

What Determines the Base Salary of Full-time/Part-time Workers?

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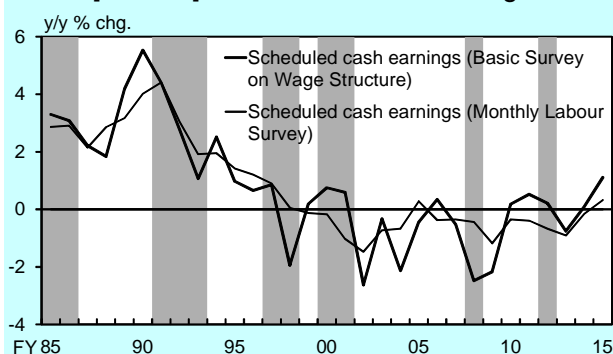
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We examine the determinants of the base salary of full-time/part-time employees in Japan. The factors that determine the base salary of full-time workers depend primarily on the size of the enterprise that employs the workers. Specifically, the base salary at large enterprises, especially in manufacturing sectors, is influenced by changes in prices, measured by the past inflation rate, via the negotiation process of base pay increase between unions and firms. As for small enterprises, both labor market tightness and margin price (defined as the difference between output and input prices) impact the base salary. On the other hand, the base salary (hourly scheduled cash earnings) of part-time workers is mainly determined by labor market tightness, while it is also affected by minimum wage increases.

Introduction

In Japan, the scheduled cash earnings¹ (Chart 1), which indicate the base salary (excluding overtime pay and bonuses), continued to increase by more than 2% every year until the early 1990s. After the burst of the financial bubble in 1991, the rate of wage increase became sluggish and eventually turned negative; we did not observe a clear recovery lasting more than one year, even during the economic expansion before the Lehman shock. However, the scheduled cash earnings began to increase in fiscal 2014, and recently the rate of the rise has gradually expanded.

[Chart 1] Scheduled Cash Earnings



Note: Scheduled cash earnings (Basic Survey on Wage Structure) is calculated as the weighted average of monthly scheduled cash earnings of full-time and part-time workers, adopting the number of workers of each type for the weight. The figures up until fiscal 1987 are estimated by the authors. Shaded areas indicate recession periods.

Source: Ministry of Health, Labour and Welfare.

To analyze these developments of average wages for all workers, we have to seriously consider the heterogeneity in workers' characteristics that influence the wage levels and movements. For instance, the wage contracts in Japanese labor market are primarily classified into two different types: full-time workers (mainly represented by "regular workers") and part-time workers². Whereas full-time workers, typically under a long-term employment contract, are required to learn firm-specific skills, part-time workers, often under a short-term contract, need general skills. This duality of the labor market³, or that full-time and part-time workers face distinct markets, may result in different wage determinants for each type of worker. We therefore need to take into account the differences in workers' characteristics to analyze how wages are determined.

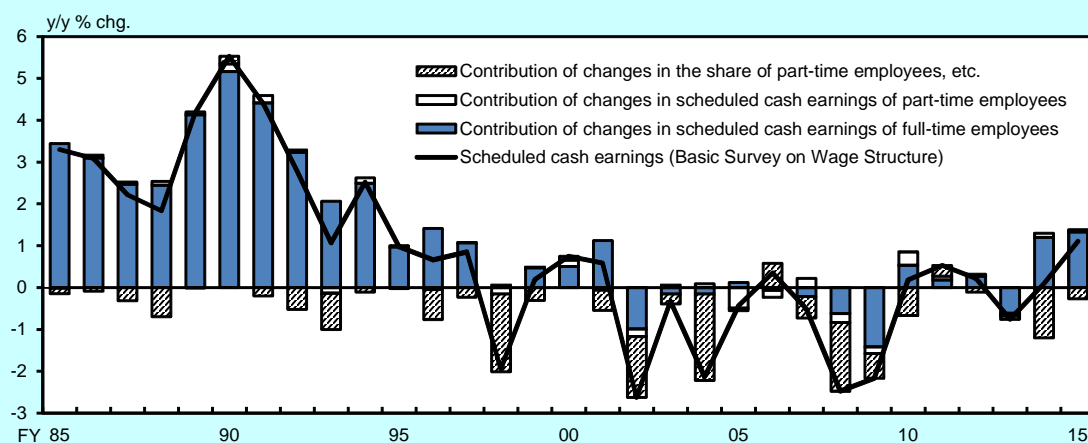
With these considerations in mind, we examine the developments of scheduled cash earnings for each type of workers separately: full-time and part-time. Specifically, since the wage levels of full-time and part-time workers are different, we first elucidate the impact of the changes in the compositions of full-time and part-time workers on the average wage. Wage determinants of each type of the workers are then analyzed. Finally, we briefly consider the background of the wage increases in recent years.

Composition Effect on Average Wages

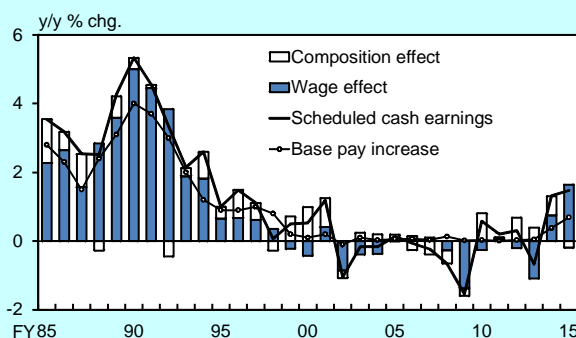
A detailed examination of the long-run movements of average scheduled cash earnings for all workers reveals that these averages are affected by composition changes of different types of workers. The primary effect of the composition changes derive from those of full-time and part-time workers. The share of part-time workers to total employment has experienced an increasing trend since late 1990s. This trend drags the growth of average wages for all workers, because the wage levels of part-time workers are lower than that of full-time workers (Chart 2(1)). In addition, even among full-time workers, the effect of the composition changes on average wages may

arise from the heterogeneity in workers' sex, age, and the length of employment, since these factors affect the wage levels of employees in Japan. By decomposing the change in the average scheduled cash earnings into the effect of the composition changes ("composition effect") and the effect of the wage changes for each type of workers ("wage effect"), we observe that the composition effect has a significant impact on average wages. For instance, during 1990s, when the babyboomers, who occupy a large share of the population, became senior and climbed the wage ladder, the composition effect exerted upward pressure on average wages. After that, during late 2000s, the retirement of the babyboomers made the composition effect negative. However, since

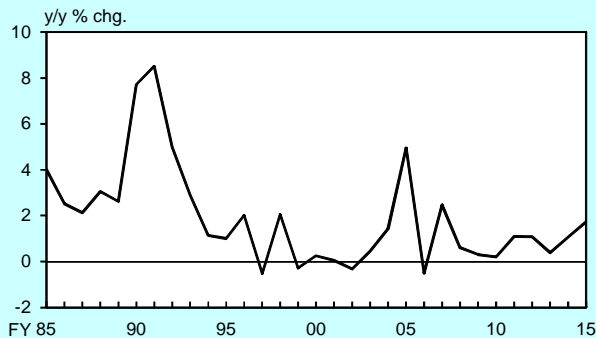
[Chart 2] Composition Effect on Average Wages
(1) Contributions of Full-time and Part-time Workers to Scheduled Cash Earnings



(2) Scheduled Cash Earnings of Full-time Workers and Base Pay Increase



(3) Hourly Scheduled Cash Earnings of Part-time Workers



- Notes: 1. Figures in (1) are obtained by the following calculations in order to explicitly take into account the effect of composition changes of full-time and part-time workers on the average wages (the figures calculated in Chart 1): The contribution of changes in scheduled cash earnings of part-time (full-time) employees is obtained by multiplying the year-on-year rate of changes in part-time (full-time) scheduled cash earnings and part-time (full-time) employees' share of total scheduled cash earnings in the previous year. The contribution of changes in the share of part-time employees, etc. is calculated as the residual.
2. Figures in (2) are obtained by the following equations in order to explicitly take into account the effect of composition changes of full-time workers of different types (sex, age, length of employment, industry, and enterprise size) on average wages:
 (the wage effect) = $\sum_i \{(y/y \text{ rate of change in the wage of type } i \text{ workers}) \times (\text{the } i\text{'s share of total wages in the previous year})\}$
 (the composition effect) = $\sum_i \{(y/y \text{ change in the share of the number of type } i \text{ workers}) \times (\text{the rate of the difference between the type } i\text{'s wage level and the average wage in the previous year})\}$
3. Figures of the base pay increase in (2) up until fiscal 1987 are based on the survey by The Institute of Labour Administration. Figures between fiscal 1988 and fiscal 2013 are based on the survey by Central Labour Relations Commission. Figures since fiscal 2014 are based on the Rengo's report.
4. Figures of scheduled cash earnings are based on the "Basic Survey on Wage Structure."

Sources: Ministry of Health, Labour and Welfare; The Institute of Labour Administrations; Central Labour Relations Commission; Japanese Trade Union Confederation (Rengo).

fiscal 2010, as the share of the young generations among all workers decreased, the composition effect has become positive again. By removing the composition effect from the scheduled cash earnings of full-time workers (i.e. the wage effect in Chart 2(2)), we observe that the increase in the wage since fiscal 2014 becomes clearer, and the rate of the increase in fiscal 2015 is the highest since fiscal 1994.

On the other hand, as for part-time workers, who need general skills and whose wages thus do not presumably depend much on workers' characteristics, the increase in wages has recently become more and more pronounced (Chart 2(3)).

These observations imply that removing the composition effect is important when we evaluate how the base salary is influenced by macroeconomic variables, such as inflation and labor market tightness⁴. The rest of this review analyzes what factors affected the movements of the base salary, by explicitly distinguishing between full-time and part-time.

Determinants of Wages: Full-time Workers

Estimation of a simple wage function

As for full-time workers, to verify what factors influence wages of each industry and firm size, we estimate a simple wage function by regressing the "wage effect" (obtained by removing the composition effect from the change in scheduled cash earnings) on the following explanatory variables⁵: (a) labor market tightness; (b) margin price (defined as the difference between output and input prices); and (c) inflation rate. Although it should be noted that the estimation involves a non-negligible error, the following results are observed: (a) the effect of the labor market tightness is statistically significant on the wages of small and medium-sized enterprises (SMEs) regardless of industry; (b) the margin price significantly influences the wages of all sectors excluding large manufacturing enterprises; and (c) the effect of the inflation rate is significant only in large manufacturing enterprises. Below we examine the background of the differences in the impact of these factors in detail.

(a) Labor market tightness

In general, the improvement of supply-demand conditions in the labor market motivates firms to raise wages to secure their labor force. On the other hand, the above-mentioned estimation result implies a differing degree in the effect of labor market tightness between SMEs and large firms. Specifically,

[Chart 3] Wage Function for Full-time Workers

Scheduled Cash Earnings (y/y % Chg.)

$$\begin{aligned}
 &= \alpha_0 \text{ <fixed effect and time effect>} \\
 &+ \alpha_1 \times (\text{labor market tightness}) \\
 &+ \alpha_2 \times (\text{margin price}) \\
 &+ \alpha_3 \times (\text{inflation rate,} \\
 &\quad \text{during the period with base pay increase})
 \end{aligned}$$

		Estimation period: FY1985-2015			
Industry		Manufacturing		Nonmanufacturing	
Size		Large	Small, Medium	Large	Small, Medium
a ₁		0.06 (0.28)	0.60*** (0.20)	0.35 (0.26)	1.01*** (0.16)
a ₂		0.13 (0.80)	0.81** (0.41)	0.73* (0.41)	0.71*** (0.17)
a ₃		1.06** (0.49)	0.44 (0.32)	0.56 (0.36)	0.14 (0.22)
Adj. R ² : 0.68		S.E. of regression : 1.02			

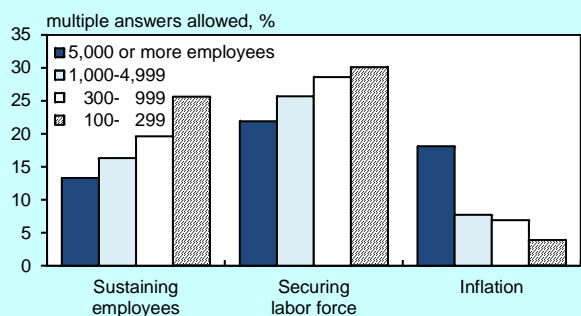
- Notes: 1. The dependent variable for each industry (manufacturing and non-manufacturing) and size (large, medium and small) is the "wage effect" similar to the figures in Chart 2(2), obtained by taking into consideration the composition changes of different types (sex, age and length of employment) of workers. We adopt the panel estimation method with fixed effect and with the panel-corrected standard error in order to allow the contemporaneous correlation of the error terms.
2. The detailed definitions of the explanatory variables are as follows. Labor market tightness is measured by the previous year's employment conditions DI in *Tankan* (with reversed sign, indicating "insufficient" minus "excessive"). Margin price is measured by the previous year's difference between the DIs for changes in output prices and in input prices in *Tankan*. The inflation rate is measured by the previous year's y/y rate of change in the CPI (less fresh food, adjusted to exclude the estimated effects of changes in the consumption tax rate). The time effect is expressed by a dummy variable whose value is 1 since fiscal 1991, and represents the decrease of the annual growth rate of labor productivity after the burst of the financial bubble in Japan. Note that the sign of the estimated coefficient of the time effect is negative and consistent with the interpretation above.
3. The period of base pay increase indicates up until fiscal 2001 and after fiscal 2014, during which the base salaries of full-time workers of many firms were revised as a result of annual labor negotiations.
4. The figures of *Tankan* used in the estimation are normalized with mean 0 and standard deviation 1 for each industry and enterprise size.
5. Enterprise sizes are defined as follows: large enterprises = 1,000 or more employees; medium-sized enterprises = 100-999 employees; small enterprises = fewer than 100 employees.
6. The figures in parentheses in the table represent standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Sources: Ministry of Health, Labour and Welfare; Bank of Japan; Ministry of Internal Affairs and Communications; The Institute of Labour Administrations; Central Labour Relations Commission; Japanese Trade Union Confederation (*Rengo*).

whereas the wages of SMEs are significantly influenced by the labor market tightness (measured by the previous year's employment conditions DI in the *Tankan Survey*), such effect is not statistically significant for large enterprises. The background of this difference may well be the higher degree of labor mobility, represented by more frequent job changes, in the labor market faced by SMEs. In other words, when the supply-demand condition is tight in the labor market, it is relatively more likely that SMEs,

compared with large firms, face the risk of being unable to sustain employees (or prevent their employees from transferring jobs), which thus induces SMEs to raise employees' wages. This hypothesis is consistent with the result of a survey, in which smaller firms tend to regard "sustaining employees" and "securing labor force" as important factors when revising wages (Chart 4). The improvement of labor market conditions in recent years has been remarkable, and the figures of "active job openings-to applicants ratio" and "employment conditions DI" in the first

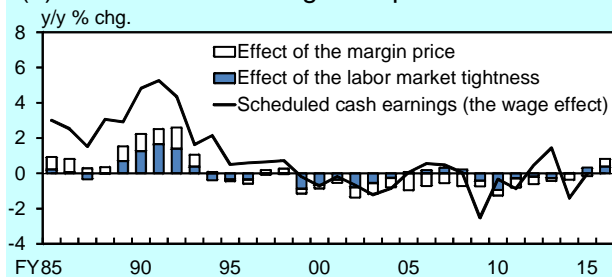
[Chart 4] Important Factors for Wage Revision



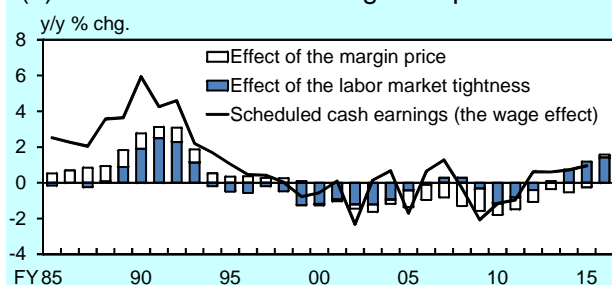
Note: Figures are for 2015.
Source: Ministry of Health, Labour and Welfare "Survey on Wage Increase."

[Chart 5] Contributions of Labor Market Tightness and Margin Price to Wages of SMEs

(1) Small Manufacturing Enterprises



(2) Small Non-manufacturing Enterprises



Sources: Ministry of Health, Labour and Welfare; Bank of Japan; Ministry of Internal Affairs and Communications.

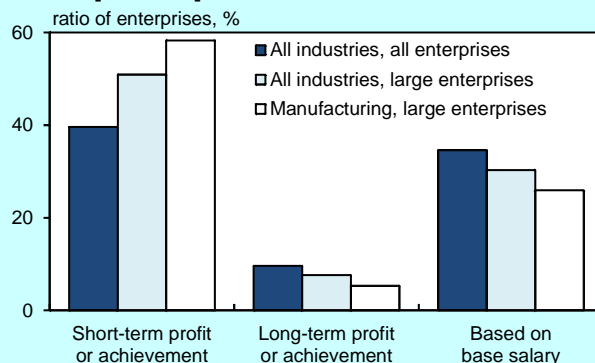
half of 2016 have even reached levels as high as they were in the early 1990s. The above-mentioned estimation result therefore implies that the prominent improvement in labor market conditions has impacted the recent increase in wages of SMEs (Chart 5).

(b) Margin price

Generally speaking, as the profit of firms improves, those firms tend to raise wages to share the profit with employees. It is therefore natural to assume that the improvement of margin price, resulted from increase in output prices or decrease in input prices, positively influences wages.

With this consideration in mind, we observe that the estimation result indicates a heterogeneous effect on margin price (measured by the previous year's difference between the DIs for changes in output prices and in input prices in *Tankan*) on the changes in wages. Specifically, according to the estimation result, whereas the effect of margin price on wages of SMEs and large non-manufacturing firms is statistically significant, it is not significant for large manufacturing firms⁶. That the influence of margin price is smaller for large manufacturing firms may be due to the following: (a) under the employment contracts of full-time workers in large firms, long-term employment is typically presumed; and (b) margin price may fluctuate in short terms due to the exchange rate or international commodity market prices. These two backgrounds may motivate large manufacturing firms to distribute the gains derived from increased margin prices by raising bonuses rather than by increasing base salaries, which firms see as more difficult to adjust in the short run. This hypothesis is consistent with the result of a survey, in

[Chart 6] Determinants of Bonuses



Notes: 1. Large enterprises are defined as those with 1,000 or more employees. Figures are for the beginning of 2012.
2. The respondents of the survey do not include those at administrative positions. Note that the qualitative features of the results are similar for the survey in which the respondents are only those at administrative positions.
Source: Ministry of Health, Labour and Welfare "General Survey on Working Conditions."

which large manufacturing enterprises tend to regard short-run profit as important factors when determining bonuses (Chart 6). On the contrary, SMEs tend to distribute more profit, even originated from possibly short-run improvement in margin price, with employees via base salaries, because they face the labor market with higher mobility than large firms do. In this context, it is especially noteworthy that the improvement of margin price due to cheaper oil prices since 2015 likely exerts upward pressure on base salaries of SMEs (Chart 5).

(c) Inflation

The effect of the inflation rate on wage developments is statistically significant for large manufacturing firms. A plausible interpretation of this result is that the inflation rate of the previous year is taken into account during the wage negotiation between labor unions and firms, and the negotiation (especially on base pay increase) impacts the wages of large manufacturing firms whose union density is higher than the other sectors (Chart 7). This interpretation is justified by the fact that the statements by the Japanese Trade Union Confederation (so-called Rengo, the biggest organization of labor unions in Japan) mention the previous year's inflation rate as an important factor in negotiating wages⁷. For instance, the "aim of the 2015 spring offensive," published before the start of the annual negotiation, explicitly states (translated from Japanese by the authors) "The year-on-year rate of the wage increase for each worker should be determined by the rate of the 'regular wage increase', necessary to maintain the pre-established wage ladder, plus the rate more than 2%. The latter is demanded based on the need to compensate the previous year's inflation rate, the proper sharing of

corporate profits, and the social responsibility on realizing a virtuous cycle of our economy, and all the constituents of Rengo act to earn that wage increase." This example suggests that the inflation rate affects the wages of large enterprises via the negotiation process. It is also consistent with the result of the above-mentioned survey, in which larger firms tend to regard "inflation" as an important factor when revising wages (Chart 4).

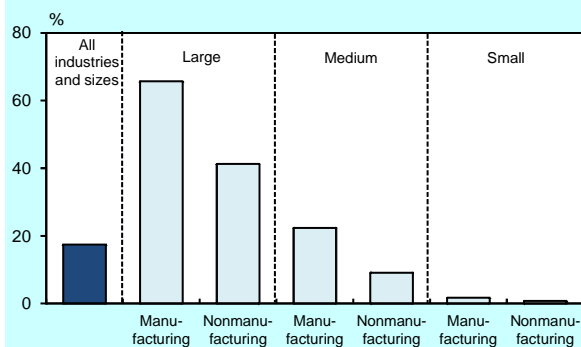
These considerations imply that the drop in the rate of base pay increase in 2016 spring wage negotiation (0.44% according to Rengo) compared with that in 2015 (0.69%) is likely due to the sluggish inflation rate, caused in part by the decrease in energy prices since 2015.

Determinants of Wages: Part-time Workers

The effect of labor market tightness on hourly wages of part-time workers

We next analyze the determinants of the base salary (hourly scheduled cash earnings) of part-time workers. Compared with full-time workers, part-time workers tend to have general skills commonly required by a variety of firms, rather than firm-specific skills demanded for full-time workers, and the length of their employment contracts is typically short and

[Chart 7] Union Density



Note: Figures for each industry and enterprise sizes are calculated by dividing the number of union members based on "Basic Survey on Labour Unions" by the number of employees based on "Labour Force Survey". Enterprise sizes are defined as follows: large enterprises = 1,000 or more employees; medium-sized enterprises = 100-999 employees; small enterprises = fewer than 100 employees. Figures are for 2015.

Sources: Ministry of Health, Labour and Welfare; Ministry of Internal Affairs and Communications.

[Chart 8] Wage Function for Part-time Workers

Hourly Scheduled Cash Earnings (y/y % Chg.)
 $= \alpha_0$ <fixed effect>
 $+ \alpha_1 \times$ (labor market tightness)
 $+ \alpha_2 \times$ (margin price)
 $+ \alpha_3 \times$ (inflation rate,
 during the period with base pay increase)

		Estimation period: FY1990-2015			
	Industry	Manufacturing		Nonmanufacturing	
	Size	Large	Small, Medium	Large	Small, Medium
α_1		1.34* (0.79)	1.00** (0.40)	1.02 (0.65)	1.32* (0.69)
α_2		-0.97 (2.45)	0.96 (0.81)	-0.81 (1.46)	0.49 (0.68)
α_3		0.72 (1.48)	0.23 (0.74)	1.47 (1.20)	0.44 (1.09)
Adj. R ² : 0.37		S.E. of regression : 2.20			

- Notes: 1. The details on the definitions of variables and the estimation method are described in the note of Chart 3.
 2. Enterprise sizes are defined as follows: large enterprises = 1,000 or more employees; medium-sized enterprises = 100-999 employees; small enterprises = fewer than 100 employees.
 3. The figures in parentheses in the table represent standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

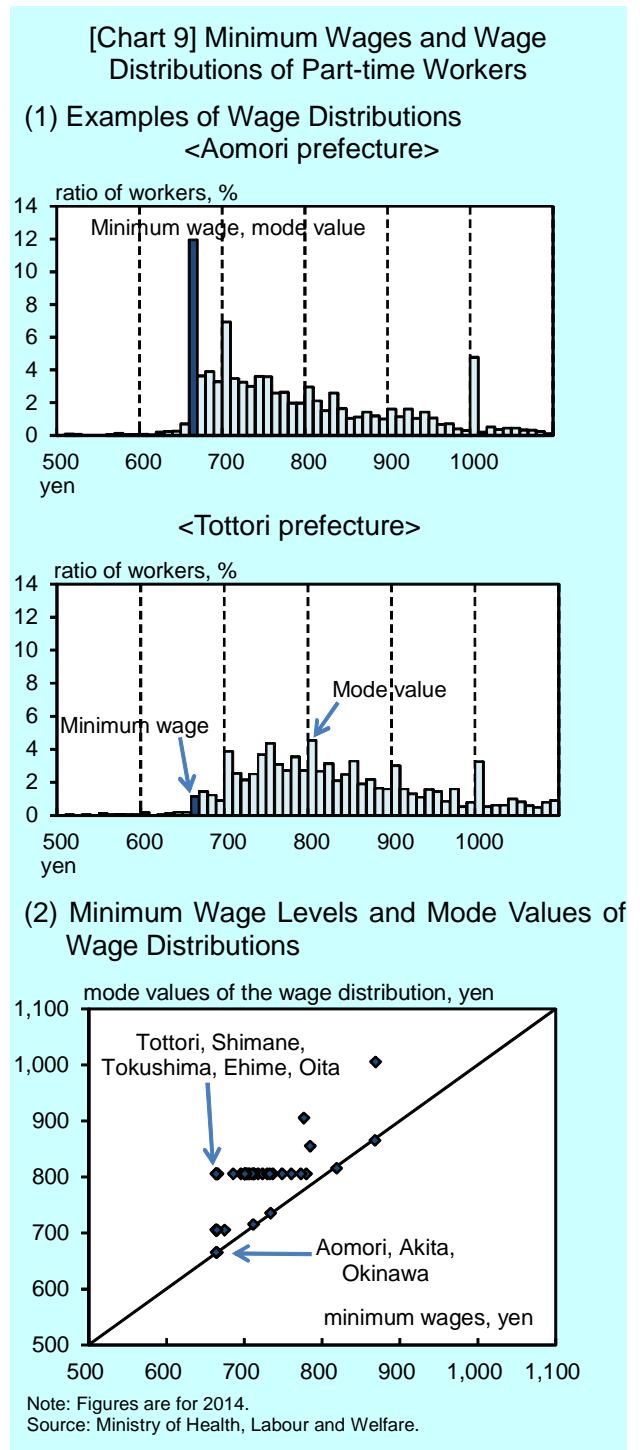
Sources: Ministry of Health, Labour and Welfare; Bank of Japan; Ministry of Internal Affairs and Communications.

predetermined, thus allowing firms to adjust the number of employees more easily. These characteristics of part-time workers and the discussions so far in this review allow us to propose a hypothesis: that the wages of part-time workers are primarily influenced by labor market tightness. To verify this hypothesis, we again estimate a simple wage function by regressing changes in the hourly scheduled cash earnings of part-time workers on the following explanatory variables: (a) labor market tightness; (b) margin price; and (c) the inflation rate (Chart 8). The result of the estimation indicates that (a) the effect of labor market tightness is statistically significant in most sectors, while neither (b) margin price nor (c) the inflation rate significantly affects the wages of part-time workers⁸. In addition, it is noteworthy that the estimated coefficients of labor market tightness are mostly larger than the corresponding coefficients estimated for full-time workers (Chart 3). These results clearly indicate that the wages of part-time workers are highly susceptible to labor market tightness.

The effect of minimum wages

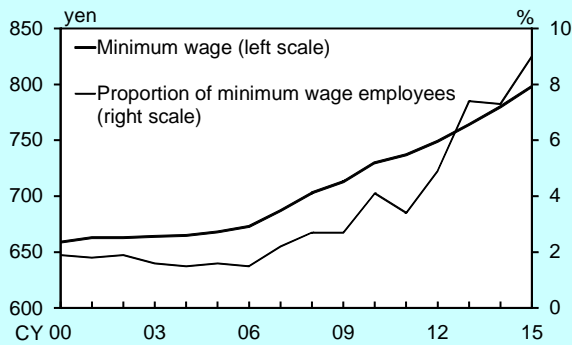
Since the wages of non-negligible share of part-time workers are close to the minimum wage levels, the effect of the increase in minimum wage should be considered. We note that, if the minimum wage itself were determined by the labor market tightness, then the above-mentioned estimation would capture the entire effect of the minimum on the wages of part-time workers⁹. However, by comparing the minimum wage levels, set differently in each prefecture, with the wage distribution of part-time workers in each prefecture, we find that the relationship is qualitatively different between prefectures. Specifically, while the mode values of the wage distribution in some prefectures are significantly separated from the minimum wage levels, those in other prefectures are located close to the minimum wage levels (Chart 9). Were there no minimum wage, the characteristics of wage distributions, including the mode value, would be determined primarily by labor market tightness. The qualitatively different relationships between the shape of wage distribution and the minimum wage levels therefore suggest that the effect of the minimum wage is not fully captured by taking into consideration only the labor market tightness¹⁰. These observations motivate us to examine the effect of the increase in minimum wages on the wages of part-time workers. The direct effect of the minimum wage increases (measured by the

proportion of employees whose wages in a particular year were below the new minimum wage level set later in that year) has become more and more pronounced due to the continued increase in minimum wages in recent years (Chart 10(1)). Moreover, even the wages of workers who earn somewhat higher hourly salaries than the minimum wage levels are sometimes shifted in response to minimum wage increases. It is therefore reasonable to assume that the minimum wage increases also have indirect effect on wages. By examining this indirect effect of minimum wages using the prefectural level wage distribution



[Chart 10] Effect of Minimum Wages on Wages of Part-time Workers

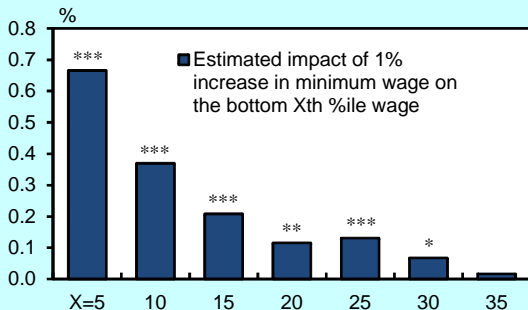
(1) Direct Effect



(2) Indirect Effect

The impact of the increase in minimum wage is estimated using prefecture-level hourly wage distributions of part-time employees for 2014.

$$\log\left(\frac{\text{Bottom } X^{\text{th}} \text{ \%ile}}{\text{Median}}\right) = \text{Const.} + \alpha \log\left(\frac{\text{Minimum wage}}{\text{Median}}\right)$$



- Notes: 1. The proportion of minimum wage employees in (1) is defined as the proportion of employees whose wages in a particular year were below the new minimum wage level set later in that year. Figures are based on (a) establishments with fewer than 30 employees for most industries, and (b) establishments with fewer than 100 employees for other industries, including manufacturing.
2. ***, **, and * in (2) denote statistical significance at the 1%, 5%, and 10% levels, respectively.
3. Note that the estimation result in (2) would be more or less invariant even if the active openings-to-applicants ratio in each prefecture is added to the set of the explanatory variables in order to take into account the prefectural variations in labor market tightness.

Source: Ministry of Health, Labour and Welfare.

data in 2014, it is estimated that the wages of workers belonging to approximately the lower 30th percentile of the wage distribution are affected by the minimum wage increases¹¹ (Chart 10(2)). These observations illuminate the importance of considering the effect of minimum wage increases in addition to labor market tightness when analyzing the developments of the wages of part-time workers.

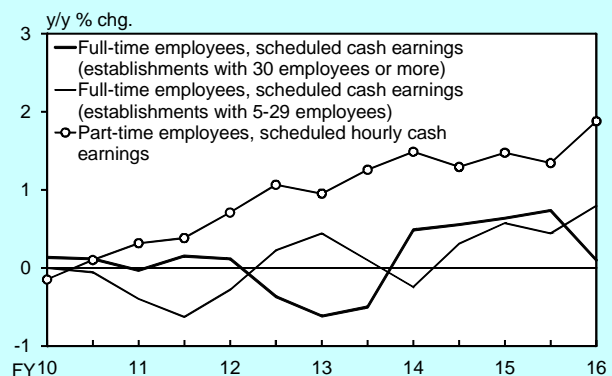
Concluding Remarks

This review examined what determines the base salary of full-time and part-time workers. To sum up the findings, the first observation is that the determinants of the base salary of full-time workers depend primarily on firm sizes. For large enterprises, especially in manufacturing sectors, the impact of the inflation rate is significant via the labor negotiation

process on base pay increase. The base salary of full-time workers in SMEs are affected by labor market tightness and margin price. On the other hand, the base salary (hourly scheduled cash earnings) of part-time workers are mostly influenced by labor market tightness, because these workers need general skills commonly required by a variety of firms and the length of their employment contracts is typically short and predetermined. In addition, the effect of the minimum wage increases is also not small when considering the wages of part-time workers.

These findings and the current economic conditions allow us to interpret the background of the recent developments of wages (Chart 11). The background of the increase in the base salary of full-time workers of SMEs is due to the improvements of labor market conditions and the margin price, the latter being the benefits of the drop of oil prices. On the other hand, as for the full-time workers of large enterprises, the rate of the increase in the base salary expanded until fiscal 2015, partly because of the improvements of the past inflation rate. However, the recent drop of the inflation rate, driven by the fall of energy prices, has stopped the expansion of the rate of the wage increases. As for part-time workers, the base salary (hourly scheduled cash earnings) has continued to increase, thanks to the improvements of labor market tightness in addition to the rise of minimum wages. Based on these interpretations about the recent wage developments, the baseline scenario on the outlook of wages in near future is described as follows. If the improvement of labor market tightness steadily continues, it will keep exerting upward pressure on wages of full-time workers of SMEs as well as on the wages of part-time workers. In addition, if the effect

[Chart 11] Recent Developments of Scheduled Cash Earnings



Note: Figures are based on the "Monthly Labour Survey." Figures for the first half of fiscal 2016 are April-June averages.

Source: Ministry of Health, Labour and Welfare.

of the drop in energy prices fades out and the inflation rate picks up, through the labor negotiation process on base pay increase, the rate of increase in wages of large firms will begin to expand again.

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¹ In this review, to examine the base salaries, we focus on (a) scheduled cash earnings for full-time employees, and (b) hourly scheduled cash earnings, obtained by dividing scheduled cash earnings by scheduled hours worked, for part-time employees. The data of the “Basic Survey on Wage Structure,” published by the Ministry of Health, Labour and Welfare, are adopted, since these allow us to analyze the long-run developments in the wages of heterogeneous workers.

² Strictly speaking, the distinction between full-time and part-time workers is based only on the hours worked. Therefore, for example, even some non-regular workers who work for as long as regular workers are classified into full-time workers. In this review, we do not explicitly consider the effect of these full-time non-regular workers, due to the lack of data needed.

³ The duality of regular and non-regular employees in Japan’s labor market has been pointed out by many in the literature. For example, see the following:

Duell, N. *et al.* (2010), “Activation Policies in Japan,” *OECD Social, Employment and Migration Working Papers*, No. 113, OECD Publishing.

Organisation for Economic Co-operation and Development (OECD) (2009), “Jobs for Youth: Japan,” OECD publishing.

In addition, Shikata (2011) analyzed the transition between part-time and full-time contracts and compared the difficulty of the transition in Japan and 14 European countries, concluding that such transitions were the hardest in Japan.

Shikata, M. (2011), “Is Temporary Work ‘Dead End’ in Japan?: Labor Market Regulation and Transition to Regular Employment,” *Japan Labor Review* 608: 88-102.

⁴ The philosophy that the composition effect has to be taken into account when evaluating the wage changes is similar to that adopted by the Employment Cost Index published by BLS. The index is composed by removing the effect of the composition changes in workers’ characteristics, such as the type of jobs and the industry that workers belong to.

⁵ Note that the estimation, shown in Chart 3, which adopts the scheduled cash earnings after removing the composition effect, has lower standard errors (1.02) than that of the estimation without subtracting the composition effect (1.22). This result supports the claim in the main text that adjusting the composition effect is important to investigate the relationship between base salary and other macroeconomic variables such as labor market tightness and the inflation rate.

⁶ Nevertheless, the coefficient of margin price for large manufacturing enterprises exhibits the correct sign (positive) and it sometimes becomes statistically significant when adopting different estimation periods. While the discussion in the main text -- that the effect of margin price on wages in large manufacturing firms is smaller than that for SMEs -- is valid, it may not therefore be accurate to claim that there is no effect of margin price on wages of large manufacturing firms.

⁷ Note that the comparison of Japan, the United States, and Germany, reveal the difference in the determinants of base pay increase. Specifically, in Japan, the past inflation rate appears to be more important than medium- to long-term inflation expectations as the determinant of base pay increase, whereas the medium- to long-term inflation expectations are more important in the United States and Germany. For details, see

Box Chart 2 of “Outlook for Economic Activity and Prices” (July 2016) by Bank of Japan.

⁸ Strictly speaking, according to the estimation result in the main text, the effect of the labor market tightness on part-time wages of large non-manufacturing enterprises is not statistically significant. However, the coefficient has the correct sign (positive), and the absolute value of this coefficient is not much smaller than the corresponding coefficient in the other sectors. In addition, if we remove from the regression the other explanatory variables (margin price and the inflation rate), whose effect is not significant in any sector, the effect of the coefficient of labor market tightness for large non-manufacturing enterprises becomes statistically significant, still with the correct sign. These results imply that the labor market tightness likely influences the wages of part-time workers of large non-manufacturing enterprises as well.

⁹ Actually, the Central Minimum Wages Council, which recommends the “guideline” for the increase in minimum wages every year, regards the labor market tightness as an important factor when determining the minimum wage. The empirical analysis by Tamada (2009) in fact indicates that the effect of the active job openings-to-applicants ratio is statistically significant as a determinant of the “guideline.”

Tamada, K. (2009), “The Determinants of the Minimum Wages in Japan,” *Japan Labor Review* 593: 16-28.

¹⁰ Kambayashi *et al.* (2013) implies that the continued increase in minimum wages in Japan resulted in the compression of the lower tail of the wage distribution of female workers.

Kambayashi, R., D. Kawaguchi, and K. Yamada (2013), “Minimum Wage in a Deflationary Economy: The Japanese Experience, 1994-2003,” *Labour Economics* 24: 264-276.

¹¹ As for the methods of empirical analysis on the effect of minimum wage increases on wage distribution, see the following papers in the literature:

Lee, David S. (1999), “Wage Inequality in the United States During the 1980s: Rising Dispersion or Falling Minimum Wage?” *Quarterly Journal of Economics* 114 (3): 977-1023.

Autor, D.H., A. Manning, and C.L. Smith (2016), “The Contribution of the Minimum Wage to US Wage Inequality over Three Decades: A Reassessment,” *American Economic Journal: Applied Economics* 8(1): 58-99.

Note that, due to the lack of data, the estimation in the main text is too simple and susceptible to the endogeneity problem, as pointed out by Autor *et al.* (2016).

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