the impact of import exposure highlighted by Elsby et al. (2013), the difference between the 2012-2016 average and the 1994-1998 average of the industry-level share of imports in output is used. An increase in imports is assumed to contribute to a decline in the labor share through the relocation of domestic labor-intensive industries abroad.

Using the National Accounts, the data were constructed by obtaining the ratio of imports to total domestic output at the goods level and then multiplying that ratio by the output of each good in each industry.

Share of university graduates:

The change in the share of university graduates in the number of persons employed in each industry is used, with data obtained from the Employment Status Survey by the Ministry of Health, Labour and Welfare. Due to data limitations, the difference between 2017 and 2002 is used for this variable.

Share of non-regular employees:

Cabinet Office (2018) highlights that one reason for the changes in the labor share at the firm-level is changes in the share of part-time workers. A possible explanation is that, as pointed out, for example, by Elsby et al. (2013), increases in imported products may have pushed up the share of non-regular employees through downward pressure on costs. Moreover, Abdih and Danninger (2017), for instance, cite the extent to which routine tasks can be automated through ICT, i.e., the routine task intensity, within an industry as a factor affecting the labor share, and the share of non-regular employees can be regarded as a variable close to this.

For the analysis, the change in the share of non-regular employees in the number of employees (excluding managers, etc.) in each industry is used based on data from the Employment Status Survey by the Ministry of Health, Labour and Welfare. As in the case of the share of university graduates, due data limitations, the difference between 2017 and 2002 is used.

The estimation results using these variables are summarized in Table 2. The table shows that the coefficients on the relative price of capital goods and the share of imports are insignificant. The coefficients on the share of non-regular workers are positive and significant.

Moreover, Figure 7 plots changes in each explanatory variable against changes in the labor share, with the size of the circles representing the share of each industry in nominal GDP. The figure also indicates that except in the case

Table 2. Estimation results for factors responsible for changes in the labor share

	Model (a)	Model (b)	Model (c)	Model (d)	Model (e)	Model (f)	Model (g)	Model (h)	Model (i)
Relative price of capital goods	0.160					-0.075			
(1) total fixed capital formation	(0.108)					(0.132)			
Relative price of capital goods		-0.018							
(2) fixed capital formation excluding housing and construction		(0.089)							
Relative price of capital goods			-0.018						
(3) machinery and equipment only in fixed capital formation			(0.089)						
Import share				0.127				0.165***	
				(0.272)				(0.235)	
Share of university graduates					-0.335				0.639*
					(0.276)				(0.372)
Share of non-regular employees						0.668***	0.782***	0.676***	1.113***
						(0.215)	(0.297)	(0.218)	(0.332)
R2	0.08	0.00	0.01	0.01	0.06	0.28	0.23	0.23	0.30
Observations	27	27	27	27	27	27	27	27	27

Source: Author's calculations based on the National Accounts of Japan, Cabinet Office, the Unincorporated Enterprise Survey, Ministry of Internal Affairs and Communications, and the Employment Status Survey, Ministry of Health, Labour and Welfare.

Notes: ***, **, and * denote significance at the 1, 5, and 10% level, respectively. Figures in parentheses are standard errors.

of the share of non-regular employees, no correlations similar to those observed in previous studies are found.

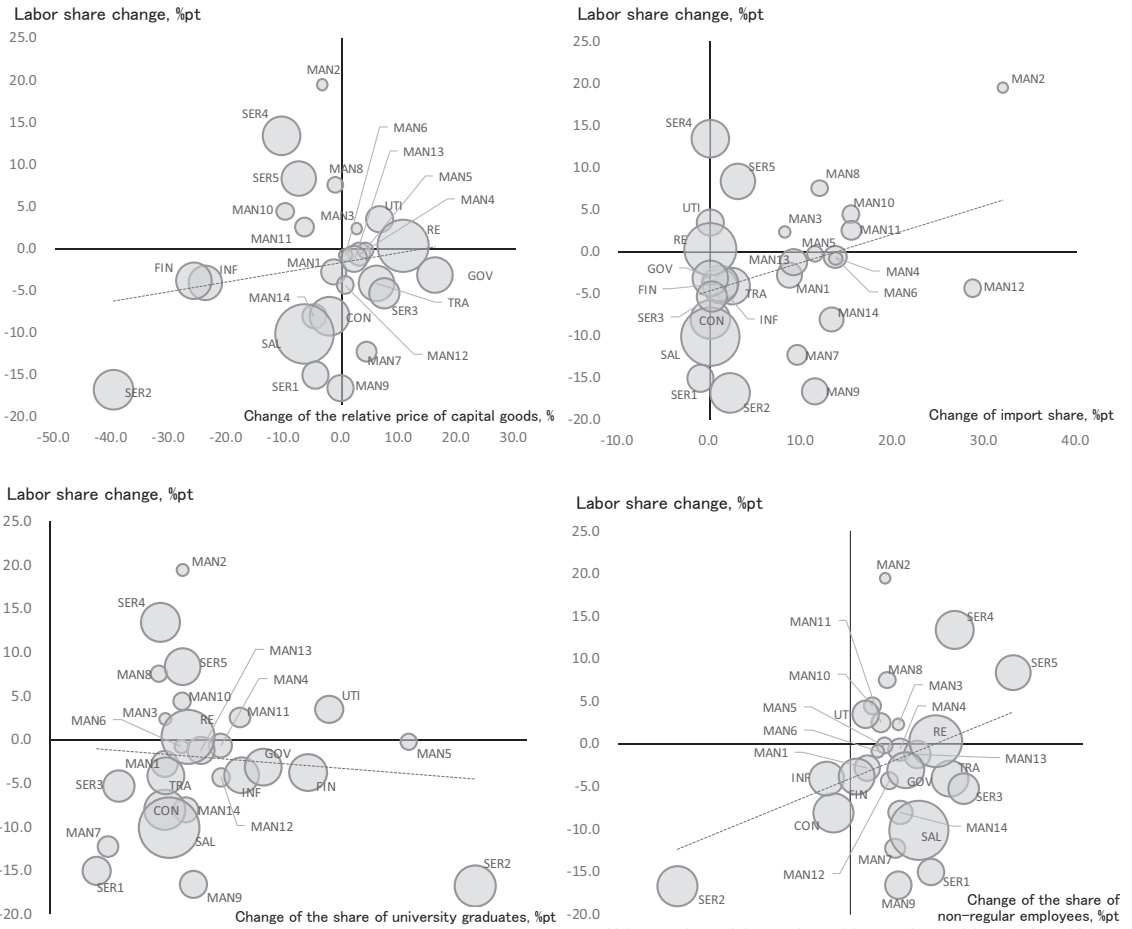
Looking at the results in more detail, they show the following:

- (1) As the estimation results in Table 2 indicate, the differences in the labor share across industries can be explained by the share of non-regular employees, while the other factors do not play a role. In fact, indicated in Figure 7, human health and social work activities (SER4) and other services activities (SER5) experienced increase of labor share, while the increase in the share of non-regular employees is especially high in these industries.
- (2) While there are no substantial differences in the price of capital goods and the structure of employment across manufacturing industries in Figure 7, there are large differences in the labor share.
- (3) While most manufacturing industries experienced an increase in imports, this increase cannot explain the decrease in the labor share, as indicated by estimation results of Model (e) in Table 2. In fact, in the textile products (MAN2), electronic components and devices (MAN10), and electrical machinery, equipment and supplies (MAN11) industries, which have seen particularly large increases in imported products, the labor share has actually increased.

The reason why only the share of non-regular employees is significant may be that in industries with a large increase in the share of non-regular employees there are many tasks that are difficult to automate, so that the labor share has not declined despite advances in ICT. This likely is especially the case in certain service industries such as the health care and insurance industries.

While the relative price of capital may have declined in many industries, whether labor is substituted by capital goods may depend on the specific production technologies and business processes of each industry (i.e., the elasticity of substitution is not uniform across industries).

Figure 7. Relationship between the labor share and the different variables



Source: Author's calculations based on the National Accounts of Japan, Cabinet Office, the Unincorporated Enterprise Survey, Ministry of Internal Affairs and Communications, and the Employment Status Survey, Ministry of Health, Labour and Welfare.

Notes: The size of the circles represents the average of the nominal value-added share of each industry during the period 1994-2016. The straight lines represent the OLS estimation results.

Moreover, while increases in imports are thought to have worked in the direction of reducing the labor share by leading to the relocation abroad of labor-intensive industries, this has not necessarily been the case in Japan. When thinking about the link between imports and the labor share, it may be necessary to consider changes in industrial structure from a more multifaceted perspective, for example by looking at firms' and industries' position in the global value chain, rather than simply focusing on increases or decreases in imports alone.

5. Conclusion

The analysis in this study has shown that the decline in the labor share in Japan is mainly due to the small increase in wages relative to the increase in labor productivity. Furthermore, most of the decline in the labor share is due to a decline within firms.

On the other hand, the differences in the labor share across industries cannot be explained by a decrease in the

price of capital goods or an increase in imports, factors that were identified in previous studies on other countries, but only by the share of non-regular employees. However, changes in the share of non-regular workers can explain only a relatively small part of the decline in the labor share. Meanwhile, it is possible that the impact of changes in the relative price of investment goods differs depending on the specific technology and employment structure of each industry, and future research will need to capture such aspects in more detail. Moreover, examination of the impact of globalization should not be limited to focusing simply on the increase in imported products but should also include a more detailed understanding of aspects such as changes in global value chains.

Notes

- 1) Because employee wages are more rigid than firms' profits, the labor share of income generally tends to increase during recessions and decrease during expansions.
- 2) While national income instead of GDP may be used for "value added generated through production activities," in this study GDP is employed due to limitations in the industry-level data.
- 3) The result of this calculation is equal to the labor share in the whole economy when the labor share of sole proprietorships is assumed to be equal to the labor share of employees. This is why this method is called "whole economy" even though the income of sole proprietorships is excluded.
- 4) The names and calculation methods for the labor share on an "economy-wide basis," a "payroll share basis," and a "labor basis" are from Elsby et al. (2013). Similar methods are also employed in the literature on Japan, for example, in Japan Institute for Labour Policy and Training (2017).
- 5) Since the Unincorporated Enterprise Survey compiles data only for the four industry categories of "manufacturing," "accommodations, eating and drinking services," "wholesale and retail trade," and "services," the estimates are obtained using the income of sole proprietors in "manufacturing" for all manufacturing industries and in "services" for all non-manufacturing industries other than "accommodations, eating and drinking services" and "wholesale and retail trade."

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