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Implied Subsidies for Tax Incentives to Increase Wages and Excess Burden in Japan

Toshiyuki Uemura

(School of Economics, Kwansei Gakuin University)

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SCHOOL OF ECONOMICS

KWANSEI GAKUIN UNIVERSITY

1-155 Uegahara Ichiban-cho
Nishinomiya 662-8501, Japan

Implied Subsidies for Tax Incentives to Increase Wages and Excess Burden in Japan^{*}

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Abstract

The wage-increase promotion tax system was introduced in the 2013 tax reform. It is an internationally unique system that aims to increase wages through corporate tax credits. This study focuses on the "hidden subsidies" and excess burdens necessary to make policy decisions about the wage-increase promotion tax credits. The study incorporated the wage-increase tax system into a firm-behavior model for analyzing corporate taxation to present the "implied wage-increase subsidy rate" concept as an indicator of a subsidy's extent and scope, and a method for measuring the excess burden. It measures the "implied wage-increase subsidy rate" and excess burden using financial data for individual firms. First, the "implied wage-increase subsidy rate" indicates that the wage-increase promotion tax system has expanded the subsidy's extent and scope. Second, the wage-increase promotion tax credits increase the producer surplus of applicable firms but exponentially increase the excess burden, which is social loss. Third, no significant difference is found in the changes in labor productivity between applicable and non-applicable firms. Global corporate tax reform tends to lean toward a neutral tax system, and the wage-increase promotion tax system may not fit this trend.

JEL classification: H25 and H87.

Keywords: wage-increase promotion tax system, implied wage-increase subsidy, excess burden

1. Introduction

Following the international race toward lower tax rates, lowering the corporate tax rate in Japan has become a policy issue. Therefore, by the late 2010s, tax rates were lowered while expanding the tax base. While the pressure to reduce tax rates has subsided, wage increases have emerged as a new policy issue. The subject of this study is the wage-increase promotion tax system, which encourages wage increases through corporate taxation to achieve a virtuous cycle of rising prices and wages.

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^{*} Professor, School of Economics, Kwansei Gakuin University,
Email: uemuratoshi@hotmail.com

The Tax Reform for Promoting Income Growth, introduced by the 2013 Tax Reform, was reorganized as the Tax Reform for Wage-Increase Promotion after several revisions. The basic structure of the wage-increase promotion taxation system is as follows: if a company's salary increase is positive, some tax credit can be deducted from its national corporate tax burden by multiplying the increase in salary and other payments from the previous year by the tax credit rate.

Tax policy systems that attempt to increase wages through corporate taxation are rare. The introduction of this rare tax system followed a policy judgment that Japanese companies were reluctant to raise wages while accumulating retained earnings. Therefore, a system was introduced to promote wage increases through tax credits using the framework of special tax measures. Although the name of the tax system for wage-increase promotion has changed several times since the tax system for promoting income growth, this study uses the term “tax system for wage-increase promotion” to refer to this series of systems unless otherwise specified.

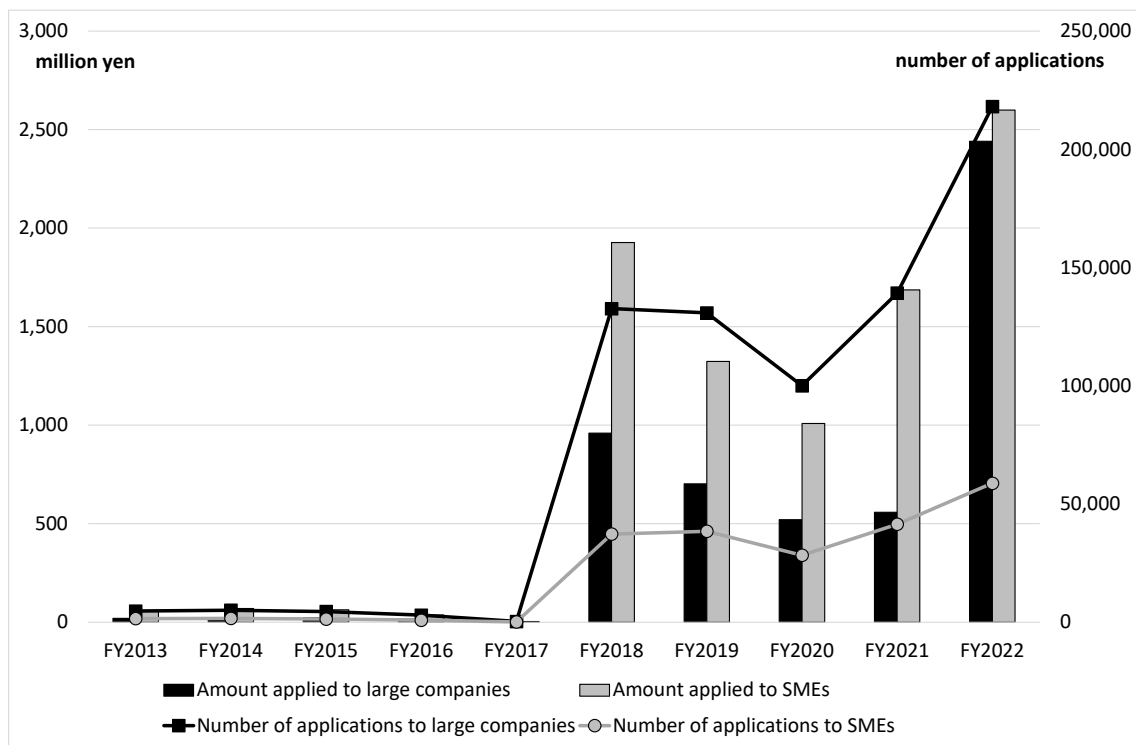


Figure 1: Amount of Tax Credits Applied to Promote Wage Increases

Note: Compiled from the Ministry of Finance's “Report on the Results of the Survey on the Application of Special Taxation Measures” for each fiscal year.

Figure 1 shows the amount and number of wages that increase the promotion

tax credits applied. When it was introduced in 2013, the number of applications was slightly large. However, the program expansion, because of the 2018 tax reform, considerably increased the number of applications. During the FY2020 COVID-19 disaster, the number of applications reduced; however, in FY2021, the number began to increase among small and medium enterprises (SMEs). FY2022 saw a marked increase in the number of applications, especially among large enterprises.

According to the Ministry of Finance's "Report on the Results of the Survey on the Application of Special Taxation Measures" for FY2022, the combined amount of tax credits applied to large and small companies to promote wage increases amounted to 515 billion yen. As tax credits are tax deductions, the amount of tax credit applied is directly related to the loss of tax revenue. The national corporate tax revenue was 15 trillion yen in FY2023; therefore, a tax revenue loss of 0.5 trillion yen is significant. In other words, the wage-increase promotion tax credits provide a "hidden subsidy."

Furthermore, a tax system that promotes wage increases causes market disturbances and generates an excess burden that creates a loss to economic welfare. A policy decision based on a data-driven examination of whether corporate taxation should be used to promote wage increases is necessary, even to the extent of allowing for policy costs such as "hidden subsidies" and excess burdens. This study seeks to address this issue.

Therefore, the analysis in this study focuses on the wage promotion taxation system for FY2022, which has increased in both the amount and the number of applications compared to the previous year. This study incorporates a wage promotion tax system into a firm behavior model to analyze the corporate tax system. The study presents the "implicit wage-increase subsidy rate" concept and shows how excess burden is calculated. It measures the "implicit wage-increase subsidy rate" and uses individual companies' financial data to measure the excess burden of wage-increase promotion tax credits. This study's contributions include the measurement of the wage promotion tax system's implicit subsidy rate and excess burden. Whether these policy costs should be paid to achieve wage-increase outcomes is an important policy decision based on empirical data analysis.

The remainder of this paper is structured as follows. Section 2 presents an overview of the wage-increase tax system and previous studies. Section 3 presents a model of firm behavior incorporating the wage-increase promotion tax system. In Section 4, the implied subsidy rate of the wage-increase promotion tax system is measured. In Section 5, the excess burden of the wage-increase promotion tax system is measured using individual corporate financial data. Section 6 summarizes and concludes this study.

2. Overview of the wage-increase promotion taxation system and previous studies

This section presents an overview of the wage-increase promotion tax system and previous studies. Tables 1 and 2 summarize the evolution of tax reforms related to wage increase promotion taxation for large and small firms, respectively.

The tax credit for promoting wage increases originated from the tax credit for promoting income growth introduced in the fiscal 2013 revision. The system allowed a certain amount of tax credit for a portion of salary increase and other payments, multiplied by 10% if the previous year's increase in salaries and wages paid to all employees was at least 5%. Subsequently, there were changes to the previous year's increase requirement and tax credit rate in the FY2014 and FY2017 tax reforms. The 2018 tax reform added requirements for capital investment in large companies and reorganized the tax system into wage increases and investment promotion tax credits.

As shown in Figure 1, the number of applications for the program was low throughout FY2017 but began to increase in FY2018. The FY2018 tax reform switched large companies' new hires to continuing employees, reorganized both large and small companies into a wage-increase promotion tax system, and made education and training expenses an additional requirement. After the FY2021, FY2022, and FY2024 tax reforms, additional requirements were added to determine whether a company was a childcare support company or a company that promotes women's activities.

As the wage-increase promotion tax system, which has undergone the process described above, is a relatively new system, there is a dearth of academic research on the subject. Koyama (2020) and Yamazaki (2023) conducted the empirical analyses.

Koyama (2020) conducted an empirical analysis of whether the introduction of a tax system to promote income growth influenced corporate labor productivity. The fiscal years covered were from FY2012 to FY2017, and, as shown in Figure 1, the study covers a period with few applications. Individual data from the Ministry of Finance's "Annual Survey of Corporate Business Enterprises (Annual Report)" were used. The analysis results indicate that firms with higher return on assets (ROA), employee growth rate, and cash flow ratio tended to be more likely to apply for tax credits to promote income growth and that, compared with firms that did not apply for tax credit, firms that did significantly increased their labor productivity.

Table 1: History of Tax Reforms Related to Wage-Increase Promotion Tax System for Large Companies

	Application Requirements	Tax Credit
FY2013 Revision Establishment of a tax credit for promoting income growth [Abe Cabinet]	The average amount of salaries and wages paid to all employees increased by 5% or more compared to that of the previous year. The average amount of salaries and wages paid to all employees does not fall below the level of that of the previous year.	The previous year's increase in the total salaries and wages paid to employees x 10% tax credit rate.
FY2014 Revision [Abe Cabinet]	Salaries and wages for all employees increased by at least 2% from FY2012 to FY2013-2014, by at least 3% for FY2015, and by at least 5% for FY2016-2017 (amended in FY2015 to 4% for FY2016). The average salary for continuing employees must exceed that of the previous year.	The increase in the total salaries and wages of employees in the previous year x 10% of the tax credit rate.
FY2017 Revision [Abe Cabinet]	The average salary and other payments for all employees are the same as in the FY2014 revision. The average salary of continuing employees increased by 2% or more from that of the previous year.	The tax credit is calculated by multiplying the increase in total wages and salaries of employees in the previous fiscal year by 10%. The tax credit rate will be increased by 2% if the increase in the total amount of employees' salaries and wages is more than 2% of the previous year's total amount.
FY2018 Revision Reorganization to Tax Reform to Promote Wage Increase and Investment [Abe Cabinet]	The total salaries and wages paid to continuing employees must increase by at least 3% over that of the previous year. The domestic capital investment is 90% or more of the total depreciation and amortization for the current fiscal year (revised to 95% or more in FY2020 and abolished in FY2021 and thereafter).	The tax credit is calculated by multiplying the increase in the total amount of employer salaries and wages by 15%. If the education and training expenses for the current year are more than 1.2 times the average of the previous year and the previous two years, the tax credit rate is increased by 5%.
FY2021 Revision Reorganization of taxation system for the promotion of human resource development [Suga Cabinet]	Total payroll of new hires increased by at least 2% over that of the previous year.	The tax credit is calculated by multiplying the increase in gross payroll for new hires during the previous year by 15%. The tax credit rate will be increased by 5% if the current year's education and training expenses are 20% or more of the previous year's expenses.
FY2022 Revision Reorganization into a	Salaries and wages of continuing employees increased by 3% or more compared to those of the previous year.	The increase in the salaries and wages of continuing employees in the previous year x 15% tax credit rate.

tax system to promote wage increases [Kishida Cabinet]	Salaries and wages of continuing employees increased by 4% or more compared to those of the previous year.	The increase in the salaries and wages of continuing employees in the previous year x 25% of the tax credit rate.
	The tax credit rate is increased by 5% if the current year's education and training expenses are at least 20% of the previous year's expenses.	
FY2024 Revision [Kishida Cabinet]	Salaries and wages of continuing employees increased by 3% or more compared to those of the previous year.	The increase in the salaries and wages of continuing employees in the previous year x 10% of the tax credit rate.
	Salaries and wages of continuing employees increased by 4% or more compared to those of the previous year.	The increase in the salaries and wages of continuing employees in the previous year x 15% of the tax credit rate.
	Salaries and wages of continuing employees increased by 5% or more compared to those of the previous year.	The increase in the salaries and wages of continuing employees in the previous year x 20% of the tax credit rate.
	Salaries and wages of continuing employees increased by 7% or more compared to those of the previous year.	The increase in the salaries and wages of continuing employees in the previous year x 15% of the tax credit rate.
	If the education and training expenses for the current fiscal year exceed 10% of the previous year's expenses, the tax credit rate will be increased by 5%. If you are certified as Platinum Kurumin or Platinum Eruboshi, you will receive a 5% increase in the tax credit rate.	

Note: Based on data from Kamada and Ito (2022), the Ministry of Finance, and the Ministry of Economy, Trade, and Industry. The maximum tax credit is 20% of the corporate tax amount. “Kurumin” and “Platinum Kurumin” are certification marks for companies supporting child rearing, and “Eruboshi” and “Platinum Eruboshi” are certification marks for companies promoting women's activities.

Table 2: History of Tax Reforms Related to Wage-Increase Promotion Tax System for SMEs

	Application Requirements	Tax Credit
FY2013 Revision Establishment of a tax credit for promoting income growth [Abe Cabinet]	The average amount of salaries and wages paid to all employees increased by 5% or more compared to the previous year. The average amount of salaries and wages paid to all employees does not fall below the level of the previous year.	The increase in the total salaries and wages of employees in the previous year x 10% of the tax credit rate.
FY2014 Revision [Abe Cabinet]	· The overall payroll for all employees must increase by at least 2% in FY2013-2014 over FY2012, by at least 3% in FY2015, and by at least 5% in FY2016-2017 (amended to 3% in FY2016-2017 by the FY2015 amendment). · The average salary of continuing employees must increase over that of the previous year.	The increase in the total salaries and wages of employees in the previous year x 10% of the tax credit rate.
FY2017 Revision [Abe Cabinet]	The average salary and other payments for all employees are the same as in the 2014 revision. The average salary of continuing employees increased by 2% or more from that of the previous year.	The tax credit is calculated by multiplying the increase in total wages and salaries of employees in the previous fiscal year by 10%. The tax credit rate will be increased by 2% if the increase in the total salaries and wages of employees is 2% or more compared to the previous year.
FY2018 Revision Reorganization to Tax Reform to Promote Wage Increase and Investment [Abe Cabinet]	The total salaries and wages paid to continuing employees must increase by at least 1.5% over those of the previous year. The total salaries and wages paid to all employees must increase over those of the previous year.	The tax credit is calculated by multiplying the increase in total wages and salaries of employees from the previous year by 15%. If the employer meets the requirements for a higher wage increase and an increase in education and training expenses, the tax credit rate is increased by 5%.
FY2021 Revision Reorganization of taxation system for the promotion of human resource development [Suga Cabinet]	The total payroll of all employees increased by at least 1.5% over that of the previous year.	The tax credit is calculated by multiplying the increase in the total payroll of the entire workforce from the previous year by 15%. The tax credit rate is increased by 10% if the increase in total payroll is 2.5% or more compared to the previous year and if the increase in education and training expenses and other requirements are met.
FY2022 Revision	The salaries and wages paid to continuing employees	The increase in salaries and wages of continuing employees from

Reorganization into a tax system to promote wage increases [Kishida Cabinet]	increased by 1.5% or more compared to those of the previous year.	the previous year x 15% of the tax credit rate.
	The salaries and wages paid to continuing employees increased by 2.5% or more compared to those of the previous year.	The increase in salaries and wages of continuing employees from the previous year x 30% of the tax credit rate.
	The tax credit rate is increased by 10% if the current year's education and training expenses are 10% or more of the previous year's expenses.	
FY2024 Revision [Kishida Cabinet]	Salaries and wages of continuing employees increased by 3% or more compared to those of the previous year.	The increase in salaries and wages of continuing employees from the previous year x 15% of the tax credit rate.
	Salaries and wages of continuing employees increased by 4% or more compared to those of the previous year.	The increase in salaries and wages of continuing employees over the previous year x 25% tax credit rate.
	The salaries and other payments for the entire workforce increased by 1.5% or more compared to those of the previous year.	The increase in salaries and wages of continuing employees from the previous year x 15% of the tax credit rate.
	The salaries and other payments for the entire workforce increased by 2.5% or more compared to those of the previous year.	The increase in salaries and wages of continuing employees from the previous year x 30% of the tax credit rate.
	(Less than 2,000 employees): 5% increase in the tax credit rate if the current fiscal year's education and training expenses are 10% or more of the previous year's expenses. (Less than 2,000 employees) For certified Platinum Kurumin or Eruboshi at the third level or higher, the tax credit rate will be increased by 5%. (Less than 1,000 employees) If the amount of education and training expenses for the current fiscal year exceeds 5% of the amount of the previous fiscal year, the tax credit rate will be increased by 10%. (Less than 1,000 employees): A 5% tax credit will be added to the tax credit rate if the training and education expenses for the current fiscal year are at least 5% of the previous fiscal year's expenses.	

Note: Based on data from Kamada and Ito (2022), the Ministry of Finance, and the Ministry of Economy, Trade, and Industry. The maximum tax credit is 20% of the corporate tax amount.

Yamazaki (2023) conducted an empirical analysis of the impact of the tax system on firm performance to promote income growth. The fiscal years covered were FY2012 through FY2017, and similar to Koyama (2020), this study was conducted during a period when the number of applications was sluggish. Individual data from the Corporate Finance Database provided by the Graduate School of Economics, Hitotsubashi University, and the Teikoku Databank Center for Advanced Research on Enterprise and Economic Empirical Studies (TDB-CAREE) were used. Based on the analysis results, the average salary per employee and number of employees increased significantly in the applied firms compared to those in the non-applied firms¹. However, the tax credit application did not affect the rate of increase in labor productivity, ROA, or cash flows.

The two previous academic studies that empirically analyzed the tax system for promoting wage increases are empirical studies of the tax system for promoting income growth up to FY2017, and not studies of the system after FY2018 when the number of applications increased markedly. In addition, both Koyama (2020) and Yamazaki (2023) are concerned with firm performance, such as labor productivity; however, their conclusions differ. Similarly, Tamura (2022) summarized various views on the effects of a tax system that promotes wage increases, showing both positive and negative views about it.

Therefore, no general view has been established regarding the effects of the current wage-increase promotion tax system and whether these effects are commensurate with policy costs, such as tax revenue loss and the excess burden that disturbs the market. While previous studies are concerned with the firm performance of tax incentives, this study focuses on the policy costs of tax incentives, namely, implied subsidies and excess burdens. Decisions on tax policies to promote higher wages should clarify the scale of policy costs for such policies.

This study incorporates a wage-increase incentive tax system into a firm behavior model that analyzes traditional corporate taxation, formulates an implied subsidy rate, and presents a method for measuring the excess burden. It is the first study to present such an analytical framework. Further, the study measures the implied subsidy rate and excess burden from the wage-increase promotion tax system. To the best of my knowledge, this is the first contribution of this study to the literature.

¹ As shown in the succeeding text, to apply the wage increase promotion tax system, salaries and other payments must increase from those of the previous year. To do so, either the salaries and other payments per worker, number of employees, or both must be increased. Yamazaki's (2023) analysis results are appropriate, considering the conditions for applying the system.

This study considers the importance of measuring the scale of implied subsidies and excess burdens to make policy decisions on whether corporate taxation should provide wage increases even when implied subsidies and excess burdens are allowed. As such, this study focuses on the wage-increase promotion tax system in FY2022 in which the number of applications has increased markedly.

3. A firm behavior model incorporating a wage-increase promotion tax system

This section presents a firm behavior model that incorporates a wage-increase promotion tax system. I introduce this tax system into the traditional firm behavior model of Jorgenson and Hall (1971), who analyzed the corporate tax system. For simplicity, the prices of goods and investment goods are standardized to 1, and, assuming the production function F , the amount of capital K , the number of employees N , the amount of salaries per employee w , and the amount of national and local corporate tax burden U , the profit Π of the firm for the current period is shown below.

$$\Pi = F(K_{-1}, N) - wN - U \quad (1)$$

Here, subscript-1 refers to the previous period, and wN is the amount of employer salary payments subject to the wage-increase promotion tax credit².

Next, the national and local corporate tax burden U and the national corporate tax burden T are formulated as follows: u is the national and local corporate income tax rate, D is the depreciation rate under the tax law, k is the investment tax credit rate, I is the capital investment, C is the tax credit for the wage promotion tax credit, and τ is the corporate income tax rate for national taxes.

$$U = u\{F(K_{-1}, N) - wN - D\} - kI - C \quad (2)$$

$$T = \tau\{F(K_{-1}, N) - wL - D\} - kI \quad (3)$$

The tax credit C under the wage-increase promotion tax system, the subject of this study's analysis, can be modeled as follows³: First, the tax credit amount C for the wage-increase promotion is limited to a certain percentage γ ($0 \leq \gamma \leq 1$) of the corporate tax amount T of the national tax. C^* is the tax credit calculated without considering the

² According to the National Tax Agency and the Ministry of Economy, Trade, and Industry, the amount of salaries, among others, paid to employees is defined as the total amount of salaries, etc. paid to all domestic employees. Domestic employees are not limited to continuous employees and do not include directors and other specially related persons.

³ Models of R&D taxation were referred to when modeling tax credits for wage-increase promotion tax credits. Examples include Koga (1998) and Hosono, Hotei, and Miyagawa (2015). R&D tax systems often have a tax credit mechanism that allows, for example, the amount or increase in R&D expenditures multiplied by a tax credit rate up to a certain amount of the corporate tax liability.

limitation of the national corporate tax amount.

$$C = \begin{cases} C^* & \text{if } \gamma T \geq C^* \\ \gamma T & \text{if } \gamma T < C^* \end{cases} \quad (4)$$

Second, if the increase in the amount of salaries and wages paid in the current period is equal to or more than the standard increase rate g_i ($0 \leq g_1 < g_2 < \dots < g_i < \dots \leq 1$), then the tax credit is allowed by multiplying the increase in the amount of salaries and wages paid in the current period by the tax credit rate ϕ_i ($0 \leq \phi_1 < \phi_2 < \dots < \phi_i < \dots \leq 1$). Here, the subscript i refers to the combination of the standard percentage increase in payroll and the tax credit rate specified by the wage-increase promotion tax system⁴. In other words, the magnitude of the previous year's increase in salary and other payments determines the magnitude of the applicable tax credit rate ϕ_i . Therefore, the tax credit rate ϕ_i varies with the standard rate of increase g_i . Conversely, if the percentage increase in payroll and other payments is less than the minimum standard increase rate, g_1 , the tax credit cannot be used.

$$C^* = \begin{cases} \phi_i(wN - w_{-1}N_{-1}) & \text{if } \frac{wN - w_{-1}N_{-1}}{w_{-1}N_{-1}} \geq g_i \\ 0 & \text{if } \frac{wN - w_{-1}N_{-1}}{w_{-1}N_{-1}} < g_1 \end{cases} \quad (5)$$

In addition, the relationship between the national and local corporate tax rates u and the national corporate tax rate τ is as follows:

$$u = \frac{\tau(1 + \tau_L + \tau_R) + \tau_B(1 + \tau_S)}{1 + \tau_B(1 + \tau_S)} \quad (6)$$

Here, τ_L is the local corporate tax rate, τ_R is the corporate inhabitant tax rate for prefectures and municipalities, τ_B is the corporate enterprise income tax rate, and τ_S is the special corporate enterprise tax rate. Local tax rates are in the denominator because they are deductible from the previous year's income.

In the following, I assume that the tax credit for the wage-increase promotion does not exceed the maximum amount of corporate income tax for national tax purposes; that is, the tax credit is full ($C = C^* > 0$). The profit Π in this case is shown below.

$$\Pi = F(K_{-1}, N) - wN - u\{F(K_{-1}, N) - wN - D\} + kI + \phi(wN - w_{-1}N_{-1}) \quad (7)$$

Assume that the firm chooses the amount of capital K and the number of employees N from the factors of the production market to maximize profit Π , where Z is the discounted present value of the asset under the depreciation system.

⁴ The actual system includes additional requirements related to education and training expenses, childcare support companies, and companies that promote women's activities; however, these are not incorporated into this study's model.

$$\frac{\partial \Pi}{\partial K_{-1}} = \frac{\partial F}{\partial K_{-1}} - u \left(\frac{\partial F}{\partial K_{-1}} - Z_t \right) + k = 0 \quad (8)$$

$$\frac{\partial \Pi}{\partial N} = \frac{\partial F}{\partial N} - w - u \left(\frac{\partial F}{\partial N} - w \right) + \phi w = (1 - u) \frac{\partial F}{\partial N} - w(1 - u - \phi) = 0 \quad (9)$$

Thus, the wage-increase promotion tax system affects the labor market. These can be organized as follows.

$$w = \frac{(1 - u)}{(1 - u - \phi)} \frac{\partial F}{\partial N} = \frac{(1 - u)}{(1 - u - \phi)} MPL \quad (10)$$

$$MPL = \frac{(1 - u - \phi)}{(1 - u)} w \quad (11)$$

That is, it is optimal for a firm to choose the number of employees N so that payroll per employee w , adjusted by $(1 - u - \phi)/(1 - u)$ on the right-hand side, equals the marginal productivity of labor, MPL , on the left-hand side. Note that without the tax incentive to raise wages, ($\phi = 0$), $MPL = w$.

Assuming a range of national and local corporate tax rates u ($0 \leq u \leq 1$) and the tax credit rate ϕ ($0 \leq \phi \leq 1$) of the wage promotion tax system, and further assuming $0 \leq (u + \phi) \leq 1$, the range is $0 \leq (1 - u - \phi)/(1 - u) \leq 1$. Thus, the presence of the wage promotion tax system results in lower marginal productivity of labor MPL . This is an important point of contention regarding the relationship between tax incentives to increase wages and labor productivity. If the marginal productivity of labor, MPL , diminishes with respect to the number of employees, N , the existence of a tax system that promotes wage increases may reduce the marginal productivity of labor⁵.

This is illustrated in Figure 2. The marginal productivity of labor, MPL , salary and other payments per worker, w , are on the vertical axis, and the number of employees, N , is on the horizontal axis. The marginal productivity of the labor curve MPL faced by a given firm can be expressed as a declining right-hand curve. In other words, the marginal productivity of labor is assumed as diminishing.

Without tax incentives to raise wages, the number of employees \tilde{N} is determined at the point F, the intersection of the per capita payroll w^* , and the marginal productivity curve of labor, MPL . The employer payroll $w^* \tilde{N}$ for this firm is denoted by the square $BF\tilde{N}O$ and the producer surplus by the triangle AFB .

If the tax incentive to raise wages can be applied and the per capita payroll w^* falls to w^{**} adjusted by $(1 - u - \phi)/(1 - u)$, the number of employees N^* is determined at the intersection point E with the marginal productivity curve of labor, MPL . At this

⁵ Noguchi (2021) intuitively pointed this.

point, the employer payroll w^*N^* for this firm is denoted by the square BQN^*O and the producer surplus by the triangle AEG .

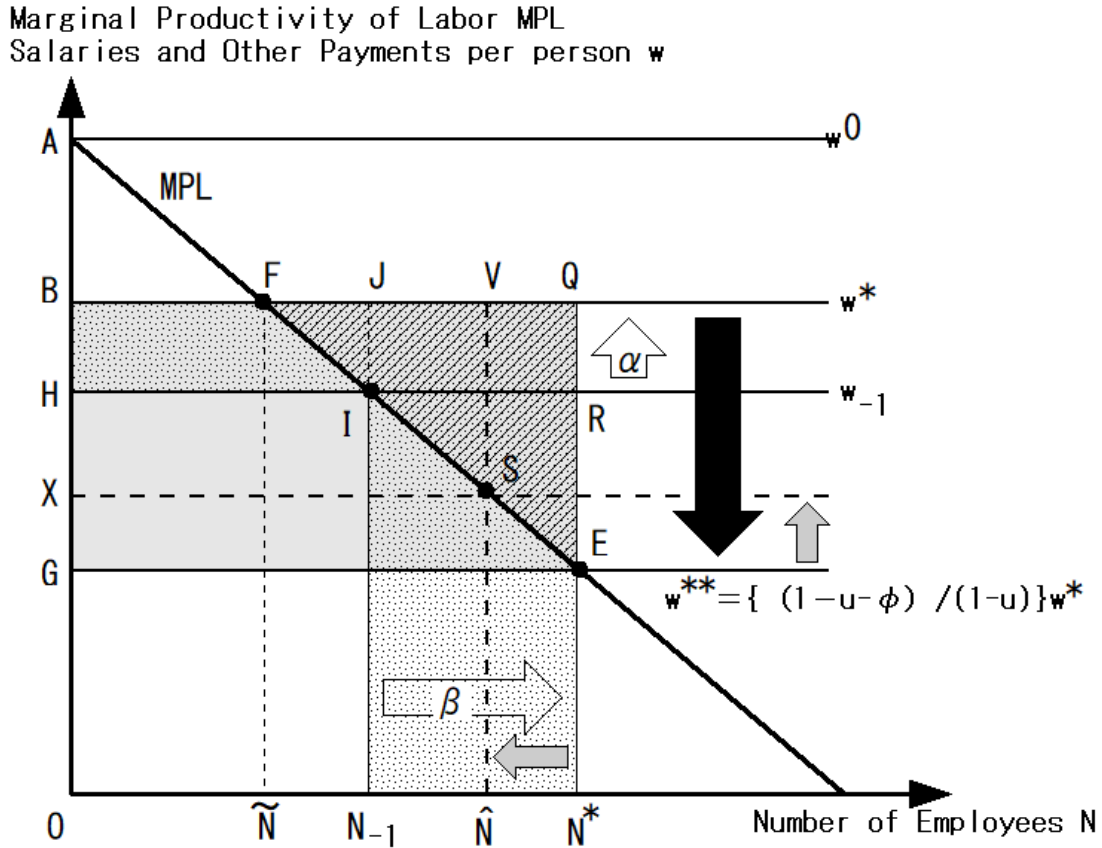


Figure 2: Effects of Wage-Increase Promotion Tax System in the Labor Market

Notably, wages can be increased in two ways: by increasing the amount of salaries, among other payments, paid per worker w , and by increasing the number of employees N . Assuming that the amount of salary and other payments per employee in the previous year is w_{-1} and the number of employees in the previous year is N_{-1} , the following relationship exists between the amount of salary and other payments per employee w^* and the number of employees N^* that would be realized in the current year if the tax incentive for wage increases were not applied:

$$w^* = (1 + \alpha)w_{-1} \quad (12)$$

$$N^* = (1 + \beta)N_{-1} \quad (13)$$

The year-on-year growth rate of salaries and wages per employee, α , and the year-on-year growth rate of the number of employees, β are shown. The following four cases are assumed:

Case 1) Salaries and wages per employee w are increased ($\alpha > 0$) and the number of employees N is increased ($\beta > 0$).

Case 2) Salaries wages per employee w are increased ($\alpha > 0$) and the number of employees N is decreased ($\beta < 0$).

Case 3) Salaries wages per employee w are decreased ($\alpha < 0$) and the number of employees N is increased ($\beta > 0$).

Case 4) Salaries wages per employee w are decreased ($\alpha < 0$) and the number of employees N is decreased ($\beta < 0$).

The condition for applying tax credit to promote wage increases is that the amount of employer salaries, and other payments, paid in the current period must exceed the amount of employer salaries, and other payments, paid in the previous period, which can be summarized as follows.

$$w^*N^* - w_{-1}N_{-1} = w_{-1}N_{-1}(\alpha + \beta + \alpha\beta) > 0 \quad (14)$$

As $w_{-1}N_{-1} > 0$, the wage-increase promotion tax system may be applied if $\alpha + \beta + \alpha\beta > 0$. If the sign conditions of α and β are considered, the conditions for applying the wage-increase promotion tax system may be satisfied for Cases 1 through 3⁶.

Figure 2 is drawn by assuming Case 1, in which the effect of the wage-increase promotion tax system is examined. In the previous period, at w_{-1} payroll per employee, a point was realized, and the number of employees was N_{-1} . A case in which wages are increased in the current period, and salary and other payments per employee rise from w_{-1} to w^* , is considered. If this situation continues, the number of employees \tilde{N} at point, F decreases ($\tilde{N} < N_{-1}$), and salaries and other payments may also decrease (if square $BF\tilde{N}O < \text{square } HIN_{-1}O$). Suppose that this firm considers using the wage-increase promotion tax system.

If the number of employees increases to N^* , the salary and other payments w^*N^* under the per capita salary and other payments w^* are in square BQN^*O . In the previous period, salary and other payments $w_{-1}N_{-1}$ were in square $HIN_{-1}O$. If the

⁶ In Case 4, if $\alpha\beta$ exceeds the sum of these negative numbers, even after the amount of payroll per employees is reduced ($\beta < 0$) and the number of employees is reduced ($\alpha < 0$), the conditions for applying the tax credit for promoting wage increases are met. However, this is unlikely to happen. For example, if $\alpha = -0.1$ and $\beta = -0.1$, then $\alpha\beta = (-0.1) \times (-0.1) = 0.01$, and $\alpha + \beta + \alpha\beta = -0.1 - 0.1 + 0.01 = -0.19 < 0$. Therefore, $\alpha + \beta + \alpha\beta > 0$ is not valid in this case. A later analysis of individual company financial data also indicates that Case 4 does not exist for companies that apply the tax system to promote wage increases.

number of employees is increased to N^* , payroll and other payments will increase by the number of polygon $BQN^*N_{-1}IH$. If this firm owes sufficient corporate taxes and is not limited in the amount of the tax credit for the wage-increase promotion tax credit, then the tax credit amount of square HREG can be applied.

In this case, the producer surplus is triangle AEG; however, compared to the case in which the tax system to promote wage increases does not apply, the government provides a “hidden subsidy,” quadrangular BQEG. This also represents social loss. Therefore, a social surplus is the area of the triangle AEG minus the area of the square BQEG. The producer surplus not using the tax system to promote wage increases was the area of triangle AFB. Comparing the two, a tax system to promote higher wages would result in an excess burden on triangle FQE.

While Figure 2 shows Case 1, I can show similar situations in which the wage-increase promotion tax credit can be applied to Cases 2 and 3 as well. However, because Cases 2 and 3 involve a reduction in w or a decrease in the number of employees N , it is more difficult to apply the wage-increase promotion tax credit than in Case 1.

Next, the case where the tax credit for the wage promotion is not full ($C < C^*$) is considered. If the tax credit rate for the case where the tax credit C of the wage promotion tax credit is full C^* ($C = C^* > 0$) is ϕ^* , and the adjusted tax credit rate for the case where the tax credit is limited by the national corporate tax amount T ($\gamma T = C < C^*$) is $\hat{\phi}$ ($0 \leq \hat{\phi} \leq \phi^* \leq 1$), these can be expressed as the following.

$$\phi = \begin{cases} \phi^* = \frac{C^*}{wN - w_{-1}N_{-1}} & \text{if } \gamma T \geq C^* \\ \hat{\phi} = \frac{\gamma T}{wN - w_{-1}N_{-1}} & \text{if } \gamma T < C^* \\ 0 & \text{if } T = 0 \end{cases} \quad (15)$$

Assuming that the marginal productivity curve MPL of labor is linear, then

$$MPL = \frac{(1 - u - \hat{\phi})}{(1 - u)} w \quad (16).$$

To meet this requirement, the number of employees \hat{N} is determined when the tax credit amount C for the wage-increase promotion tax credit is subject to the limitation of the national corporate income tax amount T .

If the tax credit is limited, the number of employees cannot be increased to N^* . For example, at Point S in Figure 2, the number of employees is less than N^* , as in \hat{N} . In this case, the producer surplus is triangle ASX, the “hidden subsidy” is square BVSX, and the excess burden is triangle area FVS. The producer surplus, “hidden subsidy,” and excess burden in each case are summarized in Table 3.

Table 3: Producer Surpluses, “Hidden Subsidies,” and Excess Burdens from Wage Increasing Promotion Tax System

Application of wage-increase promotion tax system	Producer Surplus	“Hidden Subsidies”	Excess Burdens
When not applicable (point F)	Triangle AFB	None	None
When the full amount is applied (point E)	Triangle AEG	Square BQEG	Triangle FQE
When the limit is applied (point S)	Triangle ASX	Square BVSX	Triangle FVS

4. Measuring the implied wage-increase promotion subsidy rate

As shown in Figure 2, the wage-increase promotion tax system functions as a “hidden subsidy,” which reduces the per capita salary and other payments w^* to the per capita salary and other payments w^{**} . Therefore, the following relationship between payroll per capita before and after the application of the wage-increase promotion tax system can be considered, depending on the “implied wage-increase promotion subsidy rate” ω ($0 \leq \omega \leq 1$)⁷.

$$(1 - \omega)w^* = w^{**} \quad (17)$$

The implicit wage-increase promotion subsidy rate ω is an indicator of the extent to which corporate tax revenues are reduced by the tax credit associated with an increase in the amount of per-unit employee payroll taxes, indicating the extent of the “hidden subsidy.” The same Figure 2 also shows that there is a relationship between the amount of payroll per employee before and after the application of tax credits to promote wage increases.

$$w^{**} = \frac{(1 - u - \phi)}{(1 - u)}w^* \quad (18)$$

From these, the implied wage-increase promotion subsidy rate ω can be calculated.

$$\omega = 1 - \frac{(1 - u - \phi)}{(1 - u)} = \frac{\phi}{(1 - u)} \quad (19)$$

The implied wage-increase promotion subsidy rate ω is an indicator of the extent to which corporate taxes are reduced by the application of the tax credit for the increase in the amount of employer payroll per unit, i.e., the extent of the “hidden subsidy.” An indicator of the implicit wage-increase promotion subsidy rate would provide a quantitative picture of the extent to which and to what extent the wage-increase

⁷ The name “implied wage increase promotion subsidy rate” is named in reference to the implied R&D tax subsidy rate used by the OECD when analyzing R&D promotion taxation. See, for example, OECD (2020) and Ijichi (2021).

promotion tax credit subsidizes wage increases.

In the following, I examined the parameters of the implied wage-increase promotion subsidy rate, that is, the tax rate u for national and local corporate income taxes and the tax credit rate \emptyset for the wage-increase promotion tax credits, which are components of the implicit wage-increase promotion subsidy rate.

The tax rate parameters for the national and local corporate tax rates, u , are explained based on the tax system as of FY2022⁸. The national corporate tax rate τ differs for large companies with capital of more than 100 million yen and SMEs with capital of less than 100 million yen, which are not wholly controlled by companies with capital of more than 500 million yen. The corporate tax rate for large companies is 23.2%, whereas that for SMEs is 15% for incomes of less than ¥8 million per year. The local corporate tax rate τ_L is 10.3%, the corporate inhabitant tax rate τ_R is 7%, the corporate enterprise income tax rate τ_B is 1% for large companies and 5.3% for SMEs, and the special corporate enterprise tax rate τ_S is 260% for large companies and 37.0% for SMEs. Thus, in 2022, the national and local corporate income tax rates, u , are 29.7% for large companies and 17.60% for SMEs. For other years, the same calculation can be performed based on the tax system. Conversely, for the standard rate of increase g and the tax credit rate \emptyset of the tax credits for promoting wage increases, the tax credit rates that may be applied under the system after FY2013 are adopted. For example, for the system for large firms in FY2022 (Table 1), $(g_1, \emptyset_1) = (3\%, 15\%)$, $(g_2, \emptyset_2) = (4\%, 25\%)$, and $i = 2$.

Based on the above assumptions, it is computed that the implied wage promotion subsidy rate ω using a combination of the national and local corporate tax rates u and the tax credit rate \emptyset of the wage-increase promotion tax credits. The results are shown in Figure 3. The black and gray arrows indicate that the implicit wage-increase promotion subsidy rate ω varies within that range.

From FY2013 to FY2016, when tax incentives were introduced to promote income growth, the implied wage-increase promotion subsidy rate was small and narrow in scope. The expansion of the program in FY2018 increased the implied wage-increase promotion subsidy rate and broadened its scope. Furthermore, a significant expansion was confirmed in FY2022. In FY2024, the maximum implied wage-increase promotion subsidy rate for both large and small firms was approximately 50%.

⁸ The tax rate parameters as of FY2022 remain unchanged as of FY2024.

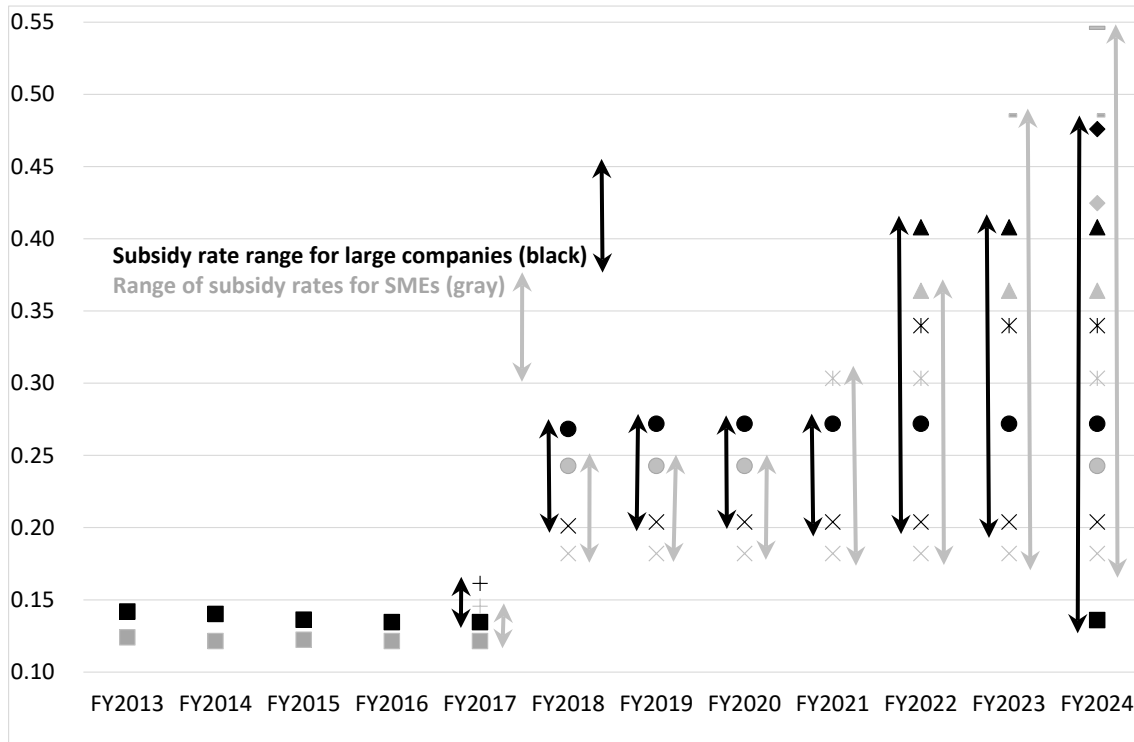


Figure 3: Implicit Wage-Increase Promotion Subsidy Rate ω

Note: Marks such as ■, ●, and ▲ indicate values of the implied wage-increase promotion subsidy rate ω , which is obtained from the combination of the standard increase rate of salary and other payments and the tax credit rate specified by the wage-increase promotion tax system.

These trends in the implied wage-increase promotion subsidy rate show that the wage-increase promotion tax system has expanded systematically. Comparing Figures 1 and 3 shows that as the implied wage-increase promotion subsidy rate increases in scope, the number of cases to which it applies increases. Using indicators such as the implied wage-increase promotion subsidy rate, the extent to which the wage-increase promotion tax system has expanded over time can be determined.

Assuming that the wage-increase promotion tax system will be expanded in the future, the implicit wage-increase subsidy rate ω is measured using the real and hypothetical national and local corporate tax rates u and the tax credit rate ϕ of the wage-increase promotion tax system. The national and local corporate income tax rates u are assumed to be from 0% to 50% in 10% increments, and the tax credit rate ϕ of the wage-increase promotion tax system is assumed to be from 10% to 45% in 5% increments, which is the pattern for all tax rates. The analysis results are presented in Table 4.

Table 4: Implied Wage-Increase Promotion Subsidy Rates ω for Varying National and Local Corporate Tax Rates and Tax Credit Rates

National and local corporate tax rates u	Tax credit rate for tax credits to promote wage increases \emptyset							
	10%	15%	20%	25%	30%	35%	40%	45%
0%	0.1000	0.1500	0.2000	0.2500	0.3000	0.3500	0.4000	0.4500
10%	0.1111	0.1667	0.2222	0.2778	0.3333	0.3889	0.4444	0.5000
17.60% (SMEs)	0.1214	0.1820*	0.2427*	0.3034*	0.3641*	0.4248*	0.4854*	0.5461*
20%	0.1250	0.1875	0.2500	0.3125	0.3750	0.4375	0.5000	0.5625
29.74% (large company)	0.1423*	0.2147*	0.2847*	0.3558*	0.4270*	0.4981*	0.5693	0.6405
30%	0.1429	0.2143	0.2857	0.3571	0.4286	0.5000	0.5714	0.6429
40%	0.1667	0.2500	0.3333	0.4167	0.5000	0.5833	0.6667	0.7500
50%	0.2000	0.3000	0.4000	0.5000	0.6000	0.7000	0.8000	0.9000

Note: The mark* implies wage-increase promotion subsidy rate ω that can be realized in the FY2024 wage-increase tax program.

Table 4 shows that the implied wage-increase promotion subsidy rate ω increases with an increase in the tax credit rate \emptyset or with a higher corporate income tax rate u . As the tax rate u of the national and local corporate income tax and other taxes is larger for large firms than for small firms, the implicit wage-increase subsidy rate ω decreases.

The mark * in Table 4 shows the implied wage-increase promotion subsidy rates ω that could be realized under the FY2022-2024 corporate tax rates, including national and local taxes, and the wage-increase promotion tax system. The minimum and maximum wages are 0.1423 and 0.4981, respectively, for large firms and 0.1820 and 0.5461, respectively, for SMEs.

5. Measurement of the excess burden of the wage-increase promotion tax system using individual company financial data

As noted earlier, the wage-increase promotion tax system causes not only tax revenue losses but also excess burden, which is a social loss. In this section, individual firms' financial data were used to measure the excess burden of the wage-increase promotion tax system. Individual firms' financial data are obtained from the Nikkei NEEDS Financial Quest, and data for FY2022, when the wage-increase promotion tax system was expanded, are used.

According to Figure 2, the excess burden DWL^{**} (triangle FQE) of tax credit for the wage-increase promotion tax credit at the full amount can be calculated as follows:

$$DWL^{**} = \frac{1}{2}(N^* - \tilde{N}) \left\{ w^* - \frac{(1-u-\phi)}{(1-u)} w^* \right\} = \frac{w^*(N^* - \tilde{N})}{2} \frac{\phi}{(1-u)} = \frac{w^*(N^* - \tilde{N})}{2} \omega \quad (20)$$

Thus, the implied wage-increase promotion subsidy rate ω analyzed in the previous section also affects the size of the excess burden DWL .

The number of employees \tilde{N} , which is necessary to measure excess burden using individual firms' financial data, cannot be obtained in reality, as it would be the number of employees if firms did not adopt a tax system that promotes wage increases. Therefore, the following equation assumes that the marginal productivity curve of labor, MPL , is linear and defines the wage elasticity of labor demand, σ , as follows.

$$\sigma = \left| \frac{\{(N^* - N_{-1})/N_{-1}\}}{\{(w^{**} - w_{-1})/w_{-1}\}} \right| = \left| \frac{\{(\tilde{N} - N_{-1})/N_{-1}\}}{\{(w^* - w_{-1})/w_{-1}\}} \right| \quad (21)$$

Using this equation, the number of employees \tilde{N} needed to measure the excess burden can be estimated.

$$\tilde{N} = \frac{N_{-1}}{1 + \sigma \{(w^* - w_{-1})/w_{-1}\}} \quad (22)$$

Thus, the excess burden of the wage promotion tax credit DWL is measurable. Note that the excess burden \widehat{DWL} can be measured even when the tax credit rate $\widehat{\phi}$ is constrained by the national corporate tax.

Furthermore, if the marginal productivity curve of labor MPL is linear, then the producer surplus PS can also be calculated, as shown in Figure 2. The producer surplus \widehat{PS} (triangle AFB) in the case of not applying the wage-increase promotion tax system and the producer surplus PS^{**} (triangle AEG) in the case of applying it can be calculated as follows:

$$\widehat{PS} = \frac{1}{2} \tilde{N} (w^0 - w^*) \quad (23)$$

$$PS^{**} = \frac{1}{2} N^* \left(w^0 - \frac{(1-u-\phi)}{(1-u)} w^* \right) \quad (24)$$

Here, if the wage elasticity of labor demand σ is constant, the per capita salary and other payments w^0 when the number of employed persons is zero can be calculated as follows: In this case, it is assumed $w^0 > w^*$.

$$\sigma = \left| \frac{\{(0 - \tilde{N})/\tilde{N}\}}{\{(w^0 - w^*)/w^*\}} \right| = \left| \frac{w^*}{(w^0 - w^*)} \right| \quad (25)$$

$$w^0 = \frac{(1 + \sigma)w^*}{\sigma} \quad (26)$$

Now that I have the analytical tools, I can begin the phase of measuring producer surplus and excess burden. The individual company financial data available from the Nikkei

NEEDS Financial Quest are for publicly listed general business companies. As listed companies, they were limited to large companies. The wage-increase promotion tax system is also applicable to SMEs; therefore, the analysis should also include SMEs. However, due to data limitations, this was abandoned.

Although the fiscal years of the available individual company financial data vary, companies with fiscal years ending in March were selected for analysis to match the timing of the application of the wage-increase promotion tax credit. For this study, financial data for the two fiscal years ending March 2022 and March 2023 were obtained to analyze the wage-increase promotion taxation system in FY2022, when the amount applied and the number of applications were larger than those in the previous year. The data used were “labor and benefit costs,” “number of employees at year-end,” “average number of temporary employees,” and “total corporate, inhabitant, and enterprise taxes”. The number of companies for which all data were available was 1,500.

Henceforth, the tax credit amount is measured when applying the 2022 wage-increase promotion tax system⁹.

First, I calculated the salaries and wages paid in the two years to determine whether the wage-increase promotion tax system can be applied. As “Personnel and welfare expenses” include the company's portion of social insurance premiums, I calculated wN by multiplying “Personnel and welfare expenses” by $1/(1+0.091)$, considering the legal welfare ratio of 9.1%. If the salary growth rate increases over the two years and $((wN - w_{-1}N_{-1})/w_{-1}N_{-1})$ is positive, then the wage-increase promotion tax system can be applied. The number of firms with a positive rate of increase in wages and other payments was 917, or 61.13% of the total data.

The sum of the “number of employees at the end of the period” and the “average number of temporary employees” was used as the number of employees N , and the amount of salaries and other payments were divided to obtain the amount of salaries and other payments per employee w . By calculating these previous year's growth rates, I obtained the previous year's growth rate of salaries and other payments per employee, α , and the previous year's growth rate of the number of employees, β .

Table 5 shows the number of firms for which the individual firm financial data under analysis are divided into two categories—those with positive and negative year-on-

⁹ Although the FY2022 wage-increase promotion tax credit includes an additional requirement regarding education and training expenses, I had to ignore the additional requirement because I could not obtain data on education and training expenses in the individual company financial data. Therefore, the tax credit amount measured in this study may be an underestimate; however, it does not significantly affect the conclusions of this study.

year growth rates in salary and other payments—and then divided into cases based on the year-on-year growth rate α in salary and other payments per employee and the year-on-year growth rate β in the number of employees. Case 1 is the most common among firms applying for the wage-increase promotion tax credit; Cases 2 and 3 are also found, but Case 4 is absent among all firms. Therefore, Case 4 cannot be realized for the previous year's rate of increase in salary and other payments to become positive, which is a condition for the application of the wage-increase promotion tax credit. As more firms applied for the wage-increase promotion tax credit in Case 2 than in Case 3, it is easier to apply for tax credit by increasing the salary paid per employee w than by increasing the number of employees N .

Table 5: Percentage Increase in Salaries and Other Payments in the Previous Year and Number of Firms in the Wage-Increase Case Classification (FY2022)

	Case1 $\alpha > 0, \beta > 0$	Case2 $\alpha > 0, \beta < 0$	Case3 $\alpha < 0, \beta > 0$	Case4 $\alpha < 0, \beta < 0$	Total
Positive Companies	419 (27.93%)	330 (22.00%)	168 (11.20%)	0 (0.00%)	917 (61.13%)
Negative Companies	21 (1.40%)	201 (13.40%)	197 (13.13%)	164 (10.93%)	583 (38.87%)
Total	440 (29.33%)	531 (35.40%)	365 (24.33%)	164 (10.93%)	1,500 (100.00%)

According to the system for large firms in FY2022 (Table 1), the tax credit rate \emptyset for the wage-increase promotion tax credit varies with the size of the previous year's increase in payroll ($g = (wN - w_{-1}N_{-1})/w_{-1}N_{-1}$). According to the system, I obtained the tax credit rate \emptyset applicable to the full amount. I multiplied this tax credit rate by the difference in wages ($wN - w_{-1}N_{-1}$) to calculate the tax credit amount C^* in the full-amount case.

Second, I calculated the amount of national corporate tax T , assuming that the “total amount of corporate, inhabitant and enterprise taxes” is the amount of national and local corporate tax burden U , and that the tax base is B . As the national and local corporate tax burden U includes not only national taxes but also local taxes, it is necessary to take out the corporate tax amount T for national taxes. Considering the relationship between the national and local corporate tax rates u and taxable base B , and the relationship between the national corporate tax amount T and taxable base B , I organized the following:

$$uB = \frac{\tau(1 + \tau_L + \tau_R) + \tau_B(1 + \tau_S)}{1 + \tau_B(1 + \tau_S)} B \quad (27)$$

$$\begin{aligned}
T = \tau B &= \{1 + \tau_B(1 + \tau_S)\}uB - \tau\tau_L B - \tau\tau_R B - \tau_B B - \tau_B\tau_S B \\
&= \{1 + \tau_B(1 + \tau_S)\}uB - (\tau\tau_L + \tau\tau_R + \tau_B + \tau_B\tau_S)B \\
&= \{1 + \tau_B(1 + \tau_S)\}uB - \{\tau(\tau_L + \tau_R) + \tau_B(1 + \tau_S)\}B \quad (28)
\end{aligned}$$

From the above, I calculated the amount of national corporate tax T by dividing the “total amount of corporate, inhabitant and enterprise taxes” U by the tax rate u of national and local corporate taxes to obtain the taxable base B , and then multiplying the taxable base B by the corporate tax rate τ of national corporate taxes.

Third, the tax credit amount C^* , when the wage-increase promotion tax credit is applied in full, is compared with the amount of national corporate tax T , multiplied by a certain percentage γ , and if C^* exceeds γT , the tax credit amount is limited ($C = \gamma T < C^*$). If the amount of national corporate income tax is limited, the adjusted tax credit rate $\hat{\phi}$ is also calculated. Of the 917 firms with positive payroll tax payments, 276 (30.10%) are subject to this limitation.

Fourth, using the implicit wage promotion subsidy rate ω and the number of employees N over the two years, I computed the wage elasticity of labor demand σ and the number of employees \tilde{N} . Using these individual firm financial data, I computed the excess burden DWL and producer surplus PS .

Using individual company financial data for FY2022, I measured the producer surplus \tilde{PS} without the wage-increase promotion tax system, producer surplus PS^* with the wage-increase promotion tax system, and the excess burden of the wage-increase promotion tax system (DWL) for companies to which the tax system can be applied. As the producer surplus and excess burden vary depending on firm size, it is necessary to use some standards to make them relative for comparison. Therefore, I divided the producer surplus PS^{**} and excess burden DWL^{**} by the producer surplus \tilde{PS} without the tax system to enable a relative comparison of the data. These are illustrated as scatter plots in Figure 4.

As shown in Figure 4, the producer surplus increases 5.124 times more on average when the wage-increase promotion tax system is applied than when it is not, indicating that the wage-increase promotion tax system enables companies to obtain large producer surpluses. Conversely, Figure 4 also shows that society would suffer a very large excess burden. The excess burden, which is a social loss, increases exponentially with an increase in producer surplus resulting from the application of the tax system to promote higher wages.

In other words, while the wage-increase promotion tax system provides a large producer surplus to individual firms, it incurs a larger social loss, or excess burden, than the producer surplus. Therefore, the policy pros and cons of a tax system that promotes

wage increase should be considered, which not only reduces tax revenue but also disturbs the market and imposes a large excess burden.

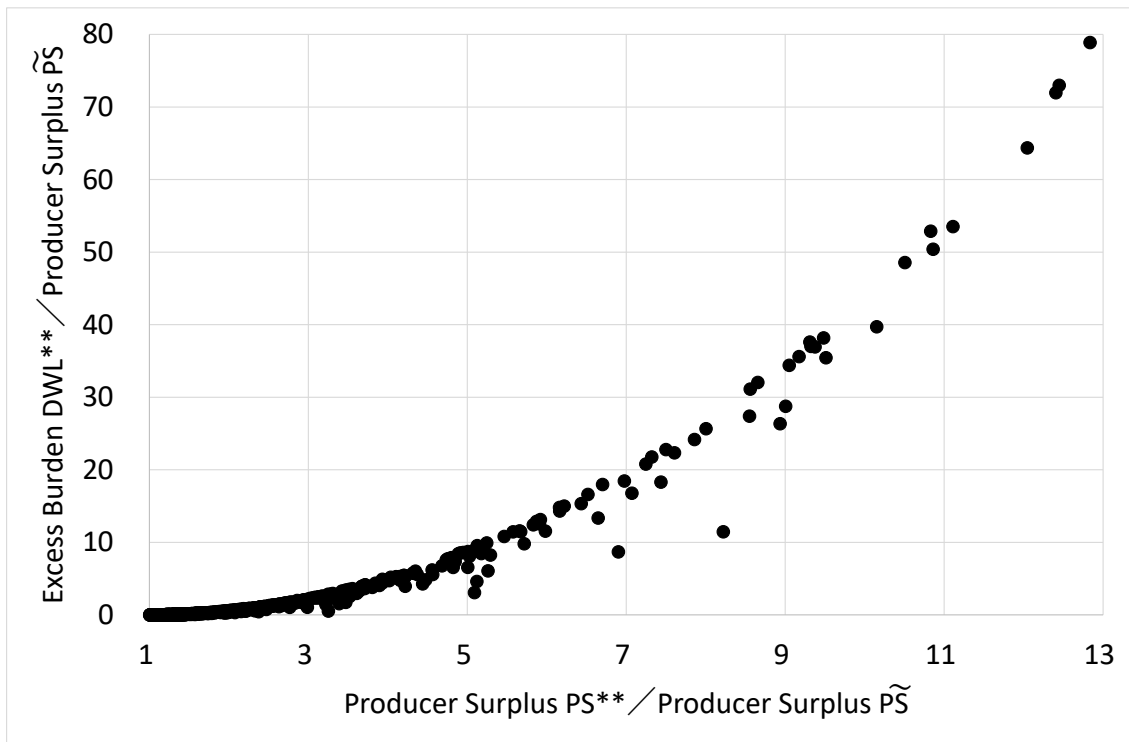


Figure 4: Impact on Producer Surplus and Excess Burden of Applying Wage-Increase Promotion Tax System

One point of view is that the application of a tax system to promote wage increases has policy significance if corporate performance improves more than it would otherwise, even if it incurs a large excess burden on society. From this perspective, Koyama (2020) and Yamazaki (2023) analyzed the impact of a wage-increase promotion tax system on corporate performance, such as labor productivity. Therefore, this study also examines the relationship between labor productivity and firms that apply or do not apply the wage-increase promotion tax system in the last section of the study.

For this analysis, measuring the labor productivity of individual firms was necessary. From Nikkei NEEDS Financial Quest, I obtained the “operating profit” of the companies to be analyzed and summed it with the “labor and benefit costs” to obtain the value added V ¹⁰. The value-added V is divided by the number of employees N to obtain

¹⁰ Although various methods are used to calculate the value added, this study assumes that V is the “operating income,” which is sales minus raw material costs and general administrative expenses, plus “labor and benefit costs”. Therefore, labor productivity

labor productivity V/N for the previous and current periods¹¹. By taking the difference between labor productivity in the previous year and current year ($v = V/N - V_{-1}/N_{-1}$), I divided firms into two groups: those whose change from the previous year is positive and labor productivity increased ($v > 0$) and those whose change from the previous year was negative and labor productivity decreased ($v < 0$).

Table 6 presents the analysis results. When the total number of firms applying the wage-increase promotion tax system was 100%, 68.01% experienced an increase in labor productivity and 31.99% experienced a decrease. Conversely, when the total number of firms that did not apply for the wage-increase promotion tax system is set at 100%, 64.67% of the firms increased their labor productivity, while 35.33% decreased it. It is believed that labor productivity has no significant difference whether the wage-increase promotion tax system is applied.

Table 6: Movements in Labor Productivity and Number of Firms (FY2022)* with and without Wage-Increase Promotion Tax Credits

	Labor productivity increases ($v > 0$)	Labor productivity decreases ($v < 0$)	Total
Applicated companies	623 [68.01%] Case1 : 291(31.77%) Case2 : 231(25.22%) Case3 : 101(11.02%) Case4 : 0(0.00%)	293 [31.99%] Case1 : 128(13.97%) Case2 : 98(10.70%) Case3 : 67(7.31%) Case4 : 0(0.00%)	916 [100.00%] Case1 : 419(45.74%) Case2 : 329(35.92%) Case3 : 168(18.34%) Case4 : 0(0.00%)
Non applicated companies	377 [64.67%] Case1 : 15(2.57%) Case2 : 125(21.44%) Case3 : 132(%) Case4 : 105(%)	206 [35.33%] Case1 : 6(1.03%) Case2 : 76(13.04%) Case3 : 65(11.15%) Case4 : 59(10.12%)	583 [100.00%] Case1 : 21(3.60%) Case2 : 201(34.48%) Case3 : 197(33.79%) Case4 : 164(28.13%)
Total	1,000 [66.71%] Case1 : 306(20.41%) Case2 : 356(23.75%) Case3 : 233(15.54%) Case4 : 105(7.00%)	499 [33.29%] Case1 : 134(8.94%) Case2 : 174(11.61%) Case3 : 132(8.81%) Case4 : 59(3.94%)	1,499 [100.00%] Case1 : 440(29.35%) Case2 : 530(35.36%) Case3 : 365(24.35%) Case4 : 164(10.94%)

Note: The reason for one less than the total number of data in Table 5 is that one firm with missing data for “operating income” is included.

Table 6 also shows the ratios of the number of firms in Cases 1 to 4. The ratios for each case do not change significantly depending on the application or non-application

V/N calculated in this case corresponds to value-added labor productivity.

¹¹ Although labor hours may be considered when calculating labor productivity, as labor hours cannot be obtained from individual firm financial data, this study uses value added per worker as labor productivity. The same is true for Koyama (2020) and Yamazaki (2023).

of the wage-increase promotion tax system. The results of the analysis are considered to indicate that the application or non-application of the tax system to promote wage increases does not significantly change the impact on labor productivity.

According to the model described earlier in this study, it can be theoretically pointed out that a tax system that promotes wage increases does not necessarily increase labor productivity, as it reduces the marginal productivity of labor when the marginal productivity of labor is diminishing. Therefore, a tax system that promotes wage increases can be assumed to not necessarily lead to an increase in labor productivity.

6. Conclusion

This study analyzes the wage-increase promotion tax system introduced to realize wage increases through the corporate tax system. The tax system for promoting wage increase was introduced in the 2013 tax reform, with a large amount of ¥515 billion applied in FY2022. The wage-increase promotion tax system is an internationally rare system that aims to raise wages through the corporate tax system and is an area where academic research has not accumulated to any great extent. While a few previous studies have analyzed the impact of the wage promotion tax system on corporate performance, this study focuses on the “hidden subsidy” or excess burden required to make a policy decision on the wage promotion tax system.

This study incorporates the wage-increase promotion tax system into a firm behavior model that analyzes corporate taxation, and presents the concept of an “implied wage-increase subsidy rate” and a method for measuring the excess burden, implicit wage-increase promotion subsidy rate, and the excess burden of the wage-increase promotion tax system using individual corporate financial data. These contributions of this study are not found in previous studies. I then conducted a supplementary analysis of the impact on labor productivity, which is of interest to previous studies. The results of this analysis are summarized as follows.

The implicit wage-increase promotion subsidy rate provides a quantitative picture of the extent and scope of the subsidies provided by the wage-increase promotion tax system. By measuring the implicit wage-increase subsidy rate, the extent and scope of subsidies provided by the wage-increase promotion tax system have been expanded. I then used individual firms’ financial data to measure the change in producer surplus and the excess burden caused by the wage-increase promotion tax system. I find that the tax system increases the producer surplus of the applicable firms; conversely, the excess burden, a social loss, increases exponentially. They also noted that there was no significant difference in the change in labor productivity between firms that apply and

do not apply the tax system to promote wage increases.

Wage-increase promotion tax systems are “hidden subsidies” and excess burdens that disrupt the market, and policy judgments should be made based on an understanding of these data to determine whether raising wages at the expense of social losses in addition to tax revenue losses is necessary. Global corporate tax reforms tend to lean toward a neutral tax system that does not affect firm behavior, and a tax system that promotes wage increases may not be in line with this trend. If a tax system that encourages higher wages has no significant contribution to labor productivity, then a fundamental reconsideration of the system is warranted.

This study has some limitations. First, education and training expenditures, which are an additional requirement, were not listed in the individual company financial data and could not be analyzed because of the lack of data. The need for analysis is high, because education and training expenditures are structured in such a way that simply increasing them would clear additional requirements, and there are concerns that they may be used arbitrarily. Second, in measuring the excess burden and producer surplus, I assumed that the marginal productivity curve of labor is linear, but this assumption may be too strict. Third, this study was limited to FY2022; it is necessary to confirm whether the results will be similar for other years. Fourth, because the tax system for promoting wage increases also covers SMEs, it is necessary to analyze SMEs as well; however, this was difficult because of data limitations. These issues should be addressed in future studies.

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