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A TAX-DATA BASED ANALYSIS OF JAPANESE HIGH-INCOME EARNERS

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Discussion Paper Series of National Tax College
April, 2025

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ABSTRACT

This study examines income distribution among Japanese high-income earners using micro tax data provided by the National Tax Agency, a first for Japan. Our analysis reveals several key findings. While wage income is the primary source of income for most high-income earners, stock capital gains are the dominant source for the top income earners. The Pareto coefficient for total income in Japan is approximately 1.45 for 2020, significantly lower than the previous estimate of 2.1 for 2003. Unlike existing studies that exclude capital gains, our lower estimate indicates a greater concentration of income among Japan's superrich. Additionally, effective average tax rates rise with income up to around 100 million yen, after which they decline. This regressivity is due to the Japanese income tax system, which imposes lower taxes on capital income. To restore the income redistribution function of the tax system, Japan should raise the tax rate on capital income.

Key words: Japanese income tax, micro tax data, income distribution, superrich
JEL classification: D31, H24

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[2] We thank the staff and former staff of the National Tax Agency of Japan for preparing and providing the micro data on Japanese income tax to our research group. However, the analysis and conclusions presented here are those of the authors and do not reflect the views or endorsement of the National Tax Agency of Japan.

[3] We thank Ryo Ishida, Chiaki Moriguchi, Takayuki Kaneda, Maxime Gravoueille, and the participants of the Japanese Economic Association Autumn Meeting 2024, the Japan Institute of Public Finance Annual Meeting 2024, and the International Institute of Public Finance 2024 for their valuable feedback. Any remaining errors are solely our responsibility. Kunieda acknowledges financial support from JSPS KAKENHI Grant Number 23K01426.

1. Introduction

Economic inequality, particularly the concentration of income among the superrich, has garnered increasing attention from both researchers and the general public worldwide.[4] Because survey data often fail to capture the income of the superrich, analyzing income distribution at the top has increasingly relied on micro tax data in many countries. However, in Japan, the National Tax Agency (NTA) did not provide micro tax data to academic researchers until very recently, although it published annual tabulated statistics and maintained a public disclosure system for high reported taxable income or tax payment amounts until 2004. In 2022, the NTA launched a pilot program for joint research with selected academic researchers, and our research group was fortunate to be chosen for this study on income tax data. This study presents the first analysis of Japanese high-income earners using this micro tax data.

In this study, we examine the characteristics of Japanese high-income earners and estimate the Pareto coefficient of their income distribution, which reflects the level of income concentration among Japan's superrich. The Pareto coefficient plays a critical role in determining optimal income tax rates. Diamond (1998) and Saez (2001) demonstrated that the top optimal income tax rates can be calculated using the Pareto coefficient, the elasticity of taxable income, and social welfare weights. Saez and Stantcheva (2018) further showed that the optimal capital income tax can be derived from the Pareto coefficient of capital income, the elasticity of taxable capital income, and social welfare weights. Therefore, estimating the Pareto coefficient is crucial not only for understanding the income distribution of Japan's high-income earners but also for deriving optimal income tax rates in the country.[5]

Recent studies have explored the progressivity of tax systems in advanced countries using administrative tax data. Some studies, such as Saez and Zucman (2019) in the U.S. and Advani, Hughson, and Summers (2023) in the U.K., found that effective average tax rates (EATRs) decrease at the top of the income distribution. In contrast, other studies, like

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[4] For a comprehensive survey on the taxation of the superrich, see Scheuer and Slemrod (2020).

[5] Another important aspect of income inequality is the income share of top earners. However, estimating this share requires data on low- and middle-income earners, including non-taxpayers, which our micro tax data does not cover. To estimate the income share of top earners, we must rely on other related data and make several assumptions. In contrast, the NTA provides complete data on high-income earners through tax return files, allowing us to focus on estimating the Pareto coefficients for the income distribution of high-income earners in Japan in this study. Estimating the income share of top earners in Japan will be addressed in future research.

Splinter (2020), argued that top tax rates, when accounting for the reduction in tax sheltering, have remained relatively flat. However, a broad consensus exists that effective tax rates for top earners are heterogeneous, with the tax treatment of financial income and capital gains playing a key role in determining the EATRs for the superrich. For instance, Advani, Hughson, and Summers (2023) noted that the significant variation in EATRs at the top of the income distribution in the U.K. is largely driven by the composition of remuneration, with investment income being taxed at lower tax rates and capital gains being taxed at even lower rates. In the policy debate, recognizing that billionaires tend to have low effective tax rates, Zucman (2024) proposed a minimum tax on billionaires of 2% of their wealth, which he presented at the G20 Finance Ministers and Central Bank Governors Meeting in Rio de Janeiro in July 2024. In this study, we examine the EATRs for Japanese high-income earners, using Japanese administrative tax data for the first time.

Our main findings are as follows. First, the top Japanese high-income earners are primarily middle-aged and older men, aged their 50s and over, and reside in Tokyo and other large cities. Second, while wage income is the primary source of income for most high-income earners, stock capital gains are the most significant income source for the very top earners (the top 0.004% of the adult population). Third, based on a transition probability matrix, the status of top earners is relatively stable in the short run in Japan. Fourth, the Pareto coefficient for total income in Japan is estimated to be 1.45 for 2020. The Pareto coefficients for capital income and labor income are 1.35 and 1.95, respectively. This low Pareto coefficient for total income reflects the growing importance of capital income for the superrich in Japan. This is significantly lower than the previous estimate of 2.1 for 2003 (Kunieda, 2012). While earlier studies without capital gains data suggested no income concentration among the superrich in Japan, our lower Pareto coefficient estimate confirms that income inequality has increased, driven by highly concentrated financial income among the superrich. Fifth, although realized gains are more volatile than accrued capital gains, as is the case in other countries, the Pareto coefficient estimated using 7-year average data—designed to offset short-term capital gains and losses—remains much lower than earlier estimates. Sixth, the EATR increases with income up to about 100 million Japanese yen (JPY) but decreases thereafter. This regressivity arises because Japan's income tax system imposes lower taxes on capital income, and stock capital gains constitute the primary income source for the superrich. To restore the redistribution function of Japan's income tax system, the capital income tax rate should be increased.

In Section 2, we review previous studies on top income distribution, focusing on the existing estimates of Pareto coefficients for top income distribution in Japan. Section 3 provides a brief explanation of the Japanese income tax system and the micro tax data,

which was recently made available by the NTA for academic research. Section 4 outlines the basic characteristics of Japanese high-income earners based on the micro tax data. Section 5 presents our estimation results for the Pareto coefficient of top income distribution in Japan. Section 6 highlights the significant role of capital gains in Japanese income inequality and discusses the appropriate treatment of capital gains. In Section 7, we examine the EATRs across different income classes in Japan and explore the reasons for the low EATRs among the superrich. The paper concludes with a brief summary.

2. Previous Literature on the Income Distribution of High-Income Earners in Japan

The income distribution of high-income earners has been a key focus for Japanese researchers. Although micro tax data was not available in Japan, the NTA published an annual statistics book containing tabulated tax data. The Pareto coefficient for the income distribution of high earners was often estimated using rank-size regression, which involves regressing the logarithm of income size on the logarithm of ranks (from the top down). Using this method, Shiomi et al. (1941) provided the earliest estimates of income distribution for top earners. They estimated the Pareto coefficient at 1.87 in 1905, which generally decreased to 1.57 by 1940 (Ono and Watanabe, 1976). Another approach based on tabulated tax statistics is the "constant Pareto coefficient" method, used by Piketty and Saez (2003) and Blanchet, Piketty, and Fournier (2022), and applied by Moriguchi and Saez (2008) in estimating the income share of Japan's top earners.

From 1950 to 1982, Japan had a public disclosure system that reported the taxable income of high earners, and from 1983 to 2004, it included information on paid taxes. The names and income or tax amounts of high-income earners above a specific threshold were disclosed annually. This system is detailed in Hasegawa et al. (2013). Using data from the top 3,000 income earners, Mizoguchi (1987) found that the Pareto coefficient for these earners ranged from about 2.1 to 2.5 between 1962 and 1982. Fujiwara et al. (2003) conducted a rank-size regression on a list of top taxpayers (excluding the top 1% and the smallest 10%), estimating the Pareto coefficient between 1.8 and 1.9 from 1987 to 1991, a period marked by Japan's asset bubble, and around 2.1 in 1999. Nirei and Souma (2007) estimated a much smaller coefficient of about 1.5 during the asset bubble. Kunieda (2012) estimated a coefficient of approximately 2.1 for those earning above 100 million JPY in 2003, using the Hill estimator (maximum likelihood estimator) and Hill plot methods. Clauset et al. (2009) noted that the Hill estimator provides a more precise estimate than rank-size regression. Hasegawa et al. (2013) estimated Pareto coefficients between 2.21 and 2.25 from 2001 to 2003, using all samples of top taxpayers from the disclosure list.

However, in 2005, the Japanese government abolished the public disclosure of top taxpayer information due to privacy concerns, and since then, no micro tax data on high-income earners has been available for research.

Recent studies on income inequality in Japan have used tabulated tax statistics, local tax data, and other survey data. Moriguchi (2017) argued that income concentration among top income earners is limited, based on data from Moriguchi and Saez (2008). Moriguchi noted that members of the top 0.1% income class were unstable due to volatile capital gains, as indicated by tax statistics from 1956 to 2006. Moriguchi concluded that Japan's income inequality issue is more related to poverty than to income concentration among the superrich. Kitao and Yamada (forthcoming) suggested that income inequality increased between 1984 and 2019, primarily due to demographic aging, using data from the National Surveys of Family Income and Expenditure, a Japanese household survey. Kitao, Suzuki, and Yamada (2023) argued that wage income inequality did not rise, based on wage data from local tax records. However, while these studies contend that income concentration among the superrich is not a significant issue in Japan, they lack data on the superrich or fail to account for capital gains. Additionally, without tax administrative data, discussions about the progressivity of Japan's income tax system have mainly focused on the statutory tax schedule. Our study is the first to analyze income distribution and EATRs among Japan's top income earners using micro tax data that includes capital gains.

A key contribution of our study is that, in contrast to previous research, we demonstrate that income concentration among the superrich has indeed occurred. Furthermore, we show that EATRs on the superrich are relatively low, owing to the low tax rates on financial income in Japan.

3. Japanese Income Tax System and the Tax Data Provided by the National Tax Agency

3.1. A Brief Explanation of the Japanese Income Tax System

The Japanese income tax system taxes personal income across 10 categories: wage income (employment income),[6] capital income (interest, dividend, and capital gains income), various personal business income (business, real property, and timber income), retirement income (retirement allowance), occasional income, and miscellaneous income (including

[6] Although the official term in Japanese tax law is "employment income," we use "wage income" for clarity and ease of understanding.

public pension income). Three methods of taxation exist: aggregation taxation, separate self-assessment, and separate taxation at source. Under "aggregation taxation," income from different categories is combined, and tax is calculated based on the total. In "separate self-assessment taxation," income from each category is taxed separately. Under "separate taxation at source," taxes are withheld when income is distributed, completing the tax payment regardless of other income types. Income subject to aggregation taxation and separate self-assessment taxation must be reported on tax returns, while income taxed under separate taxation at source is not reported. Since our study uses tax data from pages 1 and 3 of tax return files, we cannot include data on income taxed under separate taxation at source. Aggregation taxation applies to wage, real property, business, occasional, and miscellaneous income.[7] Retirement and timber income are subject to separate self-assessment taxation.

The taxation of capital income is more complex. Interest income is primarily taxed under separate taxation at source, with a 15% income tax, an additional 0.315% for special income tax for reconstruction, and a 5% local resident tax. The special income tax for reconstruction is a temporary levy to fund recovery efforts in areas severely impacted by the 2011 Great East Japan Earthquake.

Dividend income earners have three options for taxation. Generally, dividend income from listed companies can be taxed either through aggregation taxation or separate self-assessment taxation. Under aggregation taxation, a progressive tax rate is applied, and dividend deductions are available to address double taxation at both the corporate and individual levels. Under separate self-assessment taxation, the tax rate is the same as for interest income, but losses from stock transfers can offset the dividend income. Additionally, for small-lot dividends, the "no declaration requirement method" (shinkoku fuyo seido) may be chosen. This method allows tax payment to be completed without filing tax returns, with taxes withheld at the same rate as interest income. However, large shareholders (those holding 3% or more of a company's shares) can only choose aggregation taxation. In our tax data, we include dividend income from taxpayers who choose separate self-assessment or aggregation taxation (including large shareholders). However, we do not include dividend income from taxpayers who use the no declaration requirement method.

Capital gains from stocks are generally taxed under separate self-assessment taxation at the same rate as interest income. Taxpayers using a special account ("tokutei kouza") can opt for either the no declaration requirement method or separate self-assessment taxation. If

[7] Income from future transactions is classified as miscellaneous income but is taxed separately.

they choose the former, they are not required to file tax returns. Additionally, the Japanese government introduced the Nippon Individual Savings Account (NISA) in 2014 to encourage stock investment. Income from assets in NISA accounts is untaxed. Therefore, financial income from "tokutei kouza" (if the no declaration method is selected) and NISA is not included in our data. However, since NISA has contribution limits, we believe its exclusion does not significantly impact the analysis of the highest income earners.

An important category of capital gains comes from real estate sales, which are taxed under separate self-assessment taxation. These gains are classified into two categories: (a) short-term capitals gains, for properties held for five years or less, and (b) long-term capital gains, for properties held for more than five years.[8] Short-term capital gains from real estate are taxed at 30% income tax and 9% local resident tax, while long-term capital gains are taxed at 15% income tax and 5% local resident tax. Additional special deductions and lower tax rates apply to the sale of personal residential properties. Owing to these tax benefits and preferential treatments, the effective tax rates on real estate capital gains are relatively low compared to income taxes on other types of income.

The total sum of income under aggregation taxation and separate self-assessment taxation is referred to as "gokei shotoku" in Japanese, which appears on the tax return form. In this study, we refer to it as "total income."[9] This total income does not include income taxed under separate taxation at source. To calculate taxable income, any loss carryover is deducted from total income. After this adjustment, the resulting income is called "so-shotoku kingaku to" in Japanese, or "total net income" in this study. Taxable income is calculated by subtracting various income deductions from total net income. The tax amount under aggregation taxation is calculated by applying progressive tax rates to the sum of income types under aggregation taxation. The tax amount under separate self-assessment taxation is calculated separately with the corresponding tax rates. The total tax payment on the tax return form is the sum of taxes under both aggregation taxation and separate self-assessment taxation. For further details on income taxes, see the NTA (2023).

3.2. Tax Data

In 2022, the NTA launched a joint research program involving academic research groups

[8] The holding periods are calculated on January 1 of the year.

[9] In some English-language literature on Japanese income tax system, different terms are used for "gokei shotoku," while "total income" refers to a different concept. However, we use "total income" for "gokei shotoku" and "total net income" for "so-shotoku kingaku to," as these terms are more easily understood.

and National Tax College staff to utilize micro tax data.[10] Academic groups selected through an application process collaborate with the National Tax College on this initiative. Our research group, led by the author of this study (Kunieda), was selected to participate in the inaugural joint research program using micro tax data from personal income tax returns. The NTA provided tax data that includes all the information on pages 1 and 3 of the tax return forms, excluding taxpayer names and exact addresses for privacy reasons. The dataset spans seven years, from 2014 to 2020, and the same internal taxpayer numbers are assigned to the same individuals, making it a seven-year panel dataset. Access to the data is restricted to a single analysis room at the National Tax College. The data is extensive, with over 22 million income tax returns filed each year, and includes all the details required to calculate the tax amount for each taxpayer.

However, some limitations exist in the data. First, since the dataset only includes pages 1 and 3 of the tax returns, certain types of income that do not require a tax return are not represented. For example, interest income and stock-related income from "tokutei kouza" (for taxpayers opting for the no-declaration requirement method) are subject to withholding tax at the source, so these income types are not included. Second, Japan's sophisticated withholding tax system on wage income means that most wage earners are not required to file income tax returns. As a result, tax data for most low- and middle-income wage earners is not available. However, the law mandates that individuals with wage income exceeding 20 million JPY must file tax returns, even if their wages are already taxed through withholding. Our study focuses on high-income earners with total income exceeding 20 million JPY, so this limitation does not significantly affect our research. Lastly, the tax returns only contain data needed to calculate the tax amount, meaning some information typically included in survey data is missing. For example, while income deductions for dependents are listed, exact family details are not provided in the tax return forms, which complicates our analysis.

As this is the first academic use of micro tax data, we spent a significant amount of time cleaning and reorganizing the existing electronic tax data provided by the NTA for academic research, with invaluable assistance from NTA staff. Details of the data cleaning process are outlined in Kunieda and Yoneta (2023).

[10] The National Tax College is not a typical academic institution; it serves as both an educational and research center for the National Tax Agency.

4. Characteristics of Japanese High-Income Earners

Although Japan does not have a formal definition of "high-income earner" or "(super) rich," we define high-income earners in this study as taxpayers with a total income ("gokei shotoku") exceeding 20 million JPY, owing to the data constraints mentioned earlier. These high-income earners exhibit the following characteristics.

4.1. Numbers of High-Income Earners[11]

Between 2014 and 2020, the number of taxpayers with more than 20 million JPY in total income ranged from 362,000 to 462,000. The average "total income" of these taxpayers each year ranged from 44 to 49 million JPY. Since Japan's income tax system is based on individual rather than household taxation, we first calculate the percentage of taxpayers earning more than 20 million JPY relative to the entire Japanese adult population (aged 20 and older). These taxpayers represent approximately 0.35% to 0.45% of the adult population, as shown in Table 1.

However, one could argue that that households, rather than individuals, are a more appropriate unit for evaluating welfare. For instance, a stay-at-home spouse of a superrich individual might be considered "poor" if only individual income is considered. Unfortunately, Japanese income tax returns do not include information on family structures. Therefore, we also present the percentage of high-income earners relative to the total number of households in Table 1. This percentage is about 1.8 to 1.9 times higher than the percentage based on the adult population.

Table 1. Percentages of High-Income Earners relative to the Adult Population and Households

Year	Numbers of Taxpayers	Average Income (millions)	Percentage relative to the Japanese adult population (%)	Percentage relative to Japanese households (%)
2014	362438	4405.3	0.35	0.66

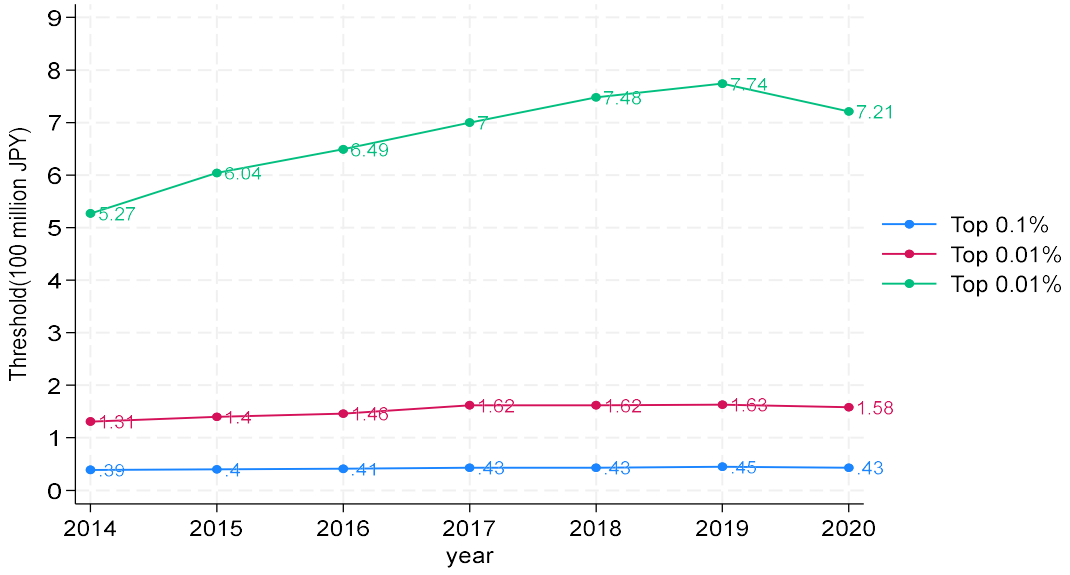
[11] Although our taxpayer data includes both Japanese and foreign taxpayers, it lacks information on the nationality of taxpayers. Therefore, in this study, we focus on the percentage of high-income taxpayers relative to the Japanese adult population.

2015	383031	4531.4	0.37	0.69
2016	391814	4613.6	0.38	0.70
2017	427587	4867	0.41	0.76
2018	432594	4717.9	0.42	0.76
2019	461541	4706.3	0.45	0.81
2020	436223	4606.2	0.42	0.76

(Source: author)

We also present the income thresholds corresponding to the top 0.1%, 0.01%, and 0.001% of the adult population from 2014 to 2020, as shown in Figure 1. The number of taxpayers in each group is approximately 100,000 for the top 0.1%, 10,000 for the top 0.01%, and 1,000 for the top 0.001%. While the thresholds for the top 0.1% and top 0.01% increased gradually, the threshold for the top 0.001% rose sharply until 2019, before dropping in 2020, likely due to the effects of the COVID-19 pandemic. The rapid increase in the threshold for the top 0.001% suggests a significant concentration of income among the superrich during this period.

Figure 1. Thresholds of Top 0.1%, 0.01%, and 0.001% Income Earners in Japan



(Source: author)

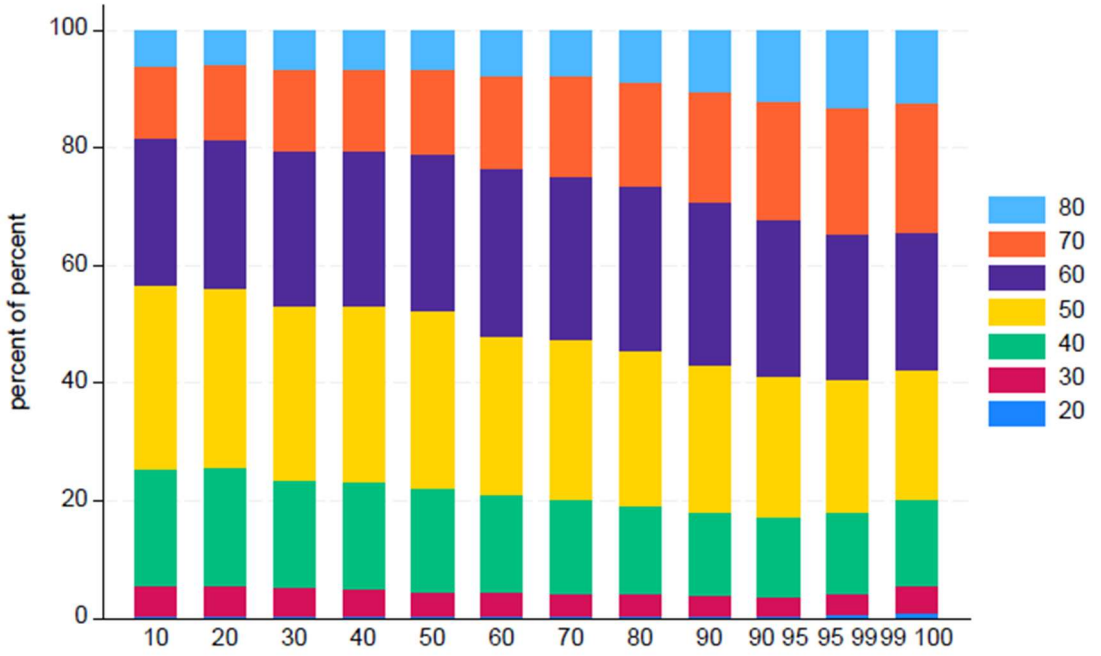
4.2. Age Structure and Regional Distribution

Figure 2 shows the age distribution of high-income earners in 2020. On the horizontal axis, the numbers 10, 20… 90 correspond to deciles of high-income earners with incomes over 20

million JPY (e.g., 0-10%, 10-20%,….80-90%). Note that this refers to a percentage of high-income earners, not the entire adult population. The numbers 90-95, 95-99, and 99-100 represent the top 90-95%, 95-99%, and 99-100%, respectively. The colors in the bars indicate the age distribution, with "30" representing those in their 30s, "20" representing those younger than 30, and "80" representing those older than 79.

The main age groups among high-income earners are individuals in their 50s and 60s, who are typically high-ranking employees and executives in Japanese companies. However, in the top income classes (90-100%), those in their 70s and 80s also play a significant role. This reflects the importance of capital income from assets for Japan's superrich.

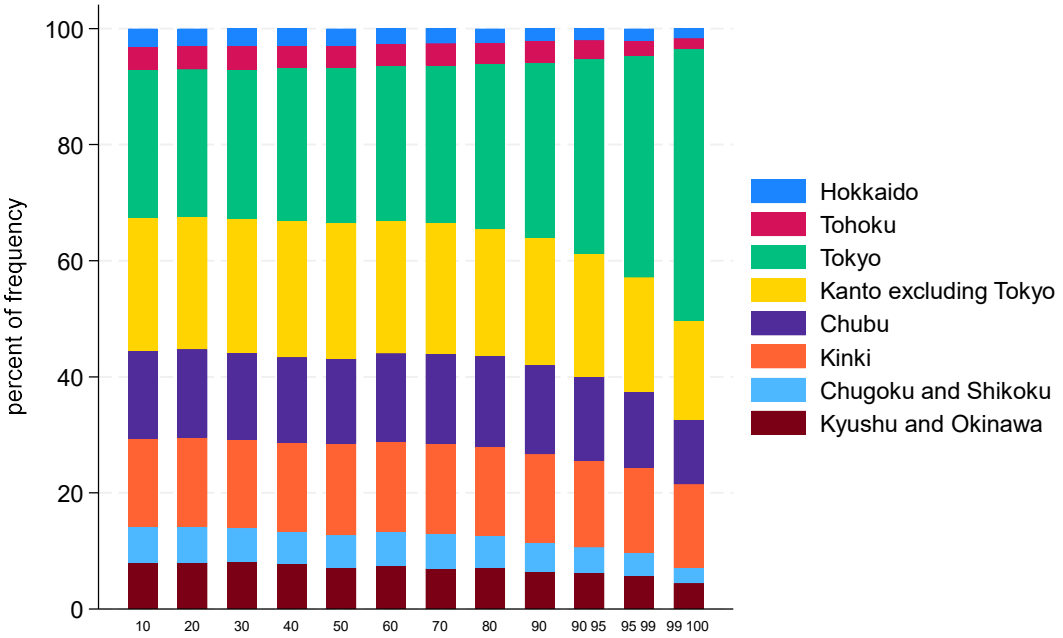
Figure 2. Age Structure of Japanese High-Income Earners



(Source: author)

We also analyze the regional distribution of high-income earners in Japan and find that they are predominantly concentrated in Tokyo and other urban areas. Notably, nearly half of the top 1% of high-income earners reside in the Tokyo metropolitan area.

Figure 3. Regional Distribution of High-Income Earners



(Source: author)

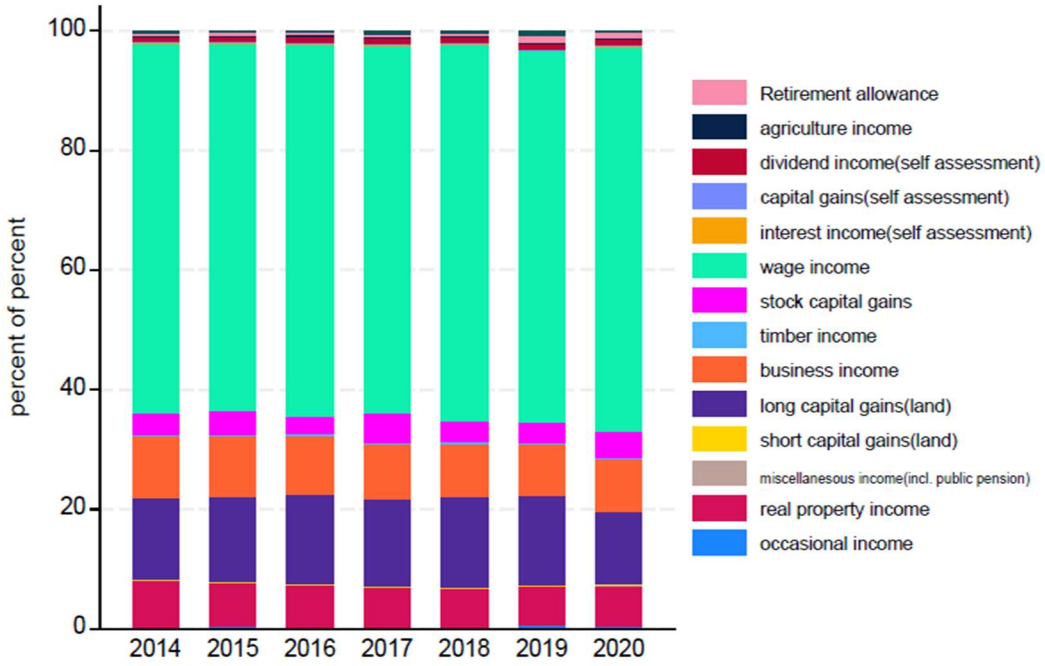
In 2019, males dominated the taxpayer population, if we exclude those who did not answer the gender question.[12] However, in 2020, the question regarding the sex of taxpayers was removed from the tax return form.

4.3. Main Income Type

We now examine the main types of income for high-income earners in Japan. We define the main income for each taxpayer as the largest source of income within their total income. Figure 4 shows the percentage of high-income earners with different main income types from 2014 to 2020.

[12] Until 2019, income tax returns included a question about the sex of taxpayers, but many taxpayers chose not to answer. This data was required to determine eligibility for deductions related to widows, which may explain why many taxpayers ignored this question. In 2019, among Japanese high-income earners, 58.8 % identified as male, while 11.8% as female, and the remaining 29.4% did not provide an answer.

Figure 4. Main Income Types of High-Income Earners

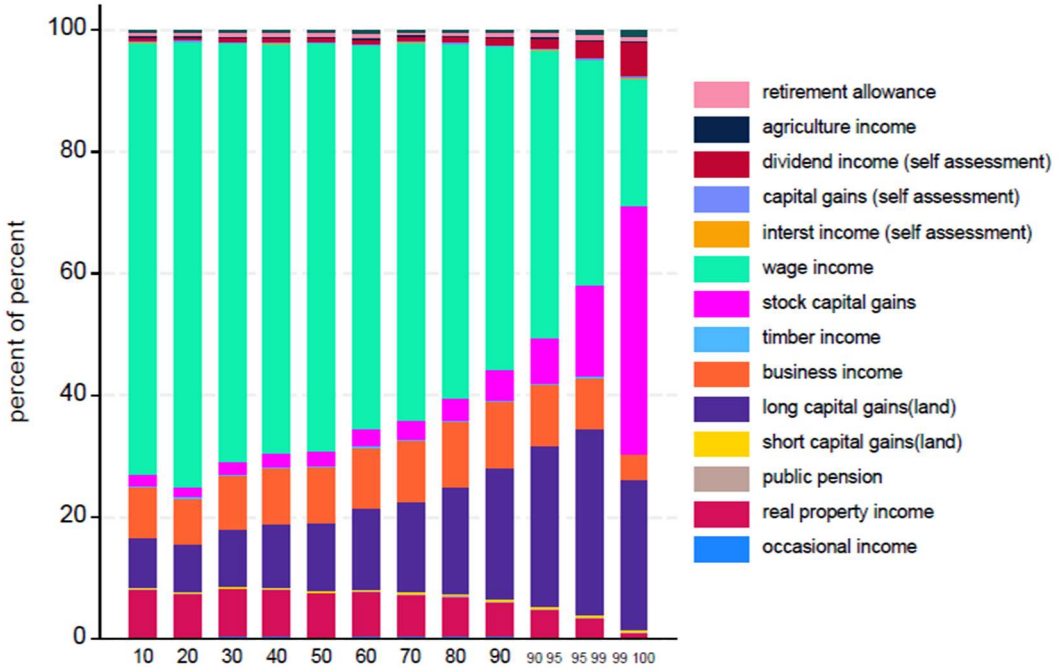


(Source: author)

More than half of high-income earners are wage income earners. The percentage of wage earners gradually increased from 2014 to 2020. The second most important income type is long-term capital gains of land. The third important portion is business income. The proportions of the taxpayers with stock capital gains as main income are limited among all high-income earners.

However, the main income type can be different in the different income classes of high-income earners. Figure 5 shows the proportion of different income type earners in the different income classes of high-income earners in 2020. The horizontal axis shows the same income classes as in Figure 2.

Figure 5 Main income type in the different income class of high-income earners in 2020.



(Source: author)

Figure 4 illustrates that wage income is the primary source of income for the bottom 90% of high-income earners. However, for the top 10%, the share of wage income decreases, while the proportion of long-term capital gains from real estate increases. Notably, for the top 1% of high-income earners—comprising just 0.004% of the Japanese adult population—stock capital gains become the dominant income source. More than half of the income for this group comes from stock capital gains and dividend income. As noted, previous analyses of Japanese top-income earners have excluded stock capital gains, overlooking nearly half of the income for this group.

4.4. Mobility of Top Income Earners in Japan

While income inequality may appear high in a given year, high mobility between income classes could suggest that economic inequality is less severe. Estimating income mobility is challenging with cross-sectional data, but our panel data enables the analysis of transitions between income classes. In the U.S., Auten and Gee (2009) and Auten, Gee, and Turner (2013) used micro tax data to study mobility at the top income level. They found that the persistence rate (the probability that a taxpayer in one income class one year will remain in the same income class the following year) for the top 1% ranged from 68 to 70% during the

1992-1999 economic expansion and about 66% from 2002 to 2006. In Japan, Moriguchi (2017) suggested that income mobility is high, based on tabulated tax statistics.

Using Japanese micro tax data, we can estimate transition probabilities between income classes. To examine mobility, we focus on three income classes: the top 0.1%, top 0.1-0.2%, and top 0.2-0.3% of the adult population, compared to other income groups. The transition probability matrix for 2014-2015 is shown in Table 2, estimated using STATA's "xttrans" command.

Table 2. Transition Probability Matrix among the Top 0.1%, 0.1-0.2%, 0.2-0.3% and Others

	Top 0.1%	Top 0.1-0.2%	Top 0.2-0.3%	Others	Threshold (2014)
Top 0.1%	81.19%	13.47%	3.32%	2.02%	39 million JPY
Top 0.1-0.2%	4.39%	65.86%	16.12%	4.39%	27 million JPY
Top 0.2-0.3%	3.79%	18.42%	58.98%	18.81%	22 million JPY
others	2.56%	6.00%	23.74%	67.71%	20 million JPY

(Source: author)

Table 2 presents the probabilities that a taxpayer in a given income class (listed in the left column) will move to a different income class the following year (shown in the top row). For example, the probability that a taxpayer in the 0.1-0.2% income class will transition to the top 0.1% income class is only 4.39%. The "Threshold" column on the far right of the table shows the minimum income required to be in each income class in 2014.

A key finding is that the persistence rate for the top 0.1% income class is high, with over 80% of taxpayers in this class remaining in the same class. This persistence rate exceeds the estimated rate for the U.S. top 1% found by Auten, Gee, and Turner (2013). For other income classes, the persistence rates are slightly lower, but still more than 50%.

To account for potential variations in transition probabilities across different years, Table 3 presents the persistence rates for the top 0.1% income class over multiple years.

Table 3 Persistence Rates for the Top 0.1% across Various Years

Period	2014 →2015	2015 →2016	2016 →2017	2017 →2018	2018 →2019	2019 →2020	2014 →2020
Persistence Rates	81.19%	82.21%	79.23%	82.14%	79.51%	82.72%	65.82%

(Source: author)

Table 3 shows that the persistence rates for the top 0.1% income class remained relatively stable at around 80% from 2014 to 2020. The far-right column displays the 7-year persistence rates (65.82%) from 2014 to 2020. Although this is lower than the annual transition probabilities, nearly two-thirds of the top 0.1% in 2014 remained in the top 0.1% by 2020.

To further explore mobility within the superrich income class, we examine three top income classes: the top 0.01%, top 0.01-0.02%, and top 0.02-0.03%. The transition probability matrix for these classes from 2014 to 2015 is presented in Table 4.

Table 4. Transition Probability Matrix among the Top 0.01%, 0.01-0.02%, 0.02-0.03% and Others

	Top 0.01%	Top 0.01-0.02%	Top 0.02-0.03%	others	Threshold (2014)
Top 0.01%	57.70%	12.92%	4.22%	25.16%	131 million JPY
Top 0.01-0.02%	12.06%	49.07%	15.61%	23.25%	91 million JPY
Top 0.02-0.03%	4.39%	14.07%	41.82%	39.72%	74 million JPY
others	0.77%	0.66%	1.06%	97.51%	20 million JPY

(Source: author)

Even within these narrower income classes, each consisting of about one thousand taxpayers, the probability of remaining in the top 0.01% is high. A taxpayer in the top 0.01% in a given year has a 57.70% chance of staying in the same class the following year. In contrast, a high income taxpayer outside the top 0.03% has almost no chance of moving into the top 0.03% income class, with a probability of only 2.49%.

As with Table 3, we present the persistence rates for the top 0.01% across different years in Table 5.

Table 5. Persistence Rates for the Top 0.01% across Various Years

Period	2014 →2015	2015 →2016	2016 →2017	2017 →2018	2018 →2019	2019 →2020	2014 →2020
Persistence Rates	61.19%	57.63%	54.26%	56.37%	57.63%	58.87%	42.83%

(Source: author)

Table 5 shows that while the persistence rates are lower than those for the top 0.1% income class, they remain relatively stable, ranging from 54.26% to 61.19%. These high probabilities of remaining in the top income classes suggest that the income concentration among Japan's superrich is more persistent in the short term than previously thought.

However, evaluating the long-term persistence of top income earners is more complex. Auten, Gee, and Turner (2013) noted that a 60-70% probability of remaining in the top 1% for one more year does not indicate true persistence, as the probability of staying in the top 1% for five consecutive years averages only 30% in the U.S. In our study, the 7-year persistence rate for Japan is 42.83%, higher than the U.S. figure. To assess long-run mobility, factors like life cycle events (e.g., marriage, death), intergenerational transfers, and other variables must be considered, in addition to simple transition probabilities. Unfortunately, our tax data is limited in duration and lacks key information, such as family structure, needed for a comprehensive long-term analysis. Future research with more detailed data is essential to explore the long-run mobility of high-income earners in Japan.

5. Pareto Coefficients of Income Distribution of High-Income Earners in Japan

Next, we examine the Pareto coefficients for the income distribution of high-income earners in Japan. To compare our Japanese findings with those of Saez and Stantcheva (2018) in the U.S., we calculate the Pareto coefficients for not only the distribution of "total income" (as discussed in Section 3) but also for "capital income" and "labor income." We define capital and labor income according to Saez and Stantcheva (2018).[13] Labor income includes wage

[13] This definition of capital income also includes (personal) business income. Saez and Stantcheva (2018)

income (employment income), retirement income, and miscellaneous income (such as public pension benefits). All other income types are classified as “capital income.”

Rank-size regression is a typical method for estimating the Pareto coefficient, but Clauset et al. (2009) noted that this approach can be biased. They recommended using the Hill estimator (a maximum likelihood estimator based on Hill, 1975) when all samples above a given threshold are available. We apply the Hill estimator to estimate the Pareto coefficient. In the Appendix, we also present Pareto coefficients using the rank-size regression method and find similar results when appropriate thresholds are assumed. However, we demonstrate that with improper thresholds, rank-size regression can yield biased results, as Clauset et al. (2009) emphasized.

Assuming the higher income distribution follows a Pareto function (1) below, we proceed with the estimation:

$$f(x) = \frac{a{x_{min}}^a}{x^{a+1}} \quad (1)$$

where α is the Pareto coefficient and x_{min} is the threshold. The maximum likelihood estimator (Hill estimator) is:

$$\hat{a} = n\left[\sum_{i=1}^{n} ln\frac{X_i}{X_{min}}\right]^{-1} \quad (2)$$

Using all samples above the thresholds, we estimate the Pareto coefficients for the income distribution of high-income earners in Japan.

By varying the assumptions about the thresholds, we can generate Pareto coefficient estimates at different thresholds, which is known as a Hill plot. The Hill plot allows researchers to identify the appropriate threshold by locating the point where the curves stabilize. Figure 6 presents the Hill plot using all available samples from 2020.

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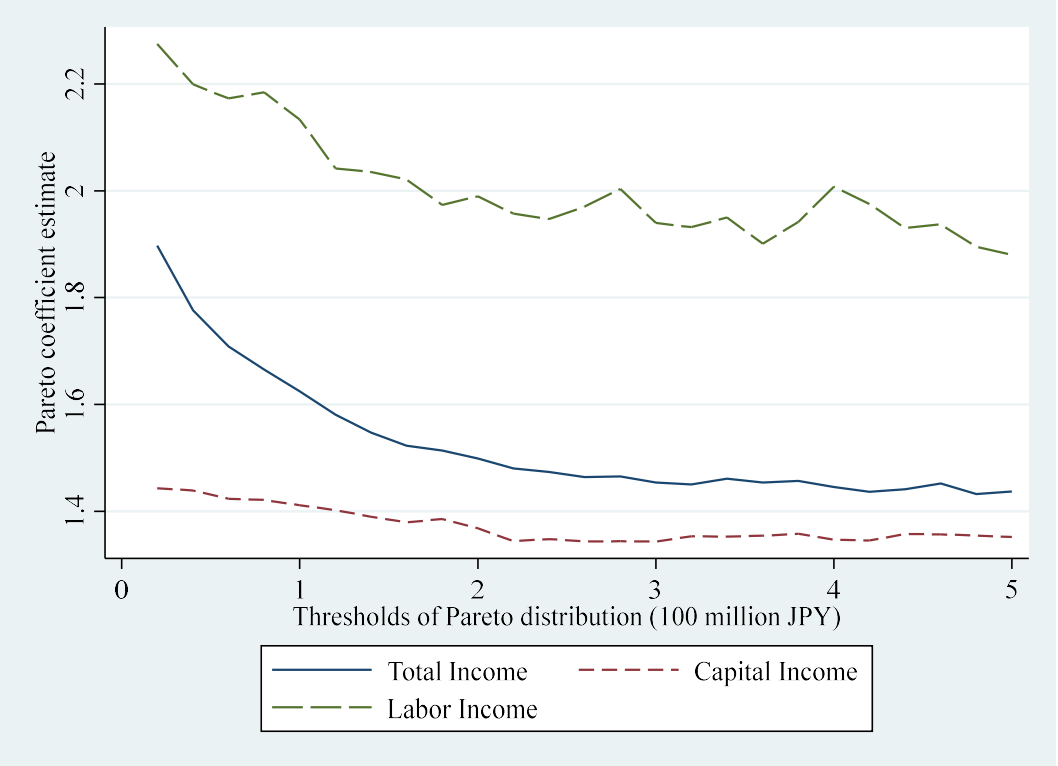
acknowledge that business income is a mix of capital and labor income, but separating the two proves exceedingly difficult. For the sake of comparability, we adopt the same definition as Saez and Stantcheva (2018) in this study.

Figure 6. Hill Plot of the Income Distribution of High-Income Earners in 2020



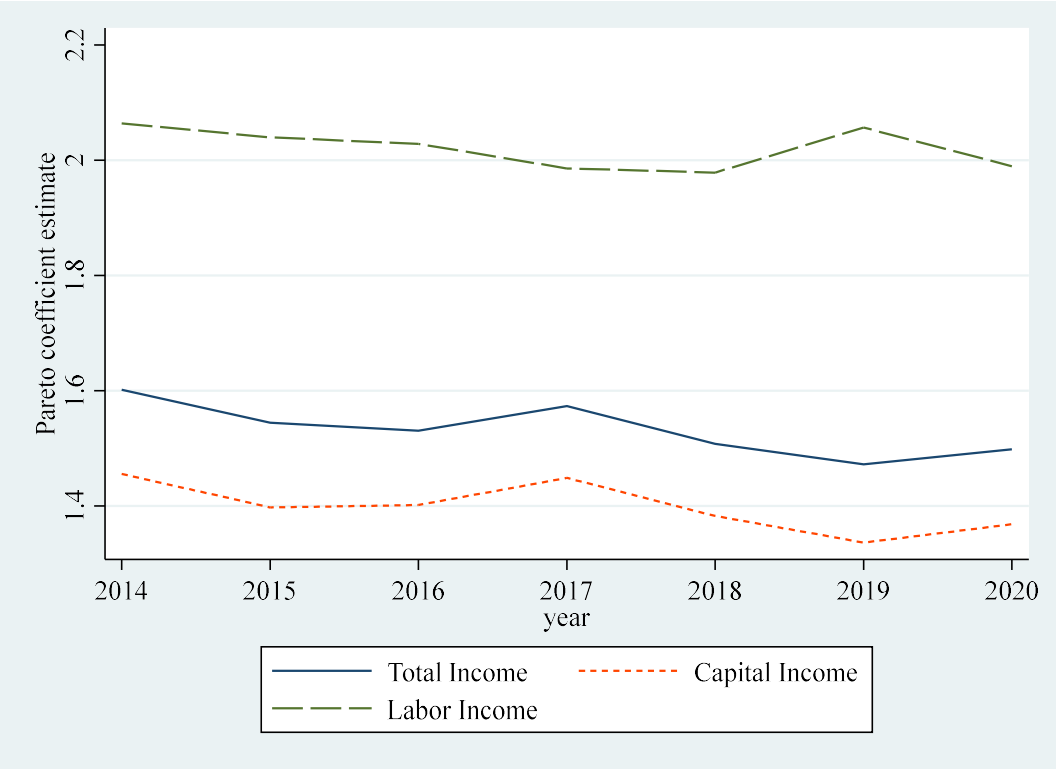
(Source: author)

The Pareto coefficient estimates for total income stabilize at around 1.45 for incomes exceeding 200 million JPY. In contrast, the Pareto coefficient estimates for capital income stabilize at about 1.35 beyond 200 million JPY, while those for labor income fluctuate around 1.95 for the same threshold.[14] The Pareto coefficient for total income is much closer to that of capital income, reflecting the fact that capital income is the primary source of income for Japan's highest earners.

Alternatively, we can examine the change in Pareto coefficients over time, with fixed threshold assumptions. Figure 6 shows the Pareto coefficient estimates for total income, capital income, and labor income, using a 200 million JPY threshold, from 2014 to 2020.

[14] In 2022, the Ministry of Finance of Japan provided a Pareto coefficient estimate of 1.1 for capital income to the Tax Research Commission of the Japanese government. Their estimation covers all samples ranging from less than 1 million JPY to around 10 billion JPY. However, their definition of "capital income" refers specifically to financial income, such as interest, dividends, and capital gains. Therefore, it is more accurately described as "financial income" rather than "capital income" as defined in this study.

Figure 7. Pareto Coefficient Estimates with Thresholds of 200 million JPY from 2014 to 2020



(Source author)

The Pareto coefficients for total income and capital income in Japan appear to gradually decrease from 2014 to 2020. This suggests that income and capital income have increasingly concentrated among the superrich during this period. In contrast, the Pareto coefficient for labor income does not show a clear trend.

When comparing our findings with previous estimates of Pareto coefficients in Japan, we observe a significant difference. Our estimate of 1.45 for total income is notably lower than the 2.1 estimated for 2003 (Kunieda, 2012). It is even closer to the estimates from the asset bubble period (Fujiwara et al., 2003; Nirei and Souma,2007). Although differences in data sources between past and current estimates should be considered, the sharp drop in the Pareto coefficient since the early 2000s suggests a substantial concentration of income among the superrich, primarily driven by capital income. This indicates that the current level of income concentration in Japan is comparable to the asset bubble period.

The Pareto coefficient for labor income (1.95) is closer to Kunieda's (2012) estimate of 2.1. This suggests that if researchers focus mainly on wage income distribution, they might wrongly conclude that income concentration among the superrich has not occurred in Japan.

Studies like Kitao, Suzuki, and Yamada (2023), which rely on wage data, naturally fail to capture the growing income inequality driven by capital income concentration.

Comparing our results with those from other countries, we find that Japan's total and capital income Pareto coefficients are similar to those of Saez and Stantcheva (2018) (1.4 for total income, 1.38 for capital income). However, Japan's Pareto coefficient for labor income (2.0) is significantly higher than that of the U.S. (1.4). This suggests that wage inequality is less pronounced in Japan than in the U.S. Since capital gains from stock investments are the primary income source for the superrich, both wage and capital income inequality must be considered when assessing overall income inequality in Japan.

6. Discussion: Importance of Capital Gains Income in Japanese Income Inequality Analyses

6.1. Importance of Capital Gains in Income Inequality Analyses

An important conclusion of our analysis is that stock capital gains are the primary source of income for Japan's superrich, and that income inequality in Japan is driven by capital income, particularly stock capital gains.

However, the treatment of capital gains in income inequality research has been a long-standing issue. Piketty and Saez (2003), in their pioneering work on income inequality based on tax-data, excluded capital gains from their analysis owing to its volatility.[15] Many studies on Japanese income inequality, including Moriguchi and Saez (2008), follow this approach. Yet, ignoring capital gains presents significant issues.

First, a growing portion of executive compensation is paid in stock options and other stock-related forms. When stock obtained through stock options is sold, it is classified as capital gains under many countries' income tax systems, meaning executive compensation that was once categorized as wage income is now considered capital gains income.

In Japan, stock-based compensation is rapidly increasing. According to the "White Paper on Corporate Governance 2023" published by the Japan Stock Exchange, around 30% of listed companies offer stock options. In the Tokyo Exchange's "Growth Market" for venture companies, nearly 80% of listed firms offer stock options, which are extended not only to executives but also to key employees. For Japan's largest companies, those with more than 3 trillion JPY in sales, stock-related compensation accounts for 25.3% of total executive

[15] Piketty and Saez (2003) also argued that including or excluding capital gains does not yield significantly different results, as noted in Footnote 7 of their paper.

compensation (Japan Research Institute, 2024). The tax treatment of income from stock options in Japan is complex. Generally, income from stock options is considered wage income until the options are exercised, and any capital gains realized upon the sale of stocks are taxed as capital gains.[16] However, in the case of "tax-preferred" stock options, all capital gains between the offer and the sale are taxed as capital gains. Capital gains are taxed at a flat rate of 20.315% (including income tax, local tax, and special income tax for reconstruction), while wage income is taxed progressively, with a top tax rate of 45% (income tax), 10% (local resident tax), and 2.1% (special income tax for reconstruction). For many Japanese executives, shifting from cash compensation to stock options reduces their tax burden. This means that analyses of income inequality that exclude capital gains from stock options significantly underestimate the extent of income concentration among the superrich in Japan.

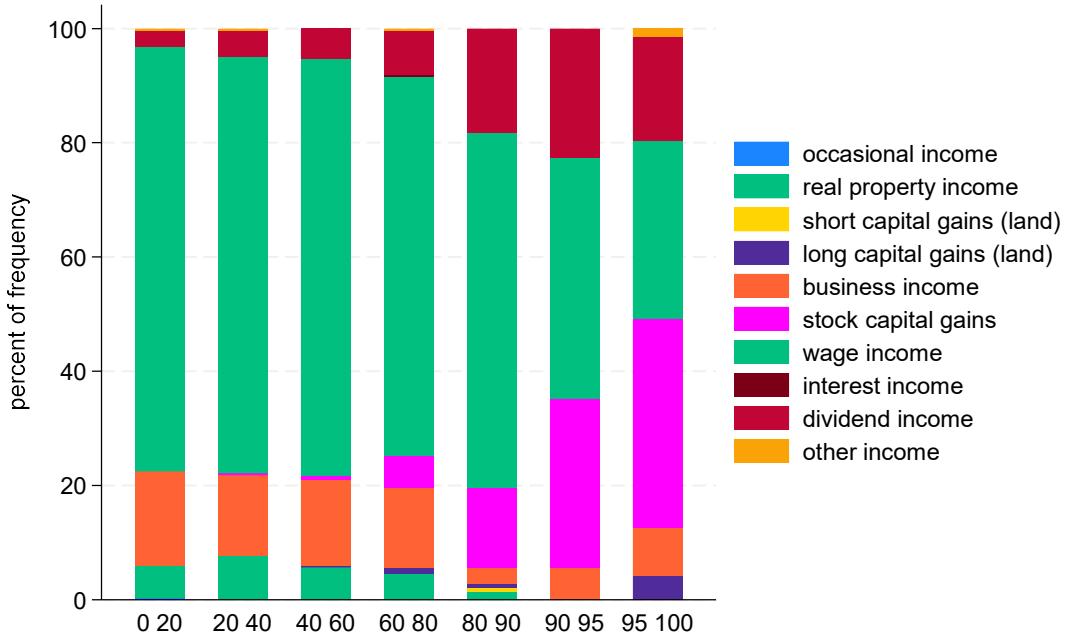
Second, many companies are increasingly returning profits to shareholders through share repurchases rather than dividends. Shareholders sell their stocks at higher prices owing to the repurchase, earning capital gains. Larrimore et al. (2021) highlighted that S&P 500 companies in the U.S. spend more on share repurchases than on dividend payments. In Japan, share repurchases surged after their effective introduction in 2001. By 2022, one in four listed companies engaged in share repurchase, totaling over 9 trillion JPY (Daiwa Securities, 2023). While dividend payments still exceed share repurchases in Japan, capital gains from repurchases must be considered in income inequality analysis.

Third, capital gains are a significant income source for the superrich in most advanced countries. Black et al. (2023) argued that capital gains from risky financial assets account for a major portion of lifetime income for the top 1% (26%) and top 0.1% (52%) in Norway. Advani and Summers (2020) observed that the composition of the top 1% differs when capital gains are included in the U.K. In Japan, as shown in Figure 5, wage income dominates for most high-income earners, but capital gains are the primary income source for the very top income class. Moreover, capital gains are important not only for taxpayers who temporarily enter the top income class but also for those who remain in the top class over time. Figure 8 illustrates the main income types of taxpayers consistently in the top 0.01% income bracket from 2014 to 2020. In Figure 8, the numbers on the horizontal axis 0 10, 10 20,…and 95 100 represent 0-10%, 10-20%, …..and 95-100%. As discussed in Section 4, the main income type is the largest income type of taxpayers' total income over the seven-year period (2014–2020). While wage income remains dominant for the bottom 90% of this group, it plays a smaller role for the top 10%. For the top 5%, stock capital gains represent the largest income

[16] Unlike this principle, in certain cases, income from stock options can be taxed as either retirement allowance, business income, miscellaneous income, or occasional income.

type, with stock-related income (capital gains and dividends) being the most significant.

Figure 8. Main Income Types of Taxpayers who Remained in the Top 0.01% Every Year



(Source: author)

As in Norway and the U.K., ignoring capital gains leads to a misunderstanding of income concentration among Japan's superrich. However, we must also consider the challenges of using realized capital gains, as discussed next.

6.2. Problems with Using Realized Capital Gains

Based on the discussion above, including capital gains in the analysis of Japanese income inequality is essential. However, using realized capital gains on reported income returns introduces significant issues. We examine five problems highlighted by Larrimore et al. (2021) in the U.S. context and consider their implications for Japan.

First, the timing of the accrual and realization of capital gains can differ. Larrimore et al. (2021) noted that more than 40% of assets in the U.S. are held for over a decade. As a result, realized capital gains often reflect long-term accumulation of annual accruals, which can lead to an overestimation of income inequality based on realized capital gains. Our tax data, provided by the NTA, do not include the holding periods of sold assets, meaning we face the

same issue with realized capital gains in Japan.

To explore this further, we conduct a simple AR(1) model for capital income and labor income, as defined in Section 5, using the Arellano and Bond estimation method. The results are presented in Table 6.

Table 6. AR(1) Models of Capital Income and Labor Income in Japan

Dependent Variables	Capital Income	Labor Income
Independent Variables	Estimated Coefficients	
1 period lag	0.006986 (0.0140231)	0.5945784*** (0.0054023)
Constant	17.4903*** (0.247032)	7.081049*** (0.0940984)
Samples	22,161	101,358
Autocorrelation	1 period lag Not Rejected 2 period lag Rejected	1 period lag Not Rejected 2 period lag Rejected

(Source: author)

Table 6 shows that the first period lag is statistically significant for labor income but not for capital income. Capital income is more volatile than labor income, and this volatility presents a challenge in moderating the effects of capital gains in Japan.

Second, some types of capital gains are not taxed under the income tax laws of certain countries. For example, in the U.S., capital gains accrued from assets received as part of an inheritance are taxed only after the assets are transferred to the heirs, owing to the step-up provision. This means no tax is imposed on capital gains between the time the parent purchases the stock and the time of their death.

This is not an issue in Japan, as the country does not have a step-up provision. All capital gains between the purchase of assets by parents and the sale of those assets by their children are taxed in Japan. On the other hand, certain types of untaxed capital gains exist because of the tax-preferred treatment of certain capital income for policy reasons. As mentioned in Section 3, financial income from “tokutei koza” (when taxpayers choose the no-declaration requirement method) and NISA are not taxed. Since we lack data on the relationship between “tokutei koza” users and the superrich in Japan, we cannot determine the direction of bias on the Pareto coefficient estimates caused by “tokutei koza.” However, NISA has limits, so we

believe its existence does not pose a significant issue for analyzing the very top income class.

Third, capital gains and losses are treated asymmetrically. In the U.S., all realized capital gains are taxed, while realized capital losses can only be deducted up to 3,000 USD. In Japan, while realized capital gains are taxed, realized capital losses can only be deducted against stock-related income.

Fourth, capital gains are evaluated at nominal value. Nominal capital gains are taxed even when the real value of assets decreases due to inflation. However, between 2014 and 2020, inflation in Japan was near zero (ranging from -0.1% to 1.0%), so we do not expect this to introduce significant bias in our study.

Fifth, the timing of realization can drastically change before and after tax rate adjustments. A surge in realizations before a tax increase and a drop afterward is commonly observed. If researchers do not account for this shift in timing, they may draw incorrect conclusions about income inequality. In our study, no significant tax rate changes on capital gains occurred between 2014 and 2020 in Japan, so this issue is not a concern.

In conclusion, among the five problems with realized capital gains highlighted by Larrimore et al. (2021) in the U.S. case, we do not find clear evidence of bias in the Pareto coefficient estimates, except for the volatility of realized capital gains in Japan. Our simple AR(1) models confirm that realized capital gains are more volatile in Japan, which may cause the underestimation of the Pareto coefficient and the overestimation of income concentration among the superrich. We discuss potential remedies for this issue next.

6.3. Possible Approaches to Fix the Problems of Realized Capital Gains

One approach is the method developed by Piketty, Saez, and Zucman (2018). They aimed to construct distributional accounts consistent with the System of National Accounts (SNA) and exclude realized capital gains that are not recognized as income in SNA accounting. They distribute firms' reserved profits to individuals in the following manner: by capitalizing financial income, including realized capital gains reported on income tax forms (using the method outlined by Saez and Zucman, 2016), they estimate the distribution of various types of assets held by individuals. They also estimate return rates for these assets based on macro data. Consequently, the capital income of individuals are estimated as the product of "the assets individuals hold" and "the estimated return rates" (for details, see Piketty, Saez, and Zucman, 2018).

However, this method has some issues. First, asset prices reflect not only current profits but also future profits, which means that the prices of start-up companies can rise even when they are not yet profitable. This suggests that Piketty, Saez, and Zucman's method may

underestimate the income of superrich venture entrepreneurs. Second, if larger asset holders receive higher return rates, this method may understate income concentration among the superrich.[17]

Auten and Splinter (2019) criticized Piketty, Saez, and Zucman's method and proposed more comprehensive estimation techniques that align with Haig-Simons' definition of "comprehensive income."

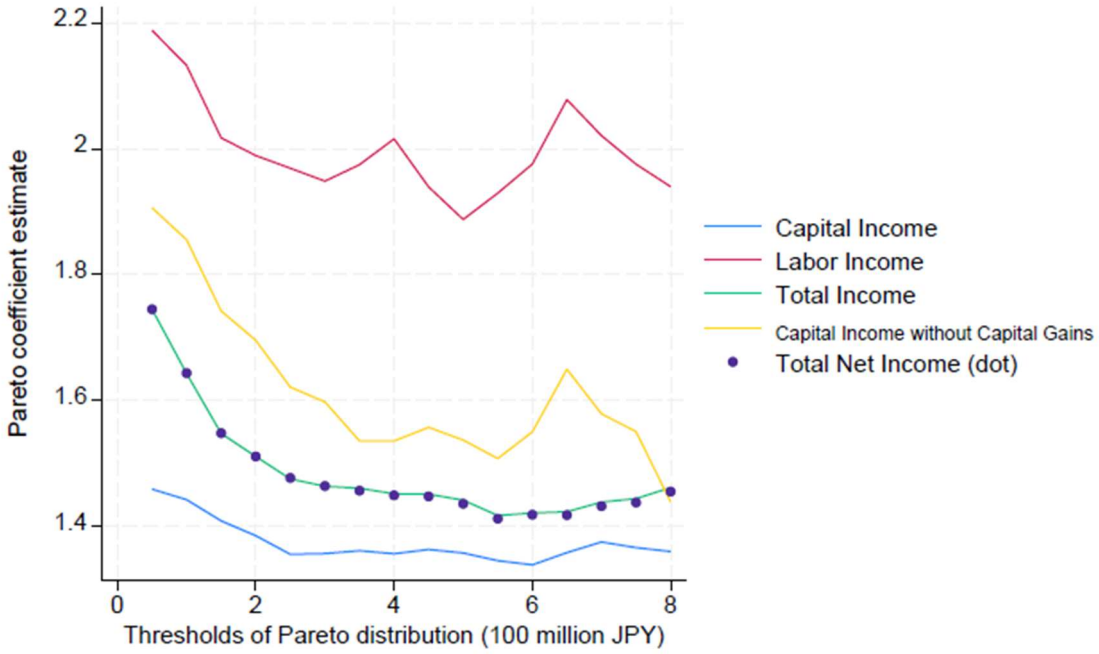
A more direct approach is the estimation method used by Advani and Summers (2020). If data on purchase prices, sale prices, and holding periods of assets are available, annually accrued capital gains can be calculated by assuming smooth asset price increases. According to Advani and Summers (2020), the U.K. income tax records contain purchase prices and holding periods, though this data is not electronically recorded. Instead, they relied on a sample study from HMRC to determine the typical holding periods for various financial assets and estimate the annual capital gains for these assets. They concluded that, in the U.K., the income share of the top 1% is 3 percentage points higher when capital gains are included, highlighting that income concentration among the superrich is underestimated without accounting for capital gains.

6.4. Pareto Coefficient Estimation in Japan with consideration to the Problems of Realized Capital Gains

Volatile realized capital gains may overestimate income concentration among the superrich and underestimate the Pareto coefficient in our previous estimation. To assess the impact of volatile capital gains on Pareto coefficient estimates in Japan, we calculate the Pareto coefficient for capital income (as defined earlier), excluding capital gains from stocks and real estate. Additionally, we estimate the Pareto coefficient for "total net income" (soshotoku kingaku to) using Japanese income tax return data. Total net income is defined as "total income minus loss carryover from previous years," which is expected to smooth out the effects of volatile capital gains and losses. Figure 9 presents these estimates using 2020 tax data.

[17] Piketty, Saez, and Zucman (2018) argued that no clear relationship exists between return rates and asset size, based on their observations of foundations and estates. However, Fagereng et al. (2020), using Norwegian income tax and wealth tax data, found that larger asset holders tend to experience higher return rates, even when risk is adjusted.

Figure 9. Pareto Coefficient Estimates of Capital Income without Capital Gains and Total Net Income in 2020



(Source: author)

In Figure 9, the estimates for total income, capital income, and labor income are identical to those in Figure 7. A new estimate is the Pareto coefficient of capital income excluding capital gains, which is significantly larger than the Pareto coefficient of capital income that includes capital gains. This clearly indicates that the volatility of capital gains reduces the Pareto coefficient estimate and may lead to an overestimation of income concentration among the superrich. However, the Pareto coefficient without capital gains is notably much smaller than previous estimates, such as those by Kunieda (2012).

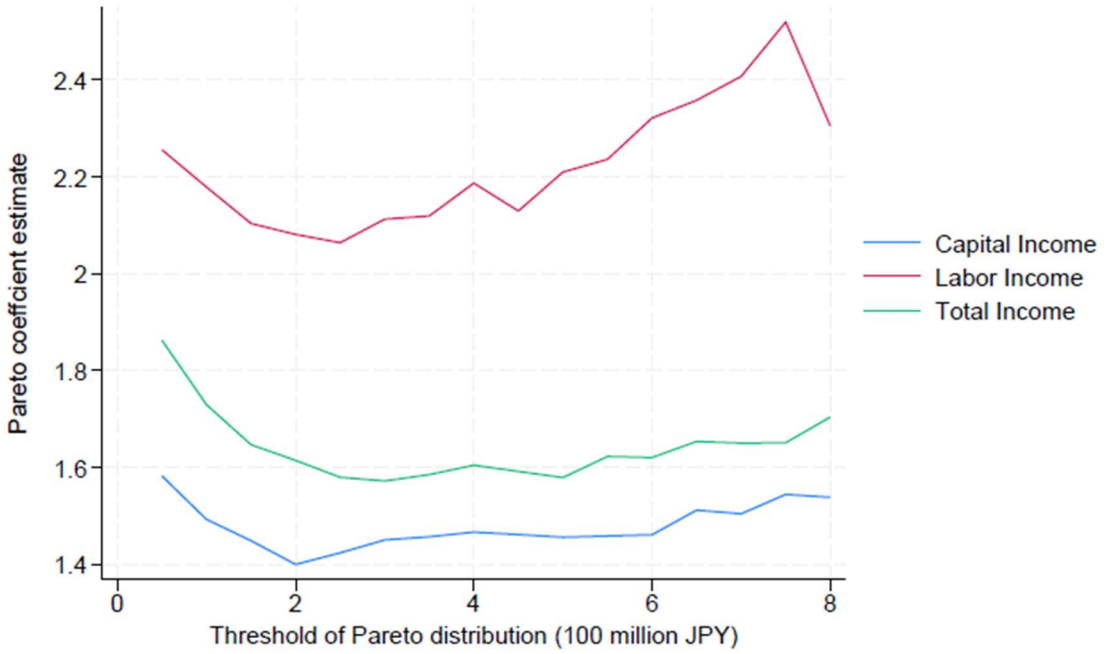
Another new estimate is the Pareto coefficient for "total net income," as defined earlier. Since this is nearly identical to the Pareto coefficient of total income, we represent the total net income estimates with dots rather than a new line in the figure. As shown in Figure 9, the Pareto coefficient for total net income closely matches that of total income, suggesting that the impact of loss carryovers on income distribution is limited.

If we had data on not only capital gains but also purchase prices and holding periods, we could estimate annually accrued capital gains, as done by Advani and Summers (2020). In Japan, taxpayers must report sales data, including sales price, purchase date, and purchase price, in an attached file to their main income tax return. However, since the NTA only

provides the main income return pages and not the attached files, we cannot use this data to estimate annually accrued capital gains.

As an alternative to smoothing volatile capital gains, we examine the Pareto coefficients of the 7-year average of total income, capital income, and labor income. This simple procedure partially smooths the capital gains stream between 2014 and 2020. Thompson, Parisi and Bricker (2018) also consider the 3-year average of IRS tax records in order to consider the effects of volatility on top income concentration in the U.S. Figure 10 shows the Hill plot.[18]

Figure 10. Pareto Coefficients of 7-Year Averages of Various Types of Income



(Source: author)

The estimates stabilize beyond 200 million JPY, as shown in Figure 10. The Pareto coefficient estimates are approximately 1.65 for total income, 1.45 for capital income, and 2.15 for labor income. Compared to the estimates for 2020 in Figure 6, the 7-year average estimates are higher by 0.1 to 0.2. This suggests that single-year estimates may underestimate the Pareto coefficient and overstate income concentration among the superrich in Japan. By averaging realized capital gains, this simple method helps reduce some of the bias associated with using volatile capital gains. However,, the 7-year average estimates for total income and

[18] Since the number of wage earners who remained in the highest income class every year is limited, the estimated Pareto coefficients of labor income are unstable beyond 400 million JPY in Figure 10.

capital income are still much lower than the previous estimate of 2.1 for 2003, though the 7-year average for labor income does not differ significantly from that earlier estimate.

In conclusion, while the 7-year average helps confirm some bias from using realized capital gains, it also supports our main finding: income concentration among the superrich in Japan is much more severe today than in the past. The primary driver of this increased concentration is capital income, such as stock capital gains. Ignoring capital gains in income inequality analysis can lead to misleading conclusions.

7. Effective Average Tax Rates on Japanese Superrich

7.1. Effective Average Income Tax Rates on Japanese Superrich

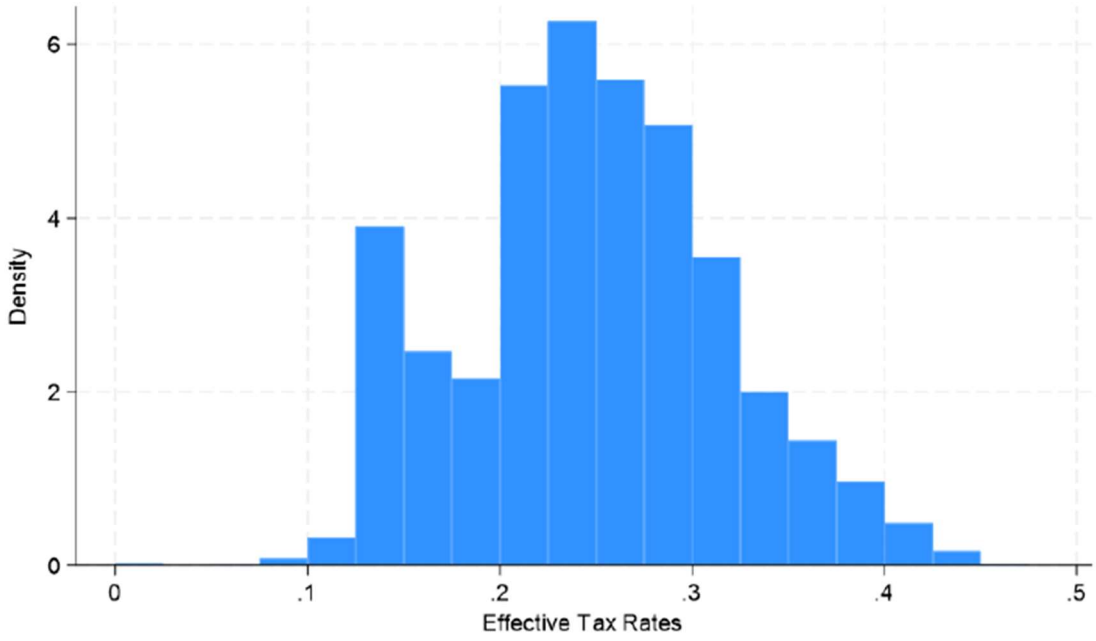
Using Japanese tax administrative data for the first time, we estimate the effective tax rates for Japanese income tax based on microdata, including the actual tax payments of individual taxpayers. In this study, the "effective tax rate" for national income tax is defined as the sum of income tax and special income tax for reconstruction, divided by total net income ("soshotoku kingaku to").[19] The income tax payment includes both tax amounts under progressive tax rates and separate self-assessment taxation, which primarily uses separate linear tax rates.[20]

Previous studies in other advanced countries have shown that effective tax rates can vary significantly even within the same income class. In the case of Japanese income tax, the effective tax rate can differ substantially among individuals with the same total net income, depending on the proportion of income subject to progressive tax rates versus separate linear tax rates. To capture the heterogeneity of effective tax rates among high-income earners, we present a histogram of effective tax rates for all individuals with a total net income above 20 million JPY in Figure 11.

[19] Unlike Auten and Splinter (2019) and Bricker et al. (2020), we do not account for the incidence of corporate tax in the numerator or "unrealized" capital gains in the denominator in this study. We plan to address the estimation of EATRs with these considerations in future research.

[20] Income tax on retirement allowances is subject to separate taxation with progressive tax rates.

Figure 11. Distribution of Effective Tax Rates for High-Income Earners

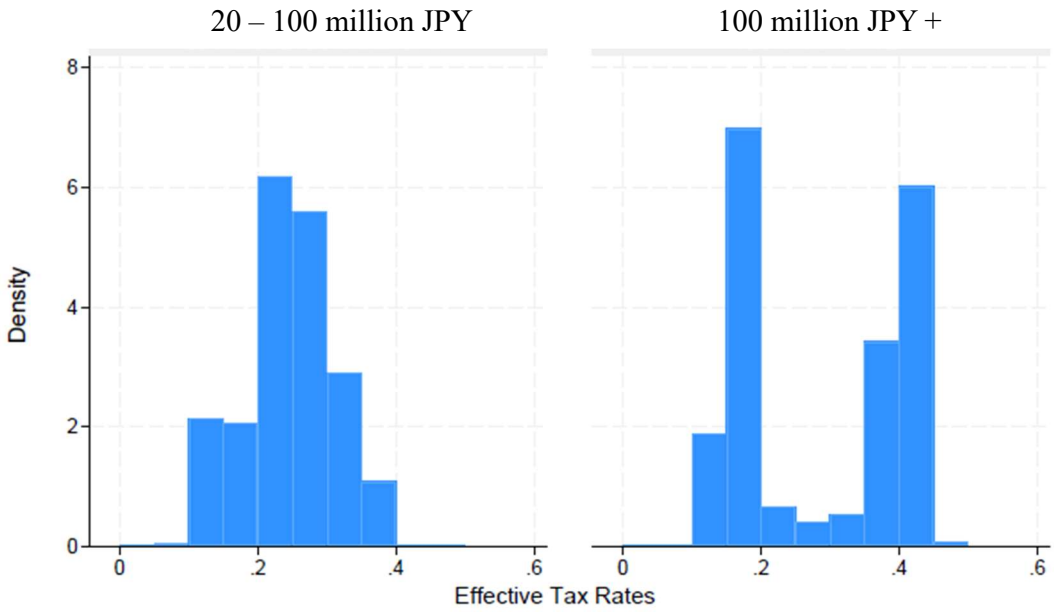


(Source: author)

Figure 11 reveals that effective tax rates among high-income earners are heterogeneous. The distribution resembles a normal distribution, with a peak in the mid-20% range of effective tax rates. In addition, a clear spike occurs in the mid-10% range, reflecting the separate 15% tax rate on financial income.

In the highest income classes, the distribution of effective tax rates changes significantly. Figure 12 presents the distribution of effective tax rates in two income ranges: the lower income range, with total net income between 20 million JPY and 100 million JPY (shown in the left histogram), and the top income range, with total net income above 100 million JPY (shown in the right histogram).

Figure 12. Distribution of Effective Tax Rates of Taxpayers in the Two Different Income Classes



(Source: author)

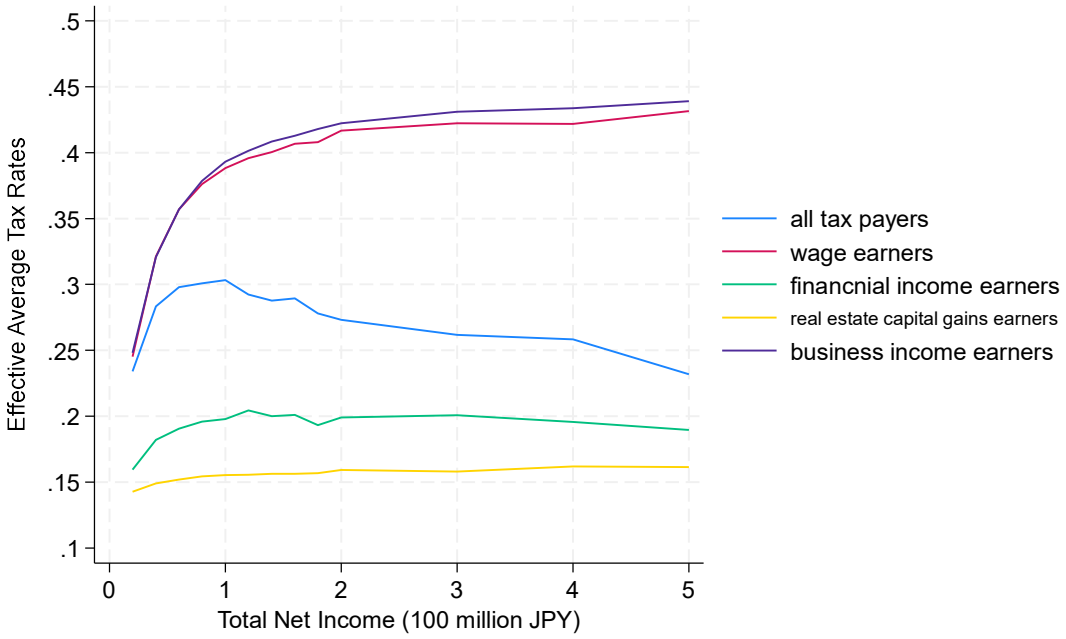
In the top income range (right side of Figure 12), the distribution of effective tax rates shows two distinct spikes: one in the 15-20% range and another in the 40-45% range, with a noticeable gap in between. The higher spike corresponds to high-income earners whose main income sources are wages or business income, who pay the top statutory income tax rate of 45%. The lower spike represents high-income earners whose primary income comes from financial income or real estate capital gains, taxed at the separate 15% or lower rates. Two distinct groups of top income earners pay vastly different tax rates—this contrast is striking.

To examine the progressivity of Japanese income tax, we calculate the EATRs across different income classes. Taxpayers are divided into income classes as follows: for total net income between 20 million JPY and 200 million JPY, income classes are set at intervals of 20 million JPY; for total net income between 200 million JPY and 500 million JPY, classes are set at intervals of 100 million JPY; and for total net income above 500 million JPY, a single top income class is established. We then calculate the EATRs for each income class. Additionally, we consider the EATRs for taxpayers based on their main income sources. The "main income source" refers to the largest income type within a taxpayer's total net income. Figure 13 displays the EATRs for (a) all taxpayers with total net income above 200 million

JPY (“all taxpayers”), (b) taxpayers whose main income source is wage income (“wage earners”), (c) taxpayers whose main income source is financial income (“financial income earners”), (d) taxpayers whose main income source is real estate capital gains (“real estate capital gains earners”), and (e) taxpayers whose main income source is business income (“business income earners”).

On the horizontal axis, the labels correspond to the thresholds of income classes. For instance, “2” represents the total net income class between 200 million JPY and 300 million JPY in Figure 13.

Figure 13. Effective Average Tax Rates of Various Types of Income



(Source: author)

As income increases, EATRs generally rise for all taxpayers, but for those earning over 100 million JPY in net income, EATRs gradually decrease. High-income earners—those with net incomes of 500 million JPY or more—benefit from a lower EATR, around 23%. This pattern is linked to the “Wall of 100 million JPY” argument in Japan.[21]

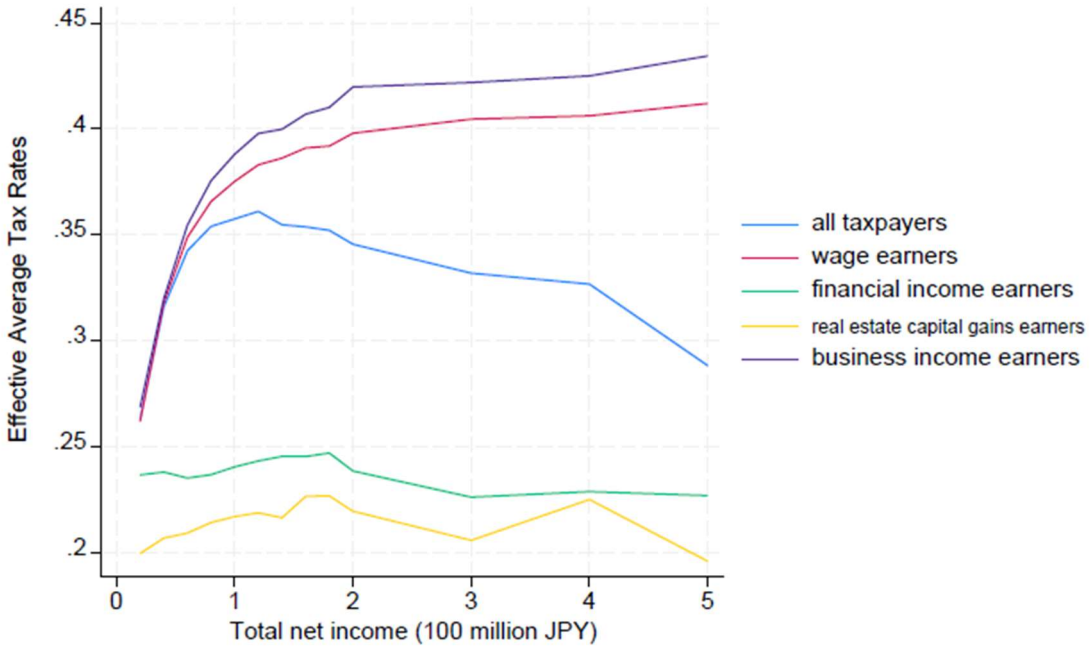
EATRs vary across income types. Wage earners and business income earners face significantly higher EATRs owing to the progressive statutory tax system, with rates reaching

[21] The Japanese government provides data on tax burden rates across different income levels to the Japanese Tax Policy Commission, which shows results like ours. This phenomenon has been referred to as the “Wall of 100 million JPY” by Japanese media.

up to 45%. For these groups, EATRs exceed 40% once net income surpasses 200 million JPY. In contrast, financial income earners experience relatively stable EATRs of around 20% reflecting the separate, linear tax on financial income. The EATRs for capital gains from real estate sales are the lowest, benefiting from various preferential tax treatments. Owing to these variations, the superrich—who derive a larger portion of their income from financial sources—experience lower EATRs when their net income exceeds 100 million JPY.

In the previous section, we discussed potential issues with using realized capital gains in income inequality assessments. Since realized capital gains fluctuate significantly from year to year, they can distort EATR estimates. To address this, we calculate 7-year average EATRs, as shown in Figure 14. This estimation focuses on taxpayers with a consistent annual net income of over 20 million JPY every year, excluding those whose income spikes due to temporary large capital gains. We derive the 7-year average effective tax rates by dividing the 7-year average of income tax and special income tax for reconstruction by the 7-year average of total net income from 2014 to 2020. The 7-year EATRs are then calculated using these averages, based on income classes aligned with the 7-year average of total net income, as illustrated in Figure 10. Figure 14 presents the results.

Figure 14. 7-Year Average EATRs



(Source: author)

By comparing Figure 13 and Figure 14, we observe that the 7-year average EATRs are a few

percentage points higher than the single-year EATRs shown in Figure 13. A likely explanation is that, in the case of the 7-year average EATRs, we only include taxpayers with stable income sources, which reduces the influence of financial and real estate capital gains that are taxed at lower rates. Despite this adjustment, the regressive nature of the EATRs remains in the 7-year case. The 7-year average EATRs rise from 20 million JPY to just above 100 million JPY before decreasing beyond that threshold. Figure 14 shows that the 7-year EATRs for wage earners and business income earners are significantly higher than those for financial income earners and real estate capital gains earners. Since financial income comprises the largest portion of the income for the superrich, their 7-year EATRs are lower in the top income classes. Therefore, even with the reduced impact of temporary realized capital gains in the 7-year average EATRs, the regressivity of Japan's income tax system is evident.

Our finding that Japan's income tax system is regressive for top earners aligns with previous studies showing similar observations in other advanced countries. The reasons behind this regressivity—such as the lower tax rates on financial income and the larger share of financial income in the earnings of the highest-income earners—are consistent with the findings of Advani, Hughson, and Summers (2023) in the U.K.

7.2. Effective Average Tax Rates with Local Tax and Social Security Premiums

In addition to the national income tax, Japanese taxpayers are also required to pay "inhabitant tax (local tax)" and "social security premiums (social insurance contributions)."

Japanese inhabitant tax consists of two components: a per capita part and a per income levy part. The per capita part is a fixed tax amount that all inhabitants must pay, regardless of income. This part is considered a user fee for public community services. While the per capita tax is regressive, it has minimal impact on superrich taxpayers owing to its small amount.

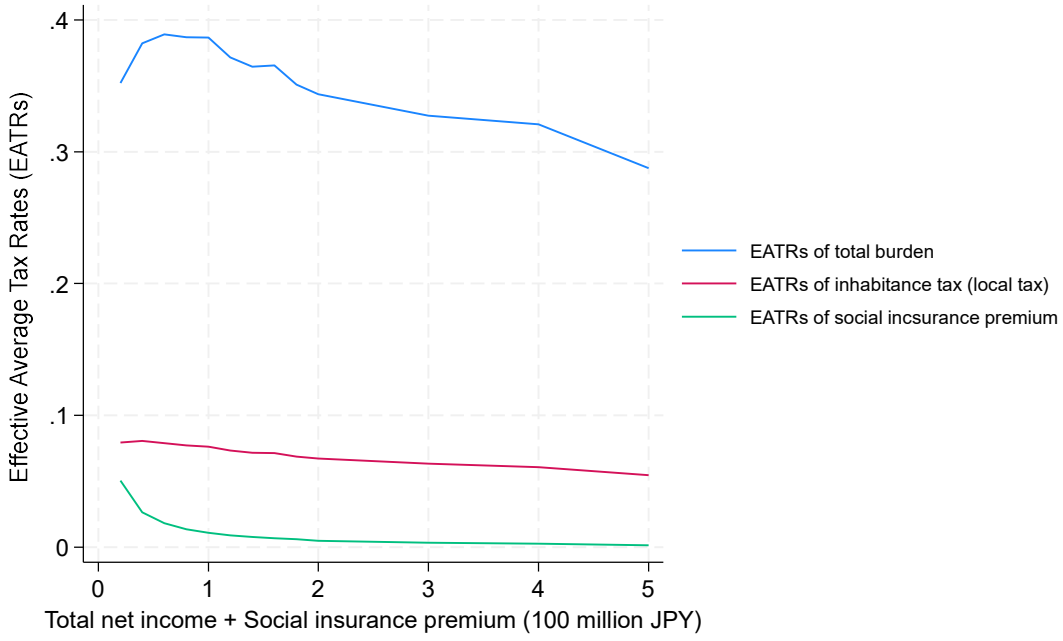
The per income levy part of the inhabitant tax is a 10% linear tax, applied to taxable income above a certain threshold. A separate 5% tax is imposed on interest income, dividends, and capital gains from shares, which are remitted to the relevant withholding account. Inhabitants are taxed based on their taxable income from the previous year, meaning that the timing of the tax differs from the national income tax. However, to assess the combined burden of national and local taxes for the same year (2020 in this case), we consider the local tax levied in 2021 on 2020 taxable income. The taxable income for the income levy part is calculated similarly to the national income tax, with some differences in deductions. Since the exact amount of inhabitant tax and the details of family structures are not reported in the national income tax data we use, we estimate taxpayers' family structures based on reported income deductions. Using these estimates, we calculate the amount of inhabitant tax imposed on each

taxpayer (details of the estimation method are available upon request).

Another significant burden for Japanese taxpayers is the social security premium (social insurance contribution). The premium rate varies depending on the type of social insurance program the taxpayer participates in. To estimate the social insurance premium payment for each taxpayer, we use the amount of social security premium deduction reported on their tax returns.

The calculation of effective tax rates differs slightly from the previous subsection. Since total net income is calculated after deducting social insurance premiums in the Japanese income tax system, we avoid double-counting these premiums by dividing both local tax and social insurance premiums by "total net income plus social insurance premiums," rather than just total net income. Figure 15 presents the EATRs for both local inhabitant tax and social insurance premiums. Additionally, we examine the EATRs for the total tax burden—comprising national income tax, local inhabitant tax, and social insurance premiums—calculated over "total net income plus social insurance premiums," as shown in Figure 15.

Figure 15. Effective Average Tax Rates of Total Burden, Inhabitance Tax (Local tax), and Social Insurance Premiums



(Source: author)

In Figure 15, the Japanese inhabitant tax is slightly regressive. Although the inhabitant tax rates are linear, the proportion of financial income, which is taxed at lower rates, is larger for

the superrich. As a result, the EATRs for local inhabitant tax are lower for superrich taxpayers in Japan.

Social security premiums are also regressive, owing to the existence of an upper limit on premiums. For example, the maximum payment for the Employee's Pension Insurance is capped at 650,000 JPY, multiplied by a premium rate of 18.3%. Once this upper limit is reached, social security premiums remain fixed, even if income continues to rise. Moreover, social security premiums do not apply to financial income in Japan, which means that the EATR for social security premiums is much lower for superrich taxpayers, whose income is largely derived from financial sources.[22]

The EATRs for the total tax burden, which includes national income tax, local inhabitant tax, and social security premiums, increase from the mid-30% range for those earning 20 million JPY to near 40% at 60 million JPY, but decrease significantly beyond 100 million JPY. For taxpayers earning over 500 million JPY, the EATR falls below 30%. Since the inhabitant tax and social insurance premiums are more regressive than the income tax, the total burden is slightly more regressive than income tax alone.

While one effective way to address income concentration among the superrich is through income redistribution via a progressive income tax, Japan's tax system currently falls short in performing this crucial role. To restore the income redistribution function of the tax system, increasing the effective tax rate on financial income in Japan should be considered.

8. Concluding Remarks

This study analyzed the income distribution of high-income earners in Japan using micro tax data provided by the NTA for the first time. Several important findings emerge from our analysis.

First, the highest-income earners in Japan are predominantly middle-aged to elderly men, aged their 50s and over, living in Tokyo and other major cities. Second, while wage income is the primary source of income for most high earners, stock capital gains are the dominant source for the top income earners. Third, based on the transition probability matrix, the status of top earners in Japan remains relatively stable in the short run. Fourth, the Pareto coefficient for total income in Japan in 2020 is approximately 1.45. This is significantly lower than previous estimates, such as the 2.1 coefficient for 2003 (Kunieda, 2012). The Pareto coefficients for capital income and labor income are about 1.35 and 1.95, respectively. The

[22] While we consider the regressivity of social security premiums only here, we need to consider both social security premiums and future pension benefits to evaluate the progressivity (or regressivity) of the public pension system.

lower Pareto coefficient for total income reflects the growing importance of capital income among the superrich in Japan. While recent studies suggest that income concentration at the top has not increased in Japan, our estimate of the lower Pareto coefficient indicates that income inequality has risen, partly due to the concentration of financial income among the superrich. Fifth, although realized capital gains are more volatile than accrued capital gains, as observed in other countries, the Pareto coefficient calculated using a 7-year average of capital gains remains significantly lower than earlier estimates. Sixth, EATRs rise with income up to 100 million JPY but decrease beyond that threshold. This regressivity in the Japanese income tax system results from the lower tax rates on capital income, which is the primary source of income for Japan's top income earners. To restore the income redistribution function of Japan's tax system, the capital income tax rate should be increased.

Academic research using Japanese micro tax data is still in its early stages. This study highlights the value of such data in analyzing the income distribution of top earners in Japan, revealing income concentration at the top that previous research has overlooked. We believe that future studies based on Japanese micro tax data will contribute not only to the academic understanding of income inequality but also to evidence-based tax policy development in Japan.

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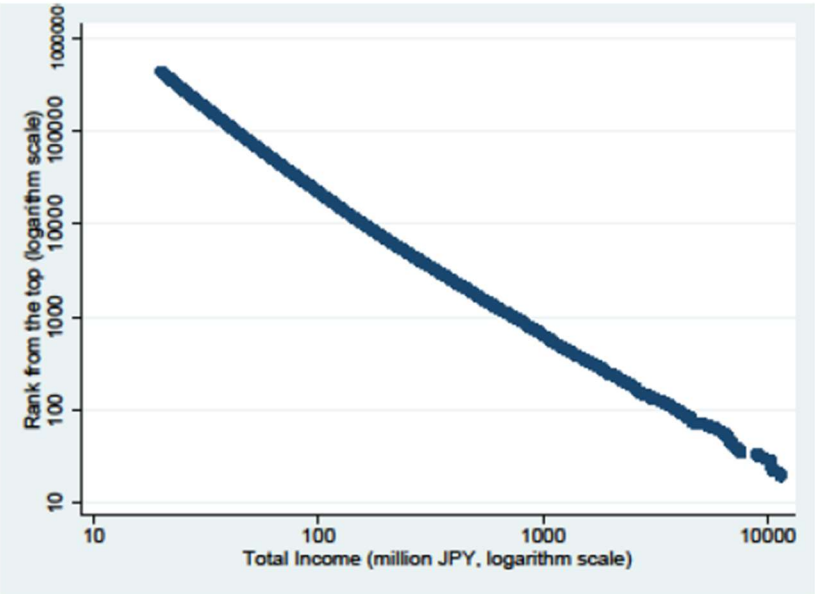
APPENDIX: The Hill Estimator and the Rank-Size Regression using Japanese Tax Data

Two main methods for estimating the Pareto coefficient are the Hill estimator and the rank-size regression. The Hill estimator and Hill plot are presented in Figure 6. This Appendix shows the results from the rank-size regression. In this method, the horizontal axis represents the logarithm of income, while the vertical axis represents the logarithm of rank (ranked from the top). We use the common logarithm for both axes.

Figure A-1 displays the scatter plot for total income above 20 million JPY. To protect privacy, the top 10 data points are not included in the figure.

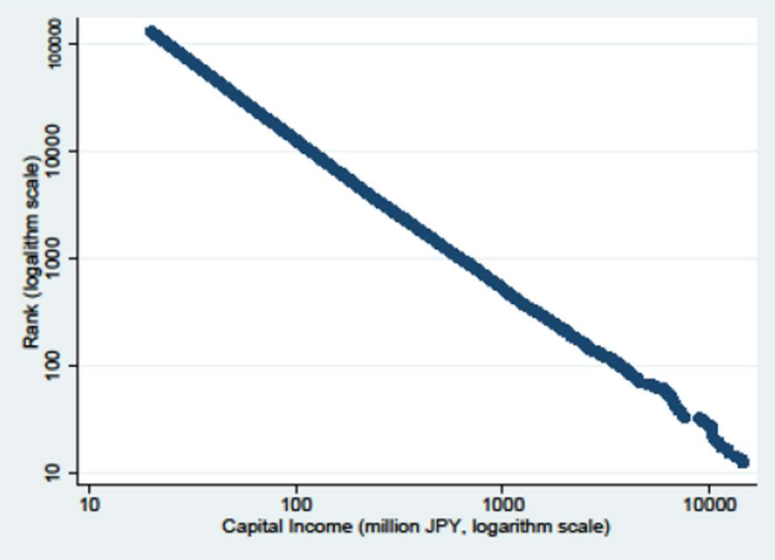
Figure A-1. Rank-Size Plot of Total Income



(Source: author)

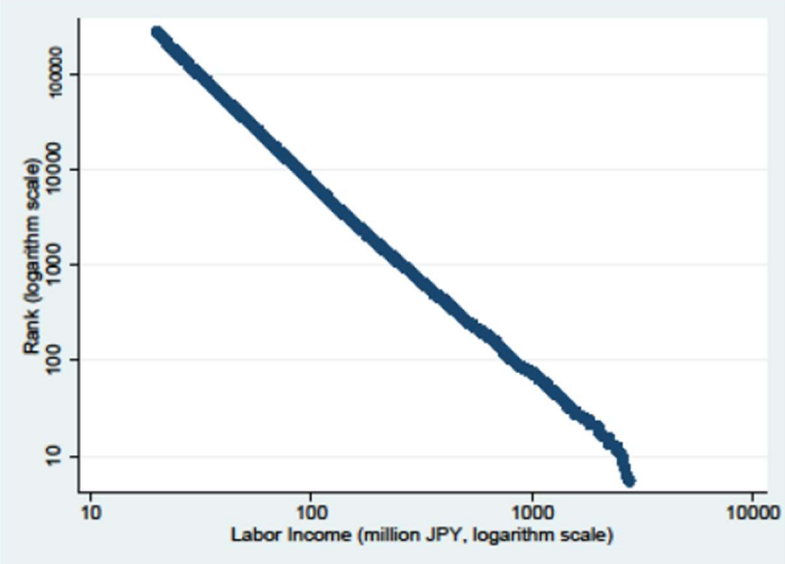
Similarly, Figure A-2 and Figure A-3 show the rank-size plots of capital income and labor income.

Figure A-2. Rank-Size Plot of Capital Income



(Source: author)

Figure A-3. Rank-Size Plot of Labor Income



(Source: author)

In all the figures, the relationship between income (log) and rank (log) appears to be clearly linear for all samples above 20 million JPY. The slopes of these "lines" are estimated using rank-size regression and are considered as estimates of the Pareto coefficients.

However, Clauset et al. (2009) highlighted a fundamental issue with rank-size plots: even if the true distribution follows a log-normal distribution rather than a Pareto distribution, the rank-size plot may still show a seemingly linear relationship. In fact, the Hill plot in Figure 6 of the text reveals that the Pareto coefficient estimates do not stabilize until incomes reach 200 million JPY. This suggests that, even when a linear relationship is observed in the rank-size plots (Figures A-1, A-2, and A-3), the income distribution may not follow a Pareto distribution below 200 million JPY. Thus, using all samples in the rank-size regression could introduce bias.

To address this potential bias, we conduct rank-size regressions following Gabaix and Ibragimov (2011), comparing two models: Model (1) includes all high-income earners, while Model (2) focuses on earners with incomes of 200 million JPY or more. The regression results for both models are presented in Table A-1.

Table A-1

Models	Model(1)	Model(2)
Dependent Variables	Rank (common log)	
Independent Variables		
Total Income (common log)	-1.7807*** (0.000131)	- 1.4544*** (0.000699)
Constant	18.617*** (0.000988)	15.989*** (0.000601)
Threshold	20 million JPY	200 million JPY
Sample number	436223	7019
Adjusted R2	0.9976	0.9984

(Source: author)

The estimated Pareto coefficients represent the coefficients of total income (with opposite signs) in both regressions. The estimated Pareto coefficient for all high-income earners is 1.78, while the estimated coefficient for earners above the 200 million JPY threshold is 1.45, which matches the value derived from the Hill plot in Section 5. This suggests that, although the relationship between rank (log) and income (log) appears linear in Figure A-1, the Pareto coefficient estimated from all samples may be overestimated. We observe similar results for capital income and labor income.

This finding implies that the rank-size regression can yield accurate estimates only if the thresholds are appropriately chosen. When all samples are available, the Hill estimator provides more reliable estimates. Therefore, we present the results from the Hill estimator in

the main text.

In this Appendix, we show rank-size plots for total income, capital income, and labor income in Japan, and conclude that the Hill estimator is preferred over the rank-size regression when all samples are included.

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