2025 Fall Semester

Master's Thesis

Where Do Corporate Tax Cuts Go?

Evidence from JPX Prime 150 Firms

Student ID: 3224C001
Name: DING ZIWEN

March 2026

Graduate School of Economics
Waseda University

Abstract

This paper examines how large listed Japanese firms respond to reductions in effective corporate tax rates. Using firm-level panel data for JPX Prime 150 companies from 2004 to 2025, the analysis studies firms' investment, R&D expenditure, employment, dividend payouts, and retained earnings. Firm and year fixed effects are employed, and a Tobit specification is used for R&D expenditure to account for censoring.

The results show that tax reductions are associated with a positive but modest increase in investment, indicating gradual adjustment. R&D expenditure exhibits limited sensitivity to tax changes, while employment does not respond significantly. In contrast, dividend payouts increase significantly following tax reductions, with a weaker response among multinational firms. Retained earnings do not display a systematic response. Overall, corporate tax reductions mainly reshape firms' financial allocation rather than generating broad-based real expansion.

Content

Introduction 1
1. Literature Review 2
2. Data 4
2.1 Sample Selection 4
2.2 Variable Construction 8
2.2.1 Independent Variables 9
2.2.2 Dependent Variables 13
2.3.3 Control Variables 14
2.3 Descriptive Statistics 16
3. Empirical Strategy and Econometric Specification 17
3.1 Motivation and Conceptual Framework 17
3.2 Baseline Econometric Specification 17
3.3 Identification Strategy 18
3.4 Expected Signs and Behavioral Predictions 19
3.5 Estimation Method 20
4. Empirical Results 21
4.1 Investment Responses to Corporate Taxation 21
4.1.1 Empirical Specification 21
4.1.2 Interpretation 24
4.2 R&D Responses to Corporate Taxation 26
4.2.1 Distributional Features and Measurement Challenges in R&D Data 26
4.2.2 Baseline model: Tobit for R&D 27
4.2.3 Interpretation 29
4.3 Dividend share 31
4.4 Retained Earnings 32
4.5 Debt ratio 34
4.6 Employee 35
5. Conclusion 36
References 37
Appendix 38

Introduction

Over the past 45 years, corporate income tax (CIT) rates have declined substantially across advanced economies, reflecting governments' efforts to alleviate firms' tax burdens and stimulate economic activity.[1] Japan is no exception. Since the mid-2000s, a sequence of fundamental corporate tax reforms has reduced the statutory corporate tax rate from 39.54% in 2004 to below 30% after 2018.[2] Recent data from the OECD show that corporate tax revenues have continued to rise and remain a significant share of total tax revenues and GDP even as statutory rates have stabilized globally in recent years, underscoring the ongoing fiscal importance of corporate taxation in many economies.[3] These reforms were motivated by concerns over international tax competitiveness and the expectation that lower tax burdens would encourage firms to expand real economic activities such as investment, innovation, and employment. Yet empirical evidence remains mixed. More fundamentally, it is still unclear how firms allocate the resources freed up by corporate tax reductions—whether these resources are directed toward real economic activities or instead redistributed through financial channels.

This paper examines how reductions in corporate tax rates affected the behavior of large Japanese listed firms over the period 2004–2025. Focusing on firms included in the JPX Prime 150 index[4], the analysis addresses a central question: when corporate tax burdens are reduced, where do firms allocate the resulting tax savings? Rather than focusing on a single outcome, the paper traces how tax savings are distributed across multiple corporate channels, including investment, research and development (R&D), dividend payouts, retained earnings, leverage, and employment. In addition, the paper explicitly distinguishes between multinational enterprises (MNEs) and non-MNEs. Although all firms in the sample are Japanese parent companies, MNEs face a wider set of tax planning opportunities and location choices, which may lead them to respond differently to domestic tax rate changes.

Beyond the allocation of tax savings, the paper also addresses a methodological issue that is particularly relevant in the Japanese context: how to construct an investment rate measure that is consistent with Japan's corporate disclosure practices. Unlike settings where capital expenditure data are reported in a standardized manner, Japanese firm-level disclosures require careful consideration when defining investment intensity. The paper therefore discusses and implements an investment rate measure that aligns with the structure of Japanese financial statements, ensuring that the empirical analysis reflects economically meaningful investment behavior rather than accounting artifacts.

---

[1] This long-run trend is documented by various international sources; see, for example, 2024 Corporate Tax Rates by Country | Tax Foundation search date:2025/12/15

[2] The source of historical statutory corporate income tax rates is https://www.mof.go.jp/tax_policy/summary/corporation/c01.htm ,法人課税に関する基本的な資料-法人税率の推移 search date:2025/12/15

[3] Source: Corporate tax revenues rise as global corporate tax rates continue to stabilise, new OECD data show, press release on corporate tax revenues and statutory tax rates. search date:2025/12/15

[4] JPX Prime 150 Index | Japan Exchange Group JPX Prime 150 Index is the index composed of leading Japanese companies that are estimated to create value, search date:2025/12/15

Using firm-level panel data and firm- and year-fixed effects regressions, the paper documents three main findings. First, corporate tax rate reductions are not associated with a strong or robust increase in real investment, and no significant response is detected for R&D expenditure. Second, in contrast to the muted response of real activities, tax reductions are associated with clear changes in firms' financial allocations, most notably an increase in dividend payouts. Third, these patterns differ between MNEs and non-MNEs, suggesting that firms with greater exposure to international tax environments adjust the use of tax savings in distinct ways. Overall, the findings suggest that while corporate tax cuts alleviate firms' tax burdens, they primarily reshape the internal allocation of resources rather than stimulating real economic activities.

1. Literature Review

A central question in the literature is whether corporate tax reductions translate into higher real investment. Dobbins and Jacob (2016) examine the investment effects of the 2008 German corporate tax reform and show that domestically owned firms increase capital investment significantly more than foreign-owned firms following the tax cut. They attribute this difference to heterogeneous profit-shifting opportunities: because domestic firms face more limited scope for international profit shifting, reductions in statutory tax rates translate more directly into lower effective tax burdens and stronger real investment responses. The study further documents that investment reactions are more pronounced among firms relying on internal financing, highlighting the role of after-tax cash flows in shaping investment behavior. Overall, the paper underscores substantial heterogeneity in firms' investment responses to tax reforms and motivates the use of firm-level controls capturing financing conditions and structural characteristics.

Focusing on Japan, De Mooij and Saito (2014) analyze the implications of corporate income tax reform for investment and growth prospects using international and Japan-specific estimates of corporate tax elasticities. They find that reductions in statutory tax rates are associated with only modest increases in predicted investment on average, and emphasize that narrow tax bases and debt bias in Japan's tax system can limit the effectiveness of rate cuts. Their results suggest that while tax reductions may improve investment incentives in theory, institutional features and financing distortions can substantially attenuate observed real investment responses.

Beyond statutory tax rates, several studies emphasize the importance of effective tax burdens in shaping firm behavior. Uemura (2023) shows that under the Japanese corporate tax system, firms' relevant tax burdens are better captured by effective rather than statutory tax rates, as financing choices lead to substantial variation in effective tax burdens across firms. This implies that corporate tax reforms need not affect firms uniformly, even when statutory rates change in the same direction.

Consistent with this perspective, Fuest, Hugger, and Neumeier (2022) use German country-by-country reporting data to show that multinational firms' reported profits are highly sensitive to cross-country differences in effective tax rates. They find that profits are disproportionately allocated to low-tax jurisdictions, while real activity such as employment and tangible assets

remains largely unchanged. The results suggest that multinational firms primarily respond to tax incentives through profit allocation rather than adjustments in real investment, highlighting the importance of non-real adjustment channels.

When real investment responses are limited, firms may adjust along alternative margins. Kawase (2022) examines firms' income-shifting behavior in response to corporate tax rate reductions in Japan, focusing on the 2012 and 2014 tax reforms. Using firm-level data and marginal effective tax rates, the study finds evidence of intertemporal income shifting, whereby firms shift taxable income from periods before the tax cut to periods after the reform. These findings indicate that corporate tax reductions can induce accounting-based adjustments rather than immediate changes in real economic activity.

Complementary evidence is provided by Kume, Kobayashi, Oikawa, and Sone (2013), who analyze how firms adjust prices, wages, and employment in response to changes in corporate tax rates from a behavioral economics perspective. Their results show that firms respond to tax-related cost shocks not only through investment decisions, but also through pricing strategies, wage adjustments, and employment changes. This suggests that firms' responses to corporate tax reforms are multifaceted and may manifest through operational and distributional channels in addition to financial reallocation.

From a methodological perspective, recent evidence highlights important features of firm-level investment data. Bai et al. (2022) show that investment rates are highly right-skewed and asymmetric, reflecting costly reversibility and lumpy adjustment rather than symmetric expansion and contraction. This motivates careful construction of investment measures that are robust to extreme observations.

Methodologically, the empirical strategy in this study builds on standard fixed-effects specifications while accounting for the censored nature of firm-level outcome variables. Following the Tobit framework, outcomes with a substantial mass at zero are modeled accordingly, while firm and year fixed effects are employed to control for time-invariant firm heterogeneity and common macroeconomic shocks, with a Mundlak-type formulation allowing correlation between unobserved effects and observed covariates (Wooldridge, 2021). This approach ensures that estimated responses reflect economically meaningful firm behavior rather than artifacts of model choice.

Finally, at the aggregate level, Hanappi and Whyman (2023) document that corporate tax revenues have continued to rise as a share of total tax revenues and GDP across OECD countries, even as statutory corporate tax rates have stabilized. This pattern suggests that changes in statutory tax rates do not mechanically translate into proportional changes in firm behavior, reinforcing the importance of examining how firms adjust to tax incentives through multiple behavioral channels.

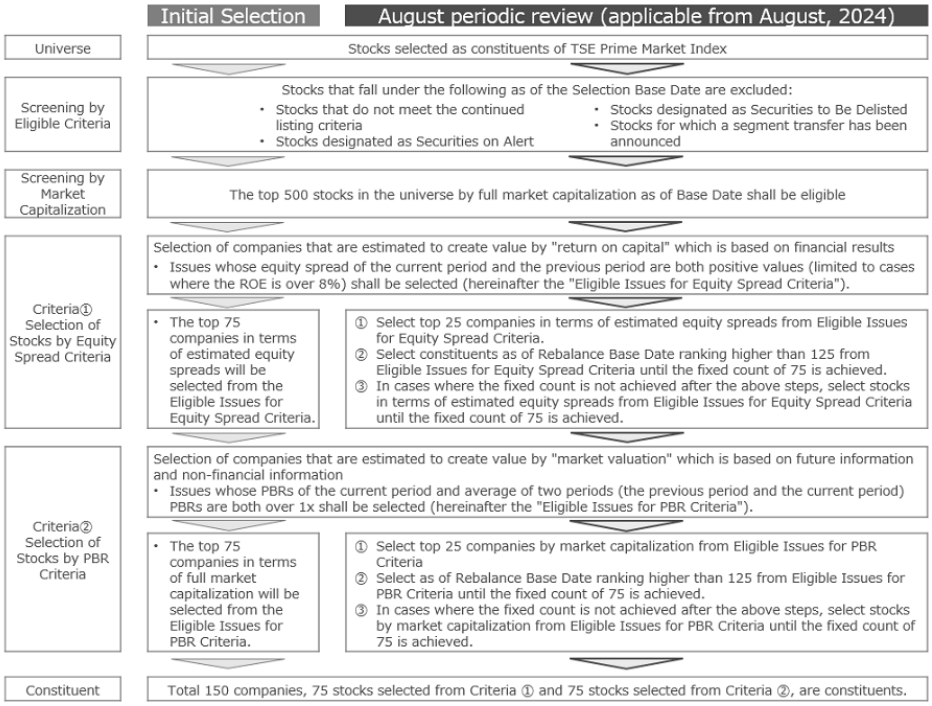
2. Data

2.1 Sample Selection

To examine the impact of corporate income tax cuts on Japan's "super firms", it is first necessary to clarify the definition of this term. In this study, I classify the firms included in the JPX Prime 150 Index (as of 2025.08.29)[5] as representative of large, highly productive firms in the Japanese economy. The JPX Prime 150 Index is explicitly constructed to "visualize the leading Japanese companies that are estimated to create value," by selecting among the largest and most liquid firms on the TSE Prime Market based on two complementary measures: (1)capital-return performance, measured by the equity spread (ROE minus cost of equity), and (2) market valuation, measured by PBR (price to book ratio).

A firm qualifies for inclusion if it ranks among the top by equity spread or among those with PBR above 1x and sufficiently large market capitalization, thereby ensuring that the index concentrates on companies with both proven profitability and positive market expectations. As such, JPX Prime 150 serves as a benchmark for "large, value-creating Japanese firms," making it a suitable proxy for the "super firms" whose behavior and sensitivity to corporate tax cuts are of interest in this study.

Figure1 Stock Selection Method[6]

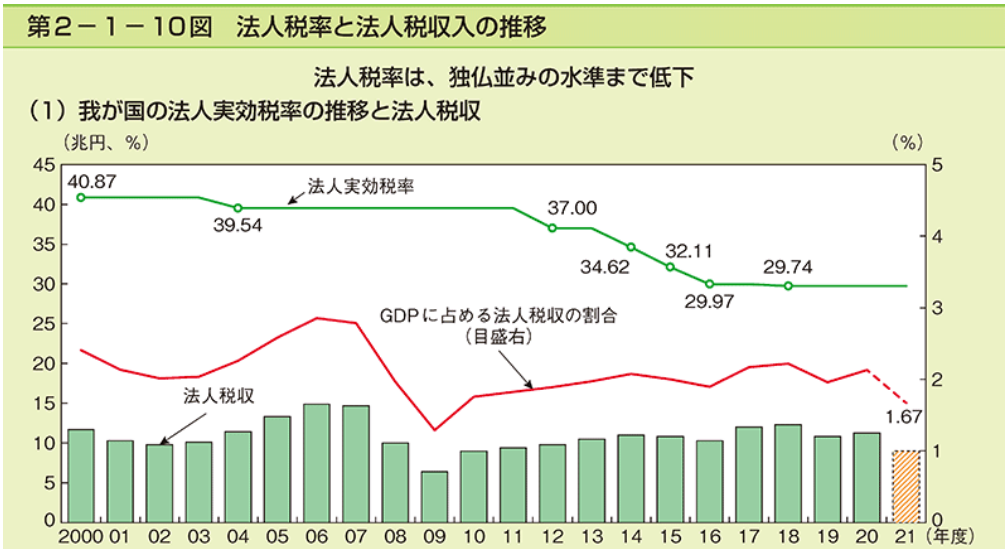


[5] JPX Prime 150 Index | Japan Exchange Group , the latest version until writing is 20251031 with 151 firms. About the Component Weight for JPX Prime 150 as of 2025.08.29, see in Appendix B.

[6] JPX Prime 150 Index | Japan Exchange Group JPX Prime 150 Index - Stock Selection Method; Update: Aug. 22, 2025

To determine the appropriate time frame for analysis, the sample period must reflect the structure of Japan's corporate tax policy. Figure 2 illustrates the stepwise decline in Japan's corporate tax rates during this period. According to materials published by the Cabinet Office, as well as statutory tax rate information from the Ministry of Finance and PwC, Japan experienced a relatively stable corporate tax regime during the mid-2000s. A sequence of gradual, multi-year reductions began in fiscal year 2012 and continued through 2018, during which the combined statutory corporate tax rate was lowered in a stepwise and predictable manner. [7]Because the objective of this study is to evaluate how Japan's leading firms respond to sustained and policy-driven changes in corporate taxation, it is essential to adopt a window that covers both the stable pre-reform period and the subsequent tax-cut sequence.

Figure2 The changes of Effective Tax Rates of Japan[8]



For this reason, I examine fiscal years 2004–2024 for the firms included in the JPX Prime 150 Index. This period captures (i) the relatively unchanged tax structure prior to the reform, since 2004 to 2012, (ii) the full sequence of tax reductions beginning in 2012, and (iii) the post-2018 environment in which the statutory rate stabilized at a lower level. This time frame therefore provides a coherent and policy-relevant horizon for evaluating changes in corporate behavior and tax sensitivity.

To construct the fiscal dataset required for this study, it is necessary to obtain financial information from the consolidated securities reports of the 150 firms in the JPX Prime 150 Index. There are two possible approaches. The first is to manually download each firm's annual

[7] Official information on corporate tax policy reforms in Japan is publicly available through government advisory council records and cabinet-level documentation.

[8] Source: https://www5.cao.go.jp/j-j/wp/wp-je21/h06_hz020110.html search date:2025/12/15

report—either from EDINET[9] or the *eol* database[10]—and extract the relevant variables from the original PDF files. Although feasible in principle, this approach proves highly inefficient and error-prone for several reasons.

First, firms report in different monetary units, which can vary across years even within the same company. Second, companies adopt different accounting standards, including Japanese GAAP, IFRS, and U.S. SEC standards, resulting in inconsistent table formats and item definitions. These discrepancies significantly complicate the process of merging firm-year data into a unified panel dataset. Third, changes in a firm's auditor, accounting policy, or fiscal year-end can alter the structure and labeling of reported items over time, creating additional challenges for consistent variable extraction. Fourth, automated PDF-reading tools in Python or R frequently fail to parse certain reports, making the extraction process incomplete and unreliable.

For these reasons, this study adopts the second approach: downloading standardized datasets from *eol* after performing company-specific searches. Unlike the PDF reports, the datasets provided through this function use uniform units, standardized item definitions, and consistent accounting categories.[11]

This paper has conducted sample cross-checks between the downloaded datasets and the original securities reports. The results confirm that the standardized *eol* data are sufficiently accurate for empirical analysis. Minor discrepancies—typically within one digit in the ones place—were observed in a small number of cases, likely due to rounding differences or slight variations in accounting treatment. These differences fall within an acceptable margin of error.

This study constructs two complementary datasets to examine the behavior of Japanese super firms and to assess the sensitivity of empirical results to alternative treatments of tax-related variables. The first dataset, *data_20042025*, contains all firm-year observations from fiscal years 2004 to 2024, without excluding cases in which *profit before tax (PRETAX)* or *corporate income tax expenses (TAXEXP)* take negative values. This full dataset preserves the complete accounting reality observed in the consolidated securities reports, including loss-making years, deferred tax adjustments, and other accounting treatments that may generate negative or extreme values in effective tax rate calculations.

The second dataset, *data_filtered*, applies a more restrictive screening criterion by removing observations in which either $PRETAX < 0$ or $TAXEXP < 0$. This filtered dataset is designed to approximate a "standard positive-tax-burden sample," eliminating observations where accounting conventions—such as loss carryforwards, deferred tax asset recognition, or

[9] https://www.fsa.go.jp/search/20130917.html the official description of EDINET
https://disclosure2.edinet-fsa.go.jp/weee0050.aspx the viewing site provided by Financial Services Agency, Japan

[10] https://ssl-eoldb-jp.waseda.idm.oclc.org/EolDb/CompanySearch.php search date:2025/12/15
"*eol* is a source of databases that provide company information…mainly concerning Japanese domestic listed companies. "——https://waseda-jp.libguides.com/az/47316663

[11] However, as of November 2025, the book-based retrieval function on *eol* sometimes returns identical values for multiple years, which requires caution. ***Appendix A*** provides detailed instructions for avoiding this issue.

temporary timing differences—may distort the interpretation of the effective tax rate or introduce extreme outliers.

When evaluating the distribution of all observations (rather than unique firms), the full dataset exhibits the following characteristics:

118 observations with negative PRETAX, typically reflecting operating losses, impairment charges, or extraordinary losses.

98 observations with negative TAXEXP, usually arising from deferred tax accounting, such as the recognition or reversal of deferred tax assets and liabilities.

47 observations where both PRETAX and TAXEXP are negative, representing cases with substantial accounting adjustments or loss-related tax treatments that complicate the computation of effective tax rates.

Using both datasets is essential for empirical rigor. The full sample captures the institutional and accounting environment as it truly operates, preserving economically meaningful variation—particularly for studying tax sensitivity in the presence of loss carryforwards or deferred tax mechanisms. In contrast, the filtered sample excludes observations where effective tax rates become undefined or misleading, thereby reducing noise and improving identification in baseline regressions. Comparing results across the two datasets enables an assessment of robustness and helps distinguish substantive economic patterns from artifacts driven by accounting conventions. This dual-sample strategy increases confidence in the reliability and interpretability of the empirical findings.

2.2 Variable Construction

This study constructs a firm-level panel dataset for the 150 JPX Prime firms over fiscal years 2004–2024.[12] All variables are used from this dataset and defined consistently across firms and years, following standard practices in the empirical corporate finance and public economics literature. Table 1, Table 2, and Table 3 summarize the mapping between conceptual variables, their R implementation, and economic meaning for independent, dependent, and other variables.[13] Detailed variable construction is discussed in subsequent sections.

Table 1. Independent Variables

Variable	R variable name	Economic meaning
ETR_data_{it}	ETR_data	Firm-level effective tax burden
$ETR_data_{it} \times \mathrm{MNE}_i$	MNE x ETR_data; MNE:ETR_data[14]	Differential tax sensitivity of multinational firms
MNE_i	MNE	Indicator for multinational enterprises

Table 2. Dependent Variables

Variable	R variable name	Economic meaning
inv_{it}	inv	Firm investment intensity
$\log(\mathrm{R\&D}+1)_{it}$	log(RD + 1);[15] y_rd	Innovation and development investment index
div_share_{it}	div_share	Shareholder payout intensity
$logRetainedEarnings_{it}$	lnRetainedEarnings	Internal fund accumulation
$DebtRatio_{it}$	DebtRatio	Leverage ratio
$logEMP_{it}$	log(EMP)	Labor input

Table 3. Control Variables

Variable	R variable name	Economic meaning
$\ln Assets_{it}$	lnAssets	Firm size
$\ln Sales_{it}$	lnSales	Operational scale
ROE_{it}	ROE	Profitability
$CashRatio_{it}$	CashRatio	Liquidity position
$DebtRatio_{it}$	DebtRatio	Capital structure
$SalesGrowth_pct_{it}$	SalesGrowth	Growth opportunities
$AssetsGrowth_pct_{it}$	AssetsGrowth	Balance sheet expansion
Firm fixed effects	firm_id	Time-invariant firm characteristics
Year fixed effects	year	Common time effects

[12] All column names of this raw dataset can be found in ***Appendix F***.

[13] Conceptual variables are indexed by firm $i$and year t. The second column of ***Table A, B, C*** reports the corresponding variable names as implemented in the R code, where subscripts are omitted for simplicity.

[14] Due to the packages used in R studio are different, these forms may show differently.

[15] Same as above.

2.2.1 Independent Variables

1. ETR_data_{it}（Effective Tax Rate based on Financial Statements）

To capture the effective tax burden reflected in firms' financial reporting, the firm-level effective tax rate is defined as follows:

$$ETR_data_{it} = \frac{Tax\ Expenses_{it}}{Profit\ Before\ Tax_{it}}$$

where $Tax\ Expenses_{it}$ is the total corporate income tax expense reported in the consolidated income statement (「法人税等」), including current and deferred tax components. $Profit\ Before\ Tax_{it}$ corresponds to 「税引前当期純利益」. This accounting-based effective tax rate captures the tax burden reflected in financial reporting and is commonly used to approximate the firm-level tax position in empirical corporate finance.

2. Multinational Enterprise Indicator (MNE_i)

To identify whether a firm operates as a multinational enterprise (MNE), the analysis constructs a dummy variable based on the presence of *foreign currency translation adjustments* (為替換算調整勘定[16]) in the consolidated balance sheet. Under Japanese accounting standards (J-GAAP and IFRS), this account arises only when a parent company consolidates foreign subsidiaries whose functional currency differs from the Japanese yen (Matsubara, 2007). The translation of foreign subsidiaries' assets, liabilities, revenues, and expenses into Japanese yen generates cumulative translation adjustments, which appear as a separate component of net assets. Therefore, the presence of this account provides a rule-based, accounting-grounded signal that a firm maintains at least one foreign subsidiary.

The MNE indicator is defined as:

$$MNE_i = \begin{cases} 1 & \text{if ForeignCurrencyTranslationAdjustment}_{it} \text{ is non-missing for any year,} \\ 0 & \text{if the account is consistently missing across years.} \end{cases}$$

A non-missing value (including both positive and negative amounts) implies that the firm consolidates at least one foreign subsidiary, as the account cannot exist unless overseas operations prepare financial statements in a foreign currency. Conversely, a missing value (NA) across all years indicates the absence of foreign subsidiaries or foreign currency-denominated consolidation entries.

This method offers several advantages. First, it avoids reliance on self-reported "overseas operations" or subjective classifications, instead using an objective, accounting-rule-based criterion. Second, the variable is available consistently across all firms in the JPX Prime 150 sample because consolidated securities reports must comply with uniform financial reporting standards. Third, this approach captures economically meaningful cross-border activities, distinguishing truly multinational firms from domestically focused firms. As such, the MNE indicator provides a reliable basis for testing heterogeneity in tax sensitivity between multinational and domestic corporations.

[16] The definition follows EY ShinNihon (2010). The *foreign currency translation adjustment account* can be directly identified among the column names listed in ***Appendix F.***

3. Firm-Level Variation in MNE Status

The dataset consists of 150 unique firms, corresponding exactly to the JPX Prime 150 constituents. Examination of firm-year MNE values reveals substantial within-firm variation:

a) 71 firms exhibit changes in MNE status over time (i.e., at least one transition between 0 and 1).

b) These transitions reflect real changes in corporate structure, such as the acquisition or divestiture of foreign subsidiaries, changes in consolidation scope, or shifts in reporting standards that modify whether translation adjustments must be recognized.

A representative example is Firm E00143, whose MNE status fluctuates as follows:

Table 4. Firm-Year Transitions in MNE Status: A Representative Example

firm_id	*year*	*MNE*	*nonMNE*
E00143	2005	1	0
E00143	2006	1	0
E00143	2007	1	0
E00143	2008	0	1
E00143	2009	0	1
E00143	2010	1	0
E00143	2011	1	0
E00143	2012	1	0
E00143	2013	1	0
E00143	2014	1	0
``	``	``	``
E00143	2025	1	0

This pattern is consistent with periods in which the firm held foreign subsidiaries, followed by interim years without such subsidiaries, and later re-expansion or reacquisition abroad. The ability of this accounting-based approach to detect such temporal fluctuations provides additional credibility to its use in identifying multinational activity.

Table 5 reports the distribution of firms across MNE and non-MNE categories under two classification criteria.

Table 5. Firm Classification by Multinational Status

Classification Criterion	Definition	MNE Firms	non-MNE Firms	Total Firms
Dominant Status	Firm is classified based on whether the number of years classified as MNE exceeds the number of non-MNE years over the sample period	97	53	150
Latest Status	Firm is classified according to its MNE status in the most recent fiscal year of the panel	70	80	150

Classification by Dominant Status

Because some firms transition between MNE and non-MNE states, an additional firm-level summary measure is constructed based on the *dominant* status. This approach reflects the long-term structural orientation of each firm. A firm that is multinational for most years of the sample period likely maintains international production networks or stable foreign subsidiary structures, making it reasonable to characterize the firm as an MNE even if occasional years lack translation adjustment values.

Classification by Latest Status

To capture firms' most recent organizational form, an alternative classification uses the latest available year:

$$latest_status_i = MNE_{it},$$

where $t$denotes the last fiscal year in the panel. This measure captures the current (rather than historical) extent of multinational activity, allowing robustness checks that distinguish between long-term and more recent global engagement.

Additional Discussion of ETR_data

In practice, the tax expense reported in financial statements (Tax Expenses) does not necessarily correspond to the actual amount of corporate income tax paid in the current fiscal year (Table 6). This is because firms may carry forward unpaid tax amounts from previous periods or recognize tax obligations that have not yet been settled in cash. As a result, the numerator of ETR_data_{it}—Tax Expenses—is influenced not only by the tax liability generated in the current year but also by timing differences, accrual adjustments, and deferred tax accounting.

At the same time, all firms are assigned the same policy-based statutory corporate income tax rate in a given year. This variable is defined as

$$ETR_oecd_t = Combined\ Statutory\ Corporate\ Income\ Tax\ Rate_t$$

This variable is derived from OECD Corporate Tax Statistics[17] and represents the combined statutory corporate income tax rate for Japan in year t, incorporating national corporate tax, local corporate tax, inhabitant tax, and enterprise tax. It provides a policy-based, cross-country comparable measure of the statutory tax burden.

Summary statistics for both tax rate measures are reported in Table 6.

Table 6. Descriptive Statistics of Firm-Level and Statutory Effective Tax Rates

Descriptive Statistics: Full Sample (data_20042025)

Variable	N	Mean	SD	Min	P25	Median	P75	Max
ETR_data	2888	0.266	5.057	-260.430	0.265	0.318	0.395	56.757
ETR_oecd	2903	0.343	0.045	0.297	0.297	0.346	0.395	0.395

Descriptive Statistics: Filtered Sample (data_filtered)

Variable	N	Mean	SD	Min	P25	Median	P75	Max
ETR_data	2837	0.403	1.376	0.001	0.276	0.327	0.402	56.757
ETR_oecd	2724	0.343	0.044	0.297	0.297	0.321	0.395	0.395

[17] Data source: OECD Data Explorer - Archive • Table II.1. Statutory corporate income tax rate, search date:2025/12/15

As shown in Table 6, the distribution of ETR_data_{it} differs substantially from that of ETR_oecd_t in both the full and filtered samples. Issues related to extreme values in ETR_data_{it} are addressed in *Section 3.3 (Identification Strategy)* and *Appendix C*.

The practical implication is that Tax Expenses may overstate or understate the firm's true tax burden in a specific year. For example, a firm may record a large tax expense due to the reversal of deferred tax assets or the creation of new deferred tax liabilities, even when its actual cash tax payment is small. Conversely, a firm may pay substantial taxes in the current year while recognizing a relatively small Tax Expense if prior-year accruals or deferred tax adjustments offset current obligations. Therefore, ETR_data_{it} captures an accrual-based measure of the tax position rather than a cash-based tax burden.

Despite these limitations, ETR_data_{it} remains widely used in empirical corporate finance and public economics for two reasons. First, Tax Expenses reflect the tax costs recognized under accounting standards and thus directly affect reported profitability, which is often relevant for managerial decision-making and investor evaluation. Second, consistent cash tax payment data are generally not available in Japan, as disclosures of actual taxes paid appear only in the cash flow statement and are not uniformly standardized across firms or years. Therefore, the accounting-based effective tax rate provides a consistent, firm-year comparable proxy for measuring tax exposure.

It is also important to note that ETR_data_{it} may take extreme negative values. These negative effective tax rates typically arise from deferred tax accounting, such as the recognition of deferred tax assets due to losses carried forward or temporary timing differences. In such cases, the firm may record negative Tax Expenses in the income statement even when its pre-tax profit is positive. This phenomenon reflects the structure of Japan's corporate tax system and accounting rules rather than data errors, but it requires careful treatment in empirical analysis.

2.2.2 Dependent Variables

1. Investment Rate (inv)

This study follows the historical-cost investment definition proposed by Bai et al. (2022). Firm-level investment I_{it} is measured as the change in net property, plant, and equipment (net PPE) plus accounting depreciation, and the investment rate is obtained by scaling this flow measure by lagged net PPE:

$$\text{Investment Rate} = \text{Investment} / \text{Lagged net PPE}$$

$$I_{it} = \Delta\text{net PPE}_{it} + \text{Accounting Depreciation}_{it}$$

$$\Delta\text{net } PPE_{it} = net\ PPE_{it} - net\ PPE_{i,t-1}$$

$$\text{Investment Rate}_{it} = \frac{\Delta\text{net PPE}_{it} + \text{Depreciation}_{it}}{\text{net PPE}_{i,t-1}} \quad [18]$$

This historical-cost measure does not attempt to construct replacement-cost capital stocks or economic depreciation rates, which require industry-specific service lives and price indices. Instead, it provides a consistent accounting-based metric that allows for comparable measurement of relative investment intensity across firms and years within the financial reporting framework.

net PPE is economically meaningful because it reflects the remaining productive capital after accumulated depreciation and impairment. This aligns the investment denominator with the capital base that actually generates output and is consistent with the accounting-based investment literature. Constructing current-cost capital stocks requires detailed asset-specific price indices and service lives, which are unavailable for Japanese firms at the necessary level of granularity. Using historical-cost investment rates therefore ensures consistency and transparency while remaining aligned with financial reporting.

While the investment rate based on current-cost capital may offer additional insights, constructing such measures is beyond the scope of this study and remains a potential direction for future work.

2. R&D variables

R&D expenditure constitutes a key margin through which corporate taxation may affect firms' long-run productivity and innovation capacity. However, empirical analysis of R&D is complicated by its highly skewed distribution, the prevalence of *Not Applicable (NA)*, and selective disclosure practices in Japanese financial reporting.

As a practical workaround, two distinct uses of zero are introduced, each serving a different purpose. First, at the conceptual level, non-disclosed R&D observations are treated as censored at zero on the logarithmic scale, reflecting the assumption that their latent log R&D intensity lies below a disclosure threshold. Second, at the operational level, missing R&D

[18] See Bai et al. (2022) for the definition of historical-cost capital as net PPE (PPENT) and for the convention of lagging capital by one period when computing investment rates.

values are temporarily recoded as zero in order to apply the transformation $\log(\text{R\&D} + 1)$. Under this transformation, firms with non-disclosed R&D are mapped to $\log(0 + 1) = 0$, establishing a one-to-one correspondence between missing R&D observations and zero values in the transformed variable.

To retain observations with zero R&D expenditure, the study constructs

$$\log(R\&D_{it} + 1),$$ [19]

which allows inclusion of firm–year observations in which R&D spending is reported as *NA* but treated as zero.

3. Dividend Payout Measure (Dividend Share)

$$div_share_{it} = \frac{dividend_{it}}{profit\ before\ tax_{it}},$$

where dividend payments are divided by profit before tax. Profit before tax corresponds to 「税引前当期純利益」, ensuring consistency with financial statement terminology. This ratio captures payout behavior relative to pre-tax profitability.

4. Retained Earnings (logRetainedEarnings)

Retained earnings are measured as the natural logarithm of 「利益剰余金」, providing an internally consistent accounting measure of undistributed profits:

$$logRetainedEarnings_{it} = \log(\text{利益剰余金}_{it}).$$

This variable reflects internal financing capacity and long-term accumulation of corporate savings.

5. Leverage (DebtRatio)

The leverage ratio is defined as:

$$DebtRatio_{it} = \frac{TotalDebt_{it}}{TotalAssets_{it}},$$

where total debt includes interest-bearing liabilities. This measure captures the firm's capital structure and financial constraints.

6. Employment (logEMP)

Employment is measured as the natural logarithm of the number of employees:

$$logEMP_{it} = \log(\text{従業員数}_{it}).$$

Using the log specification reduces skewness and ensures comparability across firms of different scales. Employment controls for firm size and internal resource capacity.

2.3.3 Control Variables

A series of standard control variables are included to account for firm size, profitability, liquidity, and growth dynamics.

(a) Firm Size

$$\ln\ Assets_{it} = \log(\text{総資産}_{it})$$
$$\ln\ Sales_{it} = \log(\text{売上高}_{it})$$

These log-transformed controls mitigate skewness and ensure comparability across firms.

[19] Because censoring in a Tobit framework must occur at a well-defined numerical threshold, censoring of an undefined quantity such as log (NA)is not mathematically meaningful. This creates a conceptual mismatch between the structure of the data and the standard Tobit interpretation.

(b) Profitability

ROE_{it}: Return on equity, as reported in the securities filings.

(c) Liquidity and Financing

$DebtRatio_{it}$: leverage measure defined above.

$CashRatio_{it} = \frac{Cash_{it}}{TotalAssets_{it}}$: measuring liquidity buffers.

(d) Growth Measures

$$SalesGrowth_pct_{it} = \frac{Sales_{it} - Sales_{i,t-1}}{Sales_{i,t-1}},$$

$$AssetsGrowth_pct_{it} = \frac{Assets_{it} - Assets_{i,t-1}}{Assets_{i,t-1}}.$$

These variables capture short-term dynamics in firm expansion and investment opportunities.

All variables are constructed in a manner that ensures cross-firm comparability, minimizes measurement error, and adheres to established empirical literature. The final dataset contains investment, payout, leverage, size, profitability, and growth indicators, enabling comprehensive estimation of how corporate tax reforms influence the behavior of Japan's largest value-creating firms.

2.3 Descriptive Statistics

Panel 1,2 report descriptive statistics for the main variables used in the empirical analysis.

Panel 1: Filtered Sample

Descriptive Statistics: Filtered Sample (data_filtered)

Variable	N	Mean	SD	Min	P25	Median	P75	Max
ETR_data	2837	0.403	1.376	0.001	0.276	0.327	0.402	56.757
MNE	2837	0.660	0.474	0.000	0.000	1.000	1.000	1.000
inv	2700	0.111	0.415	-3.060	-0.012	0.051	0.142	6.786
R & D	2837	27548.536	72962.141	0.000	0.000	0.000	14674.000	742800.000
div_share	2768	-0.258	0.802	-39.065	-0.275	-0.193	-0.126	0.129
lndividend	2767	9.276	1.743	0.000	8.245	9.441	10.518	13.265
lnRetainedEarnings	2795	12.388	1.739	5.100	11.257	12.656	13.646	16.513
DebtRatio	2837	2.672	12.754	0.040	0.480	0.959	1.953	261.774
EMP	2836	31962.642	48990.406	28.000	4493.750	13140.500	37441.000	368247.000
lnAssets	2837	13.634	1.865	7.333	12.518	13.654	14.917	19.839
lnSales	2837	13.273	1.625	7.396	12.321	13.330	14.427	16.887
ROE	2780	0.126	0.085	-0.182	0.073	0.110	0.158	0.727
CashRatio	2837	0.181	0.151	0.001	0.073	0.133	0.239	0.887
SalesGrowth	2780	0.082	0.160	-0.880	0.005	0.060	0.132	2.044
AssetsGrowth	2780	0.094	0.386	-0.369	0.013	0.059	0.123	18.767

Panel 2: Full Sample

Descriptive Statistics: Full Sample (data_20042025)

Variable	N	Mean	SD	Min	P25	Median	P75	Max
ETR_data	2888	0.266	5.057	-260.430	0.265	0.318	0.395	56.757
MNE	2911	0.653	0.476	0.000	0.000	1.000	1.000	1.000
inv	2851	0.101	0.904	-15.302	-0.016	0.047	0.138	38.141
R & D	2911	28712.990	74269.953	0.000	0.000	0.000	15740.500	742800.000
div_share	2809	-0.196	1.737	-39.065	-0.275	-0.192	-0.123	73.672
lndividend	2809	9.294	1.773	0.000	8.276	9.473	10.546	13.265
lnRetainedEarnings	2821	12.406	1.745	5.100	11.308	12.693	13.661	16.513
DebtRatio	2888	2.737	12.664	0.040	0.495	0.991	2.043	261.774
EMP	2887	32243.184	48874.612	28.000	4658.500	13546.000	38367.000	368247.000
lnAssets	2888	13.662	1.867	7.333	12.529	13.705	14.938	19.839
lnSales	2888	13.292	1.622	7.174	12.341	13.370	14.436	16.887
ROE	2830	0.114	0.120	-2.176	0.069	0.108	0.157	0.727
CashRatio	2888	0.180	0.152	0.000	0.074	0.133	0.237	0.927
SalesGrowth	2830	0.079	0.170	-0.668	-0.001	0.058	0.132	2.044
AssetsGrowth	2830	0.093	0.402	-0.722	0.011	0.058	0.123	18.767

3. Empirical Strategy and Econometric Specification

3.1 Motivation and Conceptual Framework

This study examines how corporate income taxation affects the behavior of Japan's largest listed firms—the JPX Prime 150 "super firms." The analysis focuses on behavioral responses in investment, R&D expenditure, dividend payouts, retained earnings, capital structure, and employment. These outcomes are theoretically relevant because corporate taxation directly alters firms' marginal cost of capital, internal financing capacity, and forward-looking profitability, thereby influencing investment decisions, innovation incentives, and payout policies. In the Japanese institutional context—characterized by conservative corporate financial practices and long-standing reliance on retained earnings—understanding how firms react to tax reductions provides important evidence on the mechanisms through which tax policy affects real economic activity.

3.2 Baseline Econometric Specification

The baseline econometric specification is given by:

$$Y_{it} = \beta_1 \, ETR_{data,it} + \mathbf{X}'_{it}\boldsymbol{\gamma} + \mu_i + \delta_t + \varepsilon_{it},$$

where Y_{it}denotes one of the firm-level outcome variables (investment rate, R&D intensity, dividend payouts, retained earnings, employment, or leverage) for firm i in year t;

ETR_data_{it} is the firm-level effective tax rate derived from consolidated reports;

MNE_i is an indicator for multinational enterprise status;

$\mathbf{X}_{it}$ is a vector of time-varying firm-level controls, including firm size (log assets and log sales), profitability (ROE), leverage (DebtRatio), liquidity (CashRatio), and growth measures (SalesGrowth and AssetsGrowth).

$\mu_i$denotes firm fixed effects;

$\delta_t$denotes year fixed effects;

$\varepsilon_{it}$is the error term.

Firm fixed effects absorb all time-invariant heterogeneity (managerial quality, corporate culture, global orientation), while year fixed effects capture aggregate macroeconomic shocks and nationwide business-cycle fluctuations. Standard errors are clustered at the firm level to account for serial correlation within firms over time.

To examine heterogeneous tax responses between multinational and purely domestic firms, the following interaction specification is estimated:

$$Y_{it} = \beta_1 \, ETR_data_{it} + \beta_2 \, MNE_i + \beta_3 (ETR_data_{it} \times MNE_i) + \mathbf{X}'_{it}\boldsymbol{\gamma} + \mu_i + \delta_t + \varepsilon_{it}.$$

In this specification, $MNE_i$is an indicator variable equal to one if the firm operates overseas and zero otherwise. The interaction term $ETR_data_{it} \times MNE_i$captures heterogeneity in tax sensitivity between multinational and purely domestic firms;

The interaction term $ETR_data_{it} \times MNE_i$ tests the theoretical expectation that multinational firms may exhibit systematically different tax sensitivities compared to purely

domestic firms, due to opportunities for profit shifting, international capital mobility, or internal capital reallocation. To empirically test for this heterogeneity—where a significant coefficient ($\beta_3 \neq 0$) would support the presence of differing tax responsiveness—the analysis must account for other firm-level factors. Therefore, all regressions incorporate a standard set of firm-level controls, including measures of size, profitability, leverage, liquidity, and growth opportunities. These controls are essential to isolate the specific effect of taxation and ensure that the estimated tax sensitivities are not confounded by underlying firm dynamics or financial constraints.

3.3 Identification Strategy

The statutory corporate tax rate (ETR_oecd_{it}) varies only over time and is set entirely by national tax policy. Japanese firms do not have discretion over their applicable statutory rate, and tax reforms—particularly the gradual reductions implemented between 2012 and 2018—were uniformly applied to all corporations regardless of size, profitability, or multinational status. Since statutory rates are determined independently of firm-level shocks such as investment opportunities or profitability, they can be treated as an exogenous policy variable.

In contrast, ETR_data_{it} is subject to firm-level accounting adjustments that may be correlated with unobservable determinants of Y_{it}. Several mechanisms generate endogeneity[20]:

a) Profit sensitivity: Since $ETR_data_{it} = \frac{Tax\ Expenses_{it}}{Profit\ Before\ Tax_{it}}$, changes in profitability mechanically affect the effective tax rate, even if statutory rates remain constant.
b) Deferred tax accounting: Recognition or reversal of deferred tax assets and liabilities causes $Tax\ Expenses_{it}$ to fluctuate independently of underlying tax policy, potentially responding to firm-specific shocks.
c) Loss carryforwards: Firms with accumulated losses may pay little or no current tax, generating unusually low or negative ETR values even when profitability recovers.
d) Lumpy or non-recurring items: Asset impairments, restructuring costs, or valuation adjustments can alter the denominator or numerator of the effective tax rate, creating spurious short-run movements.

Because of these features, ETR_data_{it} may correlate with the error term ε_{it} in behavioral equations.

To address these concerns, the model includes:

[20] For example, firms experiencing substantial earnings deterioration may fully write down deferred tax assets, resulting in positive tax expenses even when pre-tax income is negative. Such accounting adjustments can generate unusually low or negative effective tax rates and introduce firm-specific noise into tax expense measures. Like the document, 2009 年三井金属の有価証券報告書, states the following: "Based on the significant deterioration in performance, after carefully examining the recoverability of deferred tax assets, ... we have fully written off the deferred tax assets .... The total tax expense was ... 12.3 billion yen."
Because the deferred tax assets were fully written off due to the deterioration in performance, the amount of that write-off was recorded as "tax expense" for the current period. As a result, even though the company is in the red before tax, the amount of "corporate tax, etc." is shown as a large positive value.

a) Firm fixed effects to absorb time-invariant accounting practices
b) Year fixed effects to capture policy and macro conditions
c) Rich time-varying controls to account for profitability, size, and financing conditions
d) Robustness checks using filtered samples, excluding observations with CIT expenditure is positive or profit before tax is positive
e) Comparisons with statutory rates, which are purely policy-driven

This identification structure isolates plausibly exogenous variation in the effective tax burden.

3.4 Expected Signs and Behavioral Predictions

Economic theory provides clear predictions regarding how corporate taxation should influence firm behavior. The expected signs of the coefficients on the effective tax rate draw from the standard tax-incidence framework, the cost-of-capital model, and corporate finance theories regarding payout behavior, financing constraints, and precautionary savings.

Investment

A lower effective tax rate reduces the user cost of capital (Hall and Jorgenson, 1967), increases the after-tax marginal return on investment, and relaxes financing constraints by increasing internal funds. Therefore, the expected sign on investment rate is negative: tax reductions should stimulate investment, while increases in effective tax burdens should depress it.

R&D Expenditure

R&D is highly sensitive to internal liquidity because it often involves intangible investment with limited collateral value. A reduction in tax liabilities expands internal financing, thereby increasing firms' ability to undertake innovative activities. Accordingly, the coefficient on R&D expenditure is expected to be negative, reflecting higher innovation investment in response to tax cuts. This prediction is consistent with empirical findings in both corporate tax and innovation literature.

Dividends

The expected sign for dividends is ambiguous. On one hand, lower taxes increase distributable profits, potentially raising dividend payouts. On the other hand, Japanese firms exhibit a strong preference for retaining earnings as a buffer against uncertainty, and dividend smoothing behavior may limit short-term adjustments (Fudenberg and Tirole, 1995). Thus, tax cuts may or may not translate into higher payouts, depending on corporate governance and balance-sheet considerations.

Retained Earnings

Given the well-documented tendency of Japanese corporations to accumulate internal reserves (hoarding cash and retained earnings)[21], tax reductions are likely to increase retained earnings.

[21] The retained earnings (internal reserves) of Japanese corporations have continued to accumulate, reaching a historic high of 516 trillion yen in 2021. Research indicates that these funds have not been effectively channeled into domestic capital investment or wage growth but are largely held as cash, deposits, and overseas investment securities. The increase is closely related to the prolonged low-interest environment resulting from monetary easing policies and the macroeconomic distribution structure characterized by a "thick corporate sector and thin household sector." See: Kimiyo Kitamura, "Retained Earnings and Reasons for Its Increasing," 企業研究所, No. 42, 2022, pp. 188–213.

Firms may choose to preserve liquidity rather than raise dividends or expand investment immediately. Therefore, a positive coefficient is expected.

Leverage (Debt Ratio)

The predicted effect on leverage is ambiguous. A lower statutory tax rate reduces the marginal tax benefit of debt (the interest tax shield), potentially decreasing firms' reliance on borrowing. However, improved internal funds may increase firms' capacity to borrow if they choose to expand operations. The net effect thus depends on whether tax shields or financing constraints dominate.

Employment

To the extent that tax cuts stimulate investment and expansion, employment is expected to rise. The predicted sign is negative, but the magnitude depends on whether firms pursue labor-intensive or capital-intensive expansion strategies.

These behavioral predictions provide a theoretical benchmark for interpreting the empirical estimates and assessing the consistency of the results with established economic frameworks.

3.5 Estimation Method

The empirical analysis employs a fixed-effects OLS (FEOLS) estimator, which removes all time-invariant firm characteristics through within-firm differencing. This approach is essential because firms differ systematically in management quality, corporate culture, internationalization, and accounting practices—factors that could otherwise bias the estimated effect of taxation on firm behavior. Year fixed effects are included to absorb aggregate macroeconomic shocks, nationwide policy changes, and common trends, ensuring that identification relies solely on within-firm changes over time.

Standard errors are clustered at the firm level to account for serial correlation and heteroskedasticity in the error structure, following best practices in panel-data estimation. Because the dataset is an unbalanced panel covering 150 large listed firms, clustering at the firm level is necessary to obtain valid inference.

Two samples are analyzed. The *full sample (data_20042025)* retains all observations, preserving the full variation in accounting-based effective tax rates, including negative or extreme values arising from deferred tax adjustments. The *filtered sample (data_filtered)* excludes observations with negative pretax income or negative tax expenses, thereby reducing measurement noise and improving comparability across firms. Estimating models on both samples provides a robustness check against accounting-driven distortions and allows assessment of the sensitivity of results to sample selection.

4. Empirical Results

Because extreme ETR values in the full sample largely reflect accounting adjustments rather than actual tax burdens, all economic interpretations rely on coefficients from the filtered sample, where effective tax variation is economically meaningful. Full-sample estimates are reported for robustness only.

4.1 Investment Responses to Corporate Taxation

4.1.1 Empirical Specification

From Chapter*2.2.2 Dependent Variables*, there is the function to calculate investment rate:

$$\text{Investment Rate}_{it} = \frac{\Delta\text{net PPE}_{it} + \text{Depreciation}_{it}}{\text{net PPE}_{i,t-1}}$$ [22]

Clarification on the Measurement of Property, Plant and Equipment (PPE) in Japanese Financial Statements: A Legal and Empirical Perspective

A recurring point of contention in empirical research utilizing Japanese financial data concerns the precise measurement of Property, Plant and Equipment (PPE) as presented in the statutory balance sheet. Specifically, researchers often question whether the item listed as **「有形固定資産」** (*Yūkei Kotei Shisan*) represents the gross historical cost (Gross PPE) or the net book value (net PPE). This confusion can significantly impact the construction of key financial ratios, such as the investment rate or asset turnover ratios.

Based on a direct examination of the relevant Japanese accounting regulations, the 「有形固定資産」 figure on the face of a consolidated balance sheet unambiguously represents the net PPE. This conclusion is firmly rooted in the *Financial Instruments and Exchange Act* and its accompanying **「財務諸表等規則」** (Regulations for Financial Statements). [23]

---

[22] *"Historical-cost capital K^H_it is net PPE (PPENT)."; "In calculating the investment rates, capital is 1-period-lagged relative to investment."* Hang Bai, Erica X. N. Li, Chen Xue, and Lu Zhang, "Asymmetric Investment Rates," NBER Working Paper 29957 (2022).

[23] 財務諸表等の用語、様式及び作成方法に関する規則 | e-Gov 法令検索
（昭和三十八年大蔵省令第五十九号）search date: 2025/12/11,
Law Revision ID:338M50000040059_20250822_507M60000002075
The legal rationale is delineated across several key articles:
Article 25 of the Regulations establishes the standard method of presenting accumulated depreciation as a separate contra-account. Crucially, Article 26 provides an alternative "direct deduction method". It permits companies to deduct the accumulated depreciation directly from the gross carrying amount of each asset and to present only the resulting net amount on the balance sheet. The article further states that when this method is applied in consolidated financial statements, detailed disclosure of the deducted depreciation in the notes is not required. Article 26-2 extends this identical treatment to accumulated impairment losses, mandating their direct deduction from the asset's carrying amount.

Therefore, the reported value for 「有形固定資産」 is legally defined as:
Reported 「有形固定資産」 = Gross Historical Cost (取得原価) – Accumulated Depreciation (減価償却累計額) – Accumulated Impairment Losses (減損損失累計額)

This constitutes the standard net PPE. The Gross PPE and the specific amounts of accumulated depreciation and impairment are, in compliance with accounting standards, detailed in the notes to the financial statements (typically under 「有形固定資産の内訳」), but are subsumed into a single net figure on the primary statement.

Implications for Empirical Research

For researchers working with datasets derived from Japanese filings, this legal clarification has a direct operational consequence. The data field commonly labeled **「有形固定資産[百万円]」** in standardized databases can and should be used directly as the net PPE for analysis. There is no need to derive it from other components, as the balance sheet figure is already the product of the legally sanctioned "direct deduction" process. Using this value for calculating investment rates (e.g., Investment / Average net PPE) or efficiency ratios (e.g., Sales / net PPE) is both methodologically sound and consistent with the economic reality the financial statements are designed to convey.

Depreciation (DP)

To maintain methodological consistency and achieve the research objective, this study employs an alternative approach widely acknowledged in financial analysis: using the difference between “EBITDA” (Earnings Before Interest, Taxes, Depreciation, and Amortization) and “EBIT” (Earnings Before Interest and Taxes) as a proxy for the total periodic D&A expense. This approach is grounded in the accounting identity that the systematic difference between EBITDA and EBIT is, by definition, the sum of depreciation and amortization. The depreciation as the difference between EBITDA and EBIT:

$$DP_{it} = EBITDA_{it} - EBIT_{it},$$

where $EBITDA_{it}$and $EBIT_{it}$are earnings before interest, taxes, depreciation and amortization, and earnings before interest and taxes, respectively, for firm i in year t(both measured in million yen). The values for $EBITDA_{it}$and $EBIT_{it}$ are extracted directly from the standardized EDINET data fields in eol.[24]

This measure is then used in the construction of the historical-cost investment flow as the accounting depreciation component in $\Delta\text{net PPE}_{it} + DP_{it}$.

This method yields a combined total of depreciation and amortization. For the purpose of this study, this total is treated as the depreciation expense for tangible assets in the subsequent calculations. While this simplification may slightly overstate the tangible investment flow by including amortization of intangibles, the potential bias is considered acceptable for the primary analysis of investment rate distributions and trends, given that amortization typically constitutes a minor portion.

Winsorization of investment rate

The raw investment rate exhibits a highly skewed distribution with a long right tail, which is standard in firm-level investment data and typically reflects episodic large-scale asset

[24] See ***Appendix F***, [232] and [233].

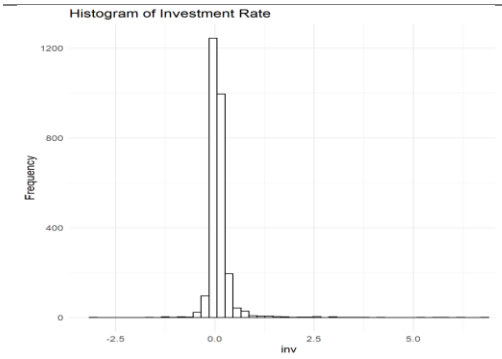
acquisitions or disposals. Following common practice in the investment literature (e.g., Dobbins and Jacob (2016); Bai et al. (2022)), the investment rate is winsorized at the 1% and 99% levels. Specifically, values below the 1st percentile and above the 99th percentile are replaced with the corresponding percentile values.

Before winsorization, the investment rate ranges from –3.06 to 6.79 with strong right skewness. After winsorization at 1% and 99%, the range narrows to –0.39 to 1.68, but the central distribution (median ≈ 0.05) remains unchanged.

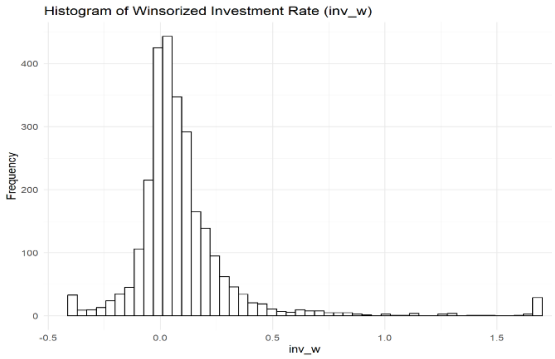
Figure3

Histogram of investment rate - before / after [data_filtered]

Before

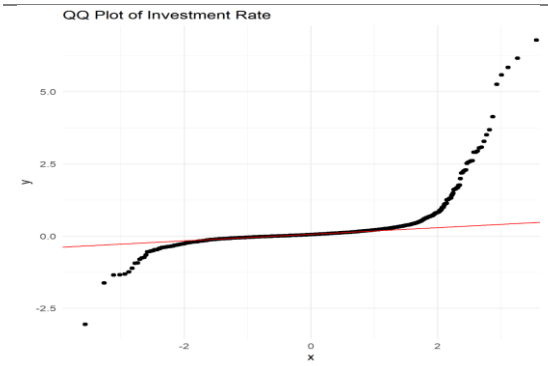


After

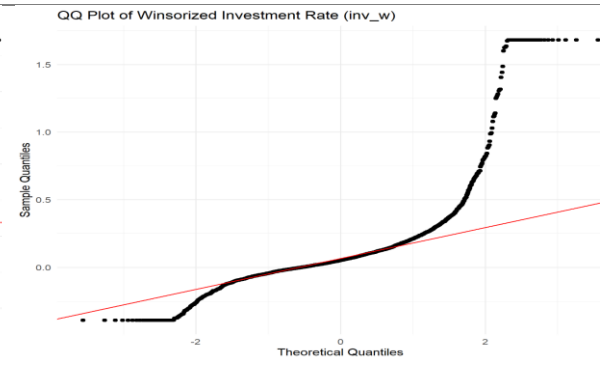


Q-Q plot of investment rate - before / after [data_filtered]

Before



After



The winsorized measure, denoted inv_w, is used in the baseline regressions, while results using the raw investment rate are reported as robustness checks.

So, the ultimate function for investment rate is:

$$inv_w_{it} = \frac{(\Delta PPE_{it} + DP_{it})}{PPE_{i,t-1}}$$

The investment rate used in all baseline regressions is the 1%–99% winsorized version of inv_{it}, denoted inv_w_{it}.

As shown in Figure 3, even after restricting the sample to observations with positive pretax income and positive tax payments, extreme values in the investment rate remain because they arise primarily from capital events—such as asset acquisitions, disposals, and impairments—rather than from profitability. Therefore, winsorization is still necessary to avoid undue influence from episodic investment spikes.

4.1.2 Interpretation

Table 7 reports the baseline fixed-effects estimates of the relationship between corporate taxation and firm-level investment, where the dependent variable is the 1%–99% winsorized investment rate, inv_w. All specifications include firm and year fixed effects, and standard errors are clustered at the firm level.

Table 7: Results in Filterd Sample

	w_inv_pos	w_inv2_pos
Dependent Var.:	inv_w	inv_w
ETR_data	-0.0044*** (0.0011)	-0.0053* (0.0021)
lnAssets	0.0680 (0.0424)	0.0724. (0.0416)
lnSales	-0.1036* (0.0434)	-0.1095* (0.0423)
ROE	0.5620*** (0.1251)	0.5624*** (0.1254)
DebtRatio	0.0002 (0.0007)	8.03e-5 (0.0007)
CashRatio	-0.1893. (0.0968)	-0.1941* (0.0971)
SalesGrowth	0.2156*** (0.0638)	0.2149*** (0.0639)
AssetsGrowth	0.0693 (0.0562)	0.0692 (0.0562)
MNE		0.0166 (0.0165)
MNE x ETR_data		0.0010 (0.0020)
Fixed-Effects:	----------	----------
firm_id	Yes	Yes
year	Yes	Yes
S.E.: Clustered	by: firm_id	by: firm_id
Observations	2,676	2,676
R2	0.28157	0.28192
Within R2	0.06191	0.06236

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

In the filtered sample, which restricts observations to firms with positive pretax income and positive tax payments, the coefficient on the effective tax rate, ETR_data, is negative and statistically significant. This indicates that, within firms, an increase in the effective corporate tax burden is associated with a reduction in investment intensity. Quantitatively, a 10-percentage-point increase in the effective tax rate (i.e., $\Delta ETR = 0.1$) is associated with a decline in the investment rate of approximately 0.0005.

Following Suárez Serrato (2020), we use the interquartile range (IQR) to interpret the economic magnitude of the estimated coefficients. The IQR of ETR is calculated based on the distribution of ETR in the full estimation sample and is used as a common scale to interpret economic magnitude across different outcomes. [25]Using a more representative scale, an interquartile-range increase in ETR_data(IQR ≈ 0.126) corresponds to a decrease in investment of about 0.0007. These magnitudes are economically small but consistent with the view that investment responds negatively to higher corporate taxation.

Specifically, the interquartile range of ETR_data spans from the 75th percentile (0.402) to the 25th percentile (0.276), a range that closely mirrors the magnitude of statutory and effective corporate tax rate changes observed in Japan over the sample period; therefore, interpreting the

[25] As shown in Table 6, in the filtered sample the 25th percentile is 0.2755074 and the 75th percentile is 0.4017689. Hence, $IQR = P75 - P25 \approx 0.402 - 0.276 = 0.126$.

estimated effect using the IQR provides a policy-relevant benchmark for assessing the investment response to Japan's corporate tax reductions.

Importantly, neither the MNE dummy nor its interaction with the effective tax rate is statistically significant in the filtered sample. This implies that there is no evidence of differential tax sensitivity between multinational and purely domestic firms once the analysis is confined to observations for which the effective tax rate is economically well-defined. The estimated tax semi-elasticities for MNEs and non-MNEs are similar in magnitude, suggesting that the investment response to taxation operates largely through common channels rather than through firm internationalization per se.

Table 8: Results in Full Sample

	w_inv	w_inv2
Dependent Var.:	inv_w	inv_w
ETR_data	0.0024*** (0.0006)	0.0027*** (0.0002)
lnAssets	0.0596. (0.0337)	0.0654* (0.0328)
lnSales	-0.1020** (0.0377)	-0.1089** (0.0367)
ROE	0.4960*** (0.0635)	0.4966*** (0.0633)
DebtRatio	0.0005 (0.0007)	0.0004 (0.0007)
CashRatio	-0.1723. (0.0975)	-0.1774. (0.0972)
SalesGrowth	0.2255** (0.0717)	0.2248** (0.0716)
AssetsGrowth	0.0879 (0.0669)	0.0876 (0.0668)
MNE		0.0239 (0.0160)
MNE x ETR_data		-0.0054** (0.0019)
Fixed-Effects:	----------	----------
firm_id	Yes	Yes
year	Yes	Yes
S.E.: Clustered	by: firm_id	by: firm_id
Observations	2,827	2,827
R2	0.28491	0.28603
Within R2	0.10092	0.10232

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

By contrast, estimates based on the full sample yield qualitatively different results. While the coefficient on ETR_databecomes positive and statistically significant for domestic firms, the interaction term $MNE \times ETR_data$is negative and significant, implying opposite tax–investment responses for MNEs and non-MNEs. However, this divergence is likely driven by measurement issues inherent in the effective tax rate, which is constructed as the ratio of tax expense to pretax income. When pretax income is close to zero or negative, or when tax expenses reflect loss carryforwards, refunds, or deferred tax adjustments, ETR_data ceases to represent the firm's marginal tax burden. In such cases, the estimated coefficients may capture firm distress or accounting effects rather than genuine tax incentives.

Taken together, these results suggest that the negative tax–investment relationship observed in the filtered sample provides a more credible characterization of firms' investment behavior. The full-sample results are therefore interpreted as reflecting heterogeneity driven by loss-making and special accounting episodes, rather than structural differences in tax sensitivity between multinational and domestic firms.

4.2 R&D Responses to Corporate Taxation

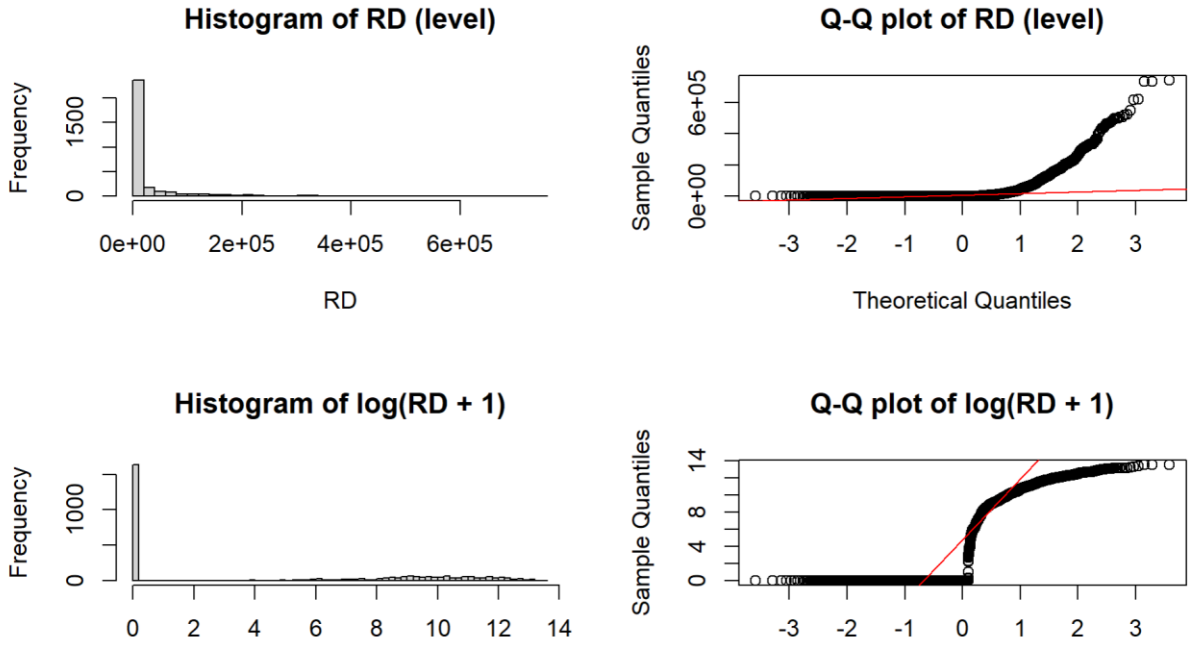
R&D investment is a central channel through which corporate taxation may influence firms' long-run productivity and innovative capacity. Using the JPX Prime 150 panel, this section examines how firm-level effective tax burdens relate to innovation spending. A key empirical challenge is that reported R&D expenditures contain a large mass at NA which are recorded as zero to analyze comfortably: in Japanese financial reporting, R&D is not necessarily disclosed as a mandatory line item unless it helps investors' understanding, so "missing" or non-reported values often reflect economically immaterial R&D rather than random nonresponse. Consistent with this institutional feature, this study treats non-disclosure as zero R&D spending and focuses on the transformed outcome $y_{it} = \log(R\&D_{it} + 1)$, which is defined for all firms and years and reduces the influence of extreme upper tails.

4.2.1 Distributional Features and Measurement Challenges in R&D Data

Even after the $\log(R\&D + 1)$transformation, the outcome remains left-censored at zero because $y_{it} = 0$whenever $R\&D_{it} = 0$. In the filtered sample used for tax analysis (restricted to observations where pre-tax income and tax expense are positive so that $ETR_data$is well-defined), there are 2,780 observations, of which 1,472 (about 53%) are at the censoring point and 1,308 are strictly positive. This motivates a censored-response model rather than treating the zeros as standard continuous outcomes.

Figure4 place (i) a histogram of $R\&D$in levels (showing the spike at 0), (ii) a histogram of $\log(R\&D + 1)$, and (iii) a Q–Q plot for $\log(R\&D + 1)$to visually establish (a) censoring at 0 and (b) improved but still non-normal tails.

Figure 4 Histogram and Q–Q Plots of R&D Expenditure in the Filtered Sample[26]



[26] RD denotes R&D expenditure; the separate naming is used solely in the R code for data management purposes and does not imply any conceptual distinction.

4.2.2 Baseline model: Tobit for R&D

To account for censoring, this paper adopts a Tobit specification following Mai and Tien (2025), where the benchmark model is specified with a latent R&D intensity:

Latent equation:

$$y_{it}^{*} = \alpha + \beta\, ETR_it + X_{it}'\theta + \tau_t + u_{it},$$

Observation rule (left-censoring at 0):

$$y_{it} = \max\{0,\, y_{it}^{*}\}.$$

Here $y_{it} = \log(R\&D_{it} + 1)$, $ETR_{it}$is the firm's effective tax rate measure (ETR_data), X_{it}includes ln $Assets$, ln $Sales$, ROE, $DebtRatio$, $CashRatio$, $SalesGrowth$, and $AssetsGrowth$, and $\tau_t$are year fixed effects capturing aggregate macro conditions and policy environments common to all firms. The Tobit model is the classical workhorse for left-censored outcomes.

When estimating R&D investment, a natural benchmark would be a two-way fixed-effects (TWFE) specification analogous to the investment regressions. However, in the present setting this approach proves infeasible. The R&D variable exhibits a pronounced mass at zero—over half of firm–year observations report zero R&D—so that the outcome is left-censored and contains limited within-firm variation in the intensive margin. For a subset of firms, R&D expenditures are zero in all observed years, implying that firm-specific intercepts are nearly perfectly aligned with the censoring pattern. In such circumstances, the inclusion of high-dimensional firm and year fixed effects in a nonlinear Tobit model leads to severe collinearity and weak identification, and the likelihood fails to recover meaningful slope parameters.

Rather than interpreting this outcome as a data failure, it reflects a mismatch between the traditional dummy-variable TWFE formulation and the structure of a short panel with a limited dependent variable. Wooldridge (2021) shows that, in linear models, the TWFE estimator is algebraically equivalent to a pooled regression augmented with unit-specific time averages and period-specific cross-sectional averages of the regressors—the so-called two-way Mundlak (TWM) regression. This result implies that the same sources of unobserved heterogeneity can be controlled for without introducing a large number of dummy variables, thereby avoiding the loss of degrees of freedom and the dimensionality problems that arise in nonlinear settings.

Motivated by this equivalence, the R&D analysis adopts a two-way Mundlak Tobit specification as the preferred approach. Specifically, the benchmark model augments the standard Tobit regression with firm-level time averages and year-level cross-sectional averages of time-varying covariates, while retaining year fixed effects to absorb common macroeconomic shocks. This approach preserves the spirit of two-way heterogeneity control while remaining compatible with the censored nature of the dependent variable and the available sample size.

Formally, the baseline empirical model is:

$$y_{it}^{*} = \beta_0 + \beta_1 ETR_{it} + \mathbf{X}_{it}'\boldsymbol{\beta} + \bar{\mathbf{X}}_i'\boldsymbol{\gamma} + \bar{\mathbf{X}}_t'\boldsymbol{\delta} + u_{it},$$
$$y_{it} = \max(0, y_{it}^{*}),$$

where:

ETR_{it} denotes the effective corporate tax rate and is implemented as ETR_{data} in the $data_filtered$ dataset (filtered sample);

$\mathbf{X}_{it}$includes firm-level time-varying controls: firm size (lnAssets), sales (lnSales), profitability (ROE), leverage (DebtRatio), liquidity (CashRatio), and growth measures (SalesGrowth, AssetsGrowth);

$\bar{\mathbf{X}}_i$denotes firm-specific time averages of all time-varying regressors (Mundlak terms), capturing unobserved firm heterogeneity; in the empirical implementation, these variables are identified by the suffix $_bar_firm$;

$\bar{\mathbf{X}}_t$denotes year-specific cross-sectional averages, capturing aggregate macroeconomic and policy trends; in the empirical implementation, these variables are identified by the suffix $_bar_year$;

$u_{it} \sim N(0, \sigma^2)$.

To examine differential tax responsiveness between multinational and purely domestic firms, the following interaction specification is estimated:

$$y_{it}^{*} = \beta_0 + \beta_1 ETR_{it} + \beta_2 MNE_i + \beta_3 (ETR_{it} \times MNE_i) + \mathbf{X}_{it}'\boldsymbol{\beta} + \bar{\mathbf{X}}_i'\boldsymbol{\gamma} + \bar{\mathbf{X}}_t'\boldsymbol{\delta} + u_{it}.$$

4.2.3 Interpretation

Table 9 reports the results from the Tobit model[27] with two-way Mundlak corrections, where the dependent variable is $\log(R\&D_{it} + 1)$and observations are left-censored at zero. Across specifications, the contemporaneous effective tax rate (ETR_{it}) does not exhibit a statistically significant association with R&D expenditure. In the baseline specification, the coefficient on ETR_{it} is positive but small in magnitude and statistically insignificant, indicating no detectable short-run response of R&D spending to within-firm changes in the effective tax burden. This result remains robust when controlling for multinational status and its interaction with ETR.

Table 9: Tobit Estimates of log(R&D$_{it}$ + 1) with Two-Way Mundlak Corrections

This table reports results from a Tobit model with two-way Mundlak corrections, where the dependent variable is log(R&D$_{it}$ + 1) and observations are left-censored at zero.

```
Observations:
         Total  Left-censored     Uncensored Right-censored
          2780           1472           1308              0

Coefficients:
                       Estimate Std. error t value  Pr(> t)
(Intercept)          -242.63075   26.75960  -9.067  < 2e-16 ***
ETR_data                0.04813    0.08326   0.578 0.563205
lnAssets                0.40114    0.86421   0.464 0.642528
lnSales                -1.24882    0.87468  -1.428 0.153364
ROE                     6.52177    2.66568   2.447 0.014422 *
DebtRatio               0.65018    0.20106   3.234 0.001222 **
CashRatio              -3.85639    2.17116  -1.776 0.075702 .
SalesGrowth            -0.27339    1.13052  -0.242 0.808912
AssetsGrowth           -3.17619    1.32944  -2.389 0.016889 *
ETR_data_bar_firm       1.82227    0.40077   4.547 5.44e-06 ***
lnAssets_bar_firm       1.69620    0.93408   1.816 0.069386 .
lnSales_bar_firm       -0.08347    0.93616  -0.089 0.928955
ROE_bar_firm          -15.53401    4.36206  -3.561 0.000369 ***
DebtRatio_bar_firm     -2.71251    0.24702 -10.981  < 2e-16 ***
CashRatio_bar_firm     -0.94450    2.57157  -0.367 0.713406
SalesGrowth_bar_firm  -19.64689    4.42423  -4.441 8.96e-06 ***
AssetsGrowth_bar_firm  15.18586    4.13515   3.672 0.000240 ***
ETR_data_bar_year      24.13747    1.36076  17.738  < 2e-16 ***
lnAssets_bar_year     -46.78627    7.61820  -6.141 8.18e-10 ***
lnSales_bar_year       57.64274    8.83176   6.527 6.72e-11 ***
ROE_bar_year           47.83694   25.46122   1.879 0.060270 .
DebtRatio_bar_year     -2.68143    0.65871  -4.071 4.69e-05 ***
CashRatio_bar_year    559.42719   34.19192  16.361  < 2e-16 ***
SalesGrowth_bar_year  -36.18218    4.82341  -7.501 6.32e-14 ***
AssetsGrowth_bar_year  36.47161    3.91865   9.307  < 2e-16 ***
logSigma                1.73799    0.02165  80.291  < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Newton-Raphson maximisation, 8 iterations
Return code 1: gradient close to zero (gradtol)
Log-likelihood: -4750.607 on 26 Df
```

In contrast, the firm-level Mundlak term for ETR ($ETR_data_bar_firm$) in Table 10, capturing persistent cross-firm differences in average tax exposure, is positive and highly significant. This suggests that firms with systematically higher long-run effective tax rates tend to exhibit higher R&D expenditure levels, conditional on other firm characteristics. At the same

[27] Estimation is implemented in R using the maxLik and censReg packages.

Henningsen, Arne and Toomet, Ott (2011). maxLik: A package for maximum likelihood estimation in R. Computational Statistics 26(3), 443-458. DOI 10.1007/s00180-010-0217-1.

Henningsen, Arne (2017). censReg: Censored Regression (Tobit) Models. R package version 0.5. http://CRAN.R-Project.org/package=censReg.

time, the year-level Mundlak mean of ETR is also strongly positive and statistically significant, indicating that periods characterized by higher average effective taxation across firms are associated with higher aggregate R&D intensity. These patterns imply that the variation driving R&D outcomes is predominantly cross-sectional and time-specific rather than arising from short-run within-firm tax fluctuations.

Table 10: Tobit Estimates of log(R&D$_{it}$ + 1) with Two-Way Mundlak Corrections and Interaction Term

```
Observations:
         Total  Left-censored     Uncensored Right-censored
          2780           1472           1308              0

Coefficients:
                        Estimate Std. error t value  Pr(> t)
(Intercept)           -239.04998   26.55779  -9.001  < 2e-16 ***
MNE                     -1.12079    0.30201  -3.711 0.000206 ***
ETR_data                 0.07250    0.17985   0.403 0.686846
lnAssets                -0.07075    0.86771  -0.082 0.935017
lnSales                 -0.72303    0.88120  -0.820 0.411931
ROE                      6.37824    2.65935   2.398 0.016466 *
DebtRatio                0.66269    0.19973   3.318 0.000907 ***
CashRatio               -3.35380    2.16070  -1.552 0.120619
SalesGrowth             -0.21252    1.12566  -0.189 0.850254
AssetsGrowth            -3.04490    1.32746  -2.294 0.021803 *
ETR_data_bar_firm        1.79426    0.39867   4.501 6.78e-06 ***
lnAssets_bar_firm        2.04053    0.93331   2.186 0.028792 *
lnSales_bar_firm        -0.56485    0.94046  -0.601 0.548103
ROE_bar_firm           -15.86943    4.34672  -3.651 0.000261 ***
DebtRatio_bar_firm      -2.62032    0.24667 -10.623  < 2e-16 ***
CashRatio_bar_firm      -1.75014    2.56572  -0.682 0.495159
SalesGrowth_bar_firm   -17.94156    4.42040  -4.059 4.93e-05 ***
AssetsGrowth_bar_firm   13.57604    4.12285   3.293 0.000992 ***
ETR_data_bar_year       24.04019    1.35213  17.779  < 2e-16 ***
lnAssets_bar_year      -45.88475    7.56822  -6.063 1.34e-09 ***
lnSales_bar_year        56.70639    8.76945   6.466 1.00e-10 ***
ROE_bar_year            44.31789   25.33050   1.750 0.080190 .
DebtRatio_bar_year      -2.79496    0.65629  -4.259 2.06e-05 ***
CashRatio_bar_year     554.94001   33.93856  16.351  < 2e-16 ***
SalesGrowth_bar_year   -35.90109    4.79609  -7.485 7.13e-14 ***
AssetsGrowth_bar_year   36.31845    3.89517   9.324  < 2e-16 ***
MNE:ETR_data            -0.03190    0.19680  -0.162 0.871222
logSigma                 1.73290    0.02164  80.063  < 2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Newton-Raphson maximisation, 7 iterations
Return code 8: successive function values within relative tolerance limit (reltol)
Log-likelihood: -4743.155 on 28 Df
```

Regarding control variables, firm size (lnAssets) and profitability (ROE) are positively associated with R&D investment, while leverage (DebtRatio) and liquidity (CashRatio) generally enter with negative and statistically significant coefficients. The estimated coefficient on the MNE dummy is negative and significant, indicating that multinational firms exhibit lower observed R&D intensity relative to purely domestic firms, conditional on covariates. However, the interaction term between MNE status and ETR is statistically insignificant, providing no evidence that multinational firms respond differently to effective tax rates in their R&D decisions.

Overall, the Tobit–Mundlak estimates indicate that R&D investment among large Japanese firms is primarily related to persistent firm characteristics and aggregate tax environments, rather than to short-term changes in firm-specific effective tax rates.

4.3 Dividend share

The dividend share is defined as

$$\text{div_share} = \frac{\text{dividend}}{\text{profit before tax}}.$$

To ensure comparability with the investment analysis, the economic magnitude of the tax effect is interpreted using an interquartile range (IQR) change in the effective tax rate. Based on the distribution of ETR_data in the full estimation sample (data_filtered), the IQR equals 0.126, corresponding to a 12.6 percentage-point difference between relatively high- and low-tax firm-years.

Table 11: Results in Filterd Sample

Dependent Var.:	m_div_pos div_share	m_div2_pos div_share
ETR_data	-0.4812** (0.1762)	-0.1093* (0.0515)
lnAssets	-0.0489 (0.0402)	-0.0391 (0.0411)
lnSales	0.1073* (0.0514)	0.0817 (0.0503)
ROE	0.4279 (0.4132)	0.6930* (0.2806)
DebtRatio	0.0004 (0.0008)	8.71e-5 (0.0007)
CashRatio	0.2073. (0.1099)	0.1505 (0.1057)
SalesGrowth	0.2552*** (0.0624)	0.2387*** (0.0595)
AssetsGrowth	0.0078 (0.0069)	0.0056 (0.0067)
MNE		0.1772** (0.0628)
MNE x ETR_data		-0.4130* (0.1810)
Fixed-Effects:	----------	----------
firm_id	Yes	Yes
year	Yes	Yes
S.E.: Clustered	by: firm_id	by: firm_id
Observations	2,722	2,722
R2	0.67235	0.71294
Within R2	0.64482	0.68882

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

In column (1) of Table 11, the coefficient on ETR is −0.4812 and statistically significant at the 5% level. This implies that an IQR decrease in ETR increases the dividend share by:

$$0.126 \times 0.4812 \approx 0.061.$$

Hence, moving from the 25th to the 75th percentile of the ETR distribution raises the dividend share by about 6.1 percentage points. This effect is economically meaningful, indicating that firms distribute a substantially larger fraction of pre-tax profits as dividends when their effective tax burden falls.

Column (2) of Table 11 introduces multinational status and its interaction with ETR. For non-MNE firms, the estimated coefficient on ETR is −0.1093, implying that an IQR decrease in ETR increases the dividend share by:

$$0.126 \times 0.1093 \approx 0.014,$$

or about 1.4 percentage points.

For MNE firms, the total tax effect combines the baseline ETR coefficient and the interaction term. The sum of coefficients is:

$$-0.1093 + (-0.4130) = -0.5223.$$

Accordingly, an IQR decrease in ETR raises the dividend share of MNEs by:

$$0.126 \times 0.5223 \approx 0.066,$$

which corresponds to an increase of approximately 6.6 percentage points. This effect is statistically significant and substantially larger than that for non-MNE firms.

These results indicate that tax reductions translate into higher dividend payouts primarily through the intensive margin among firms that already pay dividends. While non-MNE firms exhibit only a modest response, MNEs show a much stronger increase in dividend share following a typical reduction in effective tax rates. This suggests that, relative to domestic firms, multinational enterprises are more likely to channel tax savings into shareholder payouts rather than retaining them internally.

Overall, compared with investment and R&D, dividend payouts appear to be an important adjustment channel of corporate tax reductions, particularly for multinational firms.

Table 12: Results in Full Sample

	m_div	m_div2
Dependent Var.:	div_share	div_share
ETR_data	-0.2993*** (0.0225)	-0.2851*** (0.0021)
lnAssets	-0.1059 (0.0772)	-0.0653 (0.0692)
lnSales	0.0891 (0.0745)	0.0730 (0.0718)
ROE	-0.0852 (0.2453)	-0.1586 (0.2391)
DebtRatio	0.0014 (0.0016)	0.0004 (0.0012)
CashRatio	0.0281 (0.2148)	0.0474 (0.1992)
SalesGrowth	0.1879. (0.1075)	0.1905. (0.1117)
AssetsGrowth	0.0245. (0.0137)	0.0217 (0.0138)
MNE		0.1055 (0.0712)
MNE x ETR_data		-0.2232 (0.1700)
Fixed-Effects:	----------	----------
firm_id	Yes	Yes
year	Yes	Yes
S.E.: Clustered	by: firm_id	by: firm_id
Observations	2,764	2,764
R2	0.78905	0.81333
Within R2	0.77510	0.80099

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

4.4 Retained Earnings

Table 13 reports the results for retained earnings. In the filtered sample, the coefficient on the effective tax rate (ETR) is small and statistically insignificant, and the interaction between ETR and MNE status is also insignificant. This indicates that, within the filtered sample, changes in the tax rate are not systematically associated with retained earnings, nor do MNEs exhibit a differential response compared with non-MNE firms.

Table 13: Results in Filtered Sample

	m_lnRetainedEarn..	m_lnRetainedEarn...1
Dependent Var.:	lnRetainedEarnings	lnRetainedEarnings
ETR_data	-0.0015 (0.0076)	0.0022 (0.0044)
lnAssets	0.6424*** (0.1302)	0.6611*** (0.1344)
lnSales	0.1798 (0.1135)	0.1539 (0.1194)
ROE	0.6179* (0.2895)	0.6208* (0.2907)
DebtRatio	-0.0139** (0.0048)	-0.0142** (0.0049)
CashRatio	0.6555** (0.2236)	0.6409** (0.2233)
SalesGrowth	-0.1431* (0.0611)	-0.1444* (0.0611)
AssetsGrowth	-0.0466** (0.0177)	-0.0474** (0.0181)
MNE		0.0810 (0.0535)
MNE x ETR_data		-0.0047 (0.0094)
Fixed-Effects:	----------	----------
firm_id	Yes	Yes
year	Yes	Yes
S.E.: Clustered	by: firm_id	by: firm_id
Observations	2,740	2,740
R2	0.96296	0.96314
Within R2	0.37098	0.37394

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

In contrast, in the full sample (Table 14), the coefficient on ETR is negative and statistically significant, suggesting that a reduction in the effective tax rate is associated with an increase in retained earnings. However, the interaction term between MNE status and ETR remains insignificant, implying that the tax sensitivity of retained earnings does not differ between MNEs and non-MNEs.

Table 14: Results in Full Sample

	m_lnRetainedEarni..	m_lnRetainedEarn..2
Dependent Var.:	lnRetainedEarnings	lnRetainedEarnings
ETR_data	-0.0024** (0.0008)	-0.0026*** (0.0005)
lnAssets	0.6891*** (0.1266)	0.7093*** (0.1287)
lnSales	0.1200 (0.1120)	0.0919 (0.1151)
ROE	1.203*** (0.2535)	1.217*** (0.2537)
DebtRatio	-0.0146** (0.0047)	-0.0150** (0.0047)
CashRatio	0.5840* (0.2322)	0.5623* (0.2321)
SalesGrowth	-0.2882*** (0.0760)	-0.2891*** (0.0763)
AssetsGrowth	-0.0704. (0.0379)	-0.0713. (0.0383)
MNE		0.0872. (0.0502)
MNE x ETR_data		0.0021 (0.0087)
Fixed-Effects:	----------	----------
firm_id	Yes	Yes
year	Yes	Yes
S.E.: Clustered	by: firm_id	by: firm_id
Observations	2,766	2,766
R2	0.96138	0.96159
Within R2	0.37841	0.38179

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Across all specifications, firm size and profitability are positively related to retained earnings, while leverage and growth variables are negatively associated, with coefficient signs and magnitudes remaining stable across samples. Overall, the results suggest that tax rate reductions may increase retained earnings at the aggregate firm level, but there is no evidence of heterogeneous responses by multinational status.

4.5 Debt ratio

Table 15 reports firm- and year-fixed effects regressions with the debt ratio as the dependent variable. Across all specifications, the coefficient on the effective tax rate (ETR) is positive but statistically insignificant, indicating no robust evidence that changes in corporate tax rates systematically affect firms' leverage decisions on average.

Firm fundamentals behave largely as expected. Asset growth enters with a consistently negative and highly significant coefficient in all models, suggesting that firms experiencing faster asset expansion rely relatively less on debt financing. Sales growth is weakly positive and occasionally significant, implying that short-run expansion in sales may be associated with higher leverage, though this effect is not stable across specifications. Other controls—firm size (lnAssets), scale (lnSales), profitability (ROE), and liquidity (CashRatio)—are not statistically significant once firm and year fixed effects are included.

The interaction terms provide some heterogeneity insights. In the baseline specification without sign restrictions, the interaction between MNE status and ETR is negative and statistically significant at the 5% level, indicating that multinational enterprises adjust their debt ratios more strongly in response to tax rate changes than non-MNEs. Specifically, a reduction in the effective tax rate is associated with a relatively larger decline in leverage among MNEs, consistent with greater flexibility in financing and tax planning across borders. However, this interaction loses significance in the alternative specification using the restricted (positive-only) debt ratio sample, suggesting that the heterogeneous tax response is sensitive to sample definition.

Overall, the results suggest that corporate tax rate reductions do not have a strong direct effect on leverage for the full sample of large Japanese firms. Instead, leverage dynamics are primarily driven by real balance-sheet adjustments, particularly asset growth. While there is some evidence of differential tax sensitivity for multinational firms, this effect is not fully robust, and thus the debt channel appears to be weaker and less stable than the investment and retained earnings channels examined in earlier sections.

Table 15: Results in Filtered Sample

Dependent Var.:	m_debt_ratio_pos DebtRatio	m_debt_ratio2_pos DebtRatio
ETR_data	0.0741 (0.0499)	0.0537 (0.0837)
lnAssets	16.01 (10.69)	16.31 (10.80)
lnSales	-12.67 (8.732)	-13.14 (8.968)
ROE	9.860 (7.316)	9.857 (7.278)
CashRatio	-0.4962 (2.174)	-0.8944 (2.212)
SalesGrowth	1.924. (1.078)	1.870. (1.055)
AssetsGrowth	-2.239*** (0.4187)	-2.236*** (0.4096)
MNE		1.675 (1.308)
MNE x ETR_data		0.0240 (0.0914)
Fixed-Effects:	----------	----------
firm_id	Yes	Yes
year	Yes	Yes
S.E.: Clustered	by: firm_id	by: firm_id
Observations	2,780	2,780
R2	0.81778	0.81919
Within R2	0.26316	0.26888

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 16: Results in Full Sample

Dependent Var.:	m_debt_ratio DebtRatio	m_debt_ratio2 DebtRatio
ETR_data	0.0339 (0.0232)	0.0375 (0.0233)
lnAssets	14.62 (10.16)	14.90 (10.26)
lnSales	-10.75 (7.815)	-11.17 (8.036)
ROE	-0.0472 (2.140)	0.0753 (2.206)
CashRatio	0.4058 (2.249)	-0.0305 (2.240)
SalesGrowth	2.812* (1.245)	2.740* (1.193)
AssetsGrowth	-2.079*** (0.5741)	-2.085*** (0.5654)
MNE		1.690 (1.319)
MNE x ETR_data		-0.0769* (0.0365)
Fixed-Effects:	----------	----------
firm_id	Yes	Yes
year	Yes	Yes
S.E.: Clustered	by: firm_id	by: firm_id
Observations	2,830	2,830
R2	0.81081	0.81224
Within R2	0.23765	0.24342

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

4.6 Employee

Table 17 reports the estimation results based on the *data_filtered* sample, while Table 18 presents the corresponding results using the *data_full* sample.

Across all specifications, the coefficient on the effective tax rate (ETR) is small and statistically insignificant, indicating that changes in corporate tax rates have no robust effect on firms' employment levels. This result holds in both the filtered and full samples.

The MNE dummy and its interaction with ETR are also insignificant, suggesting no systematic difference between multinational and non-multinational firms in their employment responses to tax rate changes.

Overall, these findings imply that, unlike investment or R&D, employment is relatively insensitive to corporate tax reductions in the short run. Employment decisions appear to be driven mainly by firm size and financial conditions rather than by contemporaneous changes in effective tax rates.

Table 17: Results in Filtered Sample

Dependent Var.:	m_logEMP_pos log(EMP)	m_logEMP2_pos log(EMP)
ETR_data	-0.0027. (0.0015)	-0.0025 (0.0041)
lnAssets	0.4437*** (0.1134)	0.4535*** (0.1133)
lnSales	0.4071*** (0.1196)	0.3938** (0.1231)
ROE	-0.5165** (0.1878)	-0.5144** (0.1890)
DebtRatio	-0.0071*** (0.0017)	-0.0073*** (0.0017)
CashRatio	-0.3013 (0.2186)	-0.3106 (0.2181)
SalesGrowth	-0.1140* (0.0460)	-0.1149* (0.0460)
AssetsGrowth	-0.0207* (0.0087)	-0.0210* (0.0088)
MNE		0.0396 (0.0471)
MNE x ETR_data		-0.0003 (0.0039)
Fixed-Effects:	---	---
firm_id	Yes	Yes
year	Yes	Yes
S.E.: Clustered	by: firm_id	by: firm_id
Observations	2,779	2,779
R2	0.98425	0.98430
Within R2	0.65158	0.65273

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 18: Results in Full Sample

Dependent Var.:	m_logEMP log(EMP)	m_logEMP2 log(EMP)
ETR_data	0.0003 (0.0004)	0.0004 (0.0004)
lnAssets	0.4841*** (0.1037)	0.4949*** (0.1029)
lnSales	0.3586*** (0.1065)	0.3444** (0.1089)
ROE	-0.4048*** (0.1027)	-0.4013*** (0.1020)
DebtRatio	-0.0075*** (0.0016)	-0.0077*** (0.0016)
CashRatio	-0.3019 (0.2205)	-0.3141 (0.2196)
SalesGrowth	-0.0798 (0.0487)	-0.0812. (0.0488)
AssetsGrowth	-0.0172 (0.0108)	-0.0178. (0.0107)
MNE		0.0473 (0.0452)
MNE x ETR_data		-0.0018. (0.0009)
Fixed-Effects:	---	---
firm_id	Yes	Yes
year	Yes	Yes
S.E.: Clustered	by: firm_id	by: firm_id
Observations	2,829	2,829
R2	0.98403	0.98410
Within R2	0.64264	0.64432

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

5. Conclusion

This paper examines how large listed Japanese firms adjust their real and financial decisions following reductions in effective corporate tax rates. The results show that investment responds positively to tax reductions, but the response is modest in magnitude, indicating gradual rather than highly elastic investment adjustments. R&D expenditure exhibits limited and less robust sensitivity to tax changes, while employment shows no significant response, suggesting that labor demand is relatively rigid and insensitive to short- to medium-term tax incentives.

In contrast, firms' payout decisions respond more clearly to tax reductions. Dividend payouts increase significantly when effective tax rates decline, indicating that a non-negligible share of tax savings is distributed to shareholders. This response differs across firm types: non-multinational firms exhibit a stronger increase in dividend payouts, whereas multinational enterprises show a significantly weaker dividend response. Importantly, retained earnings do not display a systematic or significant response to tax reductions, suggesting that tax-induced gains are not directly reflected in higher retained earnings on average.

Taken together, these findings imply that while corporate tax reductions affect firms' financial allocation, their effects are uneven across decision margins. Focusing on JPX Prime 150 firms as representative "super firms" in Japan, the evidence indicates that tax cuts primarily support incremental investment and shareholder payouts rather than broad-based expansion in employment. Despite policy intentions to stimulate real activity and help firms weather major economic shocks, corporate tax reductions mainly reshape how firms allocate internal resources.

References

1. De Mooij, Ruud A. and Saito, Ikuo, Japan's Corporate Income Tax: Facts, Issues and Reform Options (August 2014). IMF Working Paper No. 14/138
2. Fudenberg, Drew, and Jean Tirole. “A Theory of Income and Dividend Smoothing Based on Incumbency Rents.” *Journal of Political Economy*, vol. 103, no. 1, 1995, pp. 75–93.
3. Fuest, Clemens & Hugger, Felix & Neumeier, Florian, 2022. "Corporate profit shifting and the role of tax havens: Evidence from German country-by-country reporting data," Journal of Economic Behavior & Organization, Elsevier, vol. 194(C), pages 454-477.
4. Hall, Robert E., and Dale W. Jorgenson. “Tax Policy and Investment Behavior.” *The American Economic Review*, vol. 57, no. 3, 1967, pp. 391–414. *JSTOR*
5. Hang Bai, Erica X. N. Li, Chen Xue, and Lu Zhang, "Asymmetric Investment Rates," NBER Working Paper 29957 (2022)
6. KAWASE, Yutaka, 法人税率引下げ時における企業の所得移転行動 (Firms' Responses to Corporate Tax Rate Reduction in Japan) (July 31, 2022). SSRN Working Paper No. 4177237.
7. Laura Dobbins & Martin Jacob (2016) Do corporate tax cuts increase investments?, Accounting and Business Research, 46:7, 731-759, DOI: 10.1080/00014788.2016.1192985
8. Mai, T Tien. (2025). High-dimensional Bayesian Tobit regression for censored response with Horseshoe prior. 10.48550/arXiv.2505.08288.
9. Suárez Serrato, Juan Carlos (2020) : Economic effects of repealing the US possessions corporation tax credit, NBER Reporter, ISSN 0276-119X, National Bureau of Economic Research (NBER), Cambridge, MA, Iss. 2, pp. 14-16
10. Tibor Hanappi & David Whyman, 2023. "Tax and Investment by Multinational Enterprises," OECD Taxation Working Papers 64, OECD Publishing.
11. Toshiyuki Uemura, 2023. "Corporate Tax Increases and Shareholder-Level Capital Income Tax Neutrality in Japan -An Analysis of Fundamental Reforms Using Effective Tax Rates-," Discussion Paper Series 257, School of Economics, Kwansei Gakuin University.
12. Wooldridge, Jeffrey M., Two-Way Fixed Effects, the Two-Way Mundlak Regression, and Difference-in-Differences Estimators (August 17, 2021).
13. Yohei KOBAYASHI & Koichi KUME & Keita OIKAWA & Tetsuro SONE, 2013. "Social Security Contributions and Employment Structure: A microeconometric analysis focused on firm characteristics," Discussion papers 13067, Research Institute of Economy, Trade and Industry (RIETI).
14. 松原 沙織. 為替換算調整勘定の性格付け--包括利益概念に関連付けて. 会計プログレス = Accounting progress / 日本会計研究学会編. (8) 2007,p.106～120

Appendix

A. Download steps in *eol* of the dataset

1. From the menu on the left, select 「企業検索」 under 「基本検索」.
2. In the [企業名] field, enter the security codes of the 150 firms to be searched and run the search.
3. Click 「ON」 at the far left of the search results, then select 「ウォッチリストへ登録」.
   Since only up to 100 firms can be registered in a single list, firstly add 100 firms to one list.
   The remaining 50 firms should be registered in a separate watchlist.
4. Assign a name (e.g., JPX 2025 prime 1, JPX 2025 prime 2) and click 「ウォッチリストに追加」.
5. From 「ウォッチリスト比較」, select 「要約財務データ比較」.
6. In the 「ウォッチリストグループ」 field, select the configured watchlist group.
7. Click 「ダウンロード」.
8. In the 「カテゴリ] field, select the following:
   「連結-損益（および包括利益）計算書」
   「連結−貸借対照表」
   「連結−キャッシュ・フロー計算書」
   「連結−株主資本等変動計算書」
   「連結−経営指標」
9. Under「年度」, select the range of years for which data are required (e.g., 2004–2025).
10. Under「ダウンロード形式」, select 「横形式」.
11. Click 「Excel ダウンロード」.
    After downloading the file, please check the contents.

B. The Component Weight for JPX Prime 150 as of 2025.08.29

Given that EJPX Market Innovation & Research, Inc. and/or its affiliates (JPX) retain all rights related to the *jpxprime150weight* document, and does not permit the reproduction or reprinting of this document in any circumstances without prior approval, so this paper cannot show the list. Please contact JPX Market Innovation & Research, Inc. Index Business (Email: index@jpx.co.jp) to get this document.

C. Why Do Full-Sample and Filtered-Sample Results Differ?

(Measurement Error, Deferred Tax Adjustments, and Selection)

A critical distinction between investment and R&D regressions is how filtering interacts with accounting practices underlying ETR_{data}. Through manual verification of EDINET filings (e.g., 2009 Mitsui Mining & Smelting), the following facts were established:

1. Tax expenses may be positive even when pretax income is negative

This occurs when firms **write off deferred tax assets** (繰延税金資産の全額取り崩し). The write-off amount is booked as **tax expense**, producing large positive tax values unrelated to actual taxation.

2. Tax expenses may also be negative

This reflects tax benefit recognition through deferred tax asset creation or reversal—again a non-cash accounting adjustment.

3. ETR becomes economically meaningless under both scenarios

Because:

$$ETR_{data} = \frac{tax_expense}{pretax_profit},$$

a) The numerator reflects accounting adjustments, not tax burdens;
b) The denominator may be small or negative;
c) Ratios can reach extreme values (–260, +57) that do not correspond to economic incentives.

D. Filtering removes these extreme accounting years

This improves measurement but introduces two consequences:

a) Variation shrinkage reduces the statistical power to estimate elasticities.
b) Selection bias removes loss-making years, during which R&D is most sensitive to financial constraints.

E. Some examples: Extreme value of inv in data_filtered

A tibble: 20 × 6

firm_id <chr>	year <dbl>	inv_rate <dbl>	PPE_lag <dbl>	dPPE <dbl>	DP <dbl>
E05425	2006	4.68131868	14	63	32
E05425	2010	21.93969849	65	69	331
E05476	2020	2.12432049	517	3197	-179
E03497	2016	1.02537389	1571	8760	7
E05425	2020	8.80003528	1563	8211	0
E27842	2021	-1.78971376	5010	16287	4410
E33000	2020	0.20488000	25579	94088	-1
E04822	2024	5.61554192	1317	3723	889
E05476	2016	12.04938272	215	137	568

1-9 of 20 rows Previous 1 2 3 Next

F. All column names of data_20042025 printed in R studio

[1] "証券コード"	[2] "EDINET コード"	[3] "企業名"	[4] "開示書類"	[5] "...5"
[6] "決算日"	[7] "提出日"	[8] "訂正日"	[9] "...9"	[10] "連結－要約損益（及び包括利益）計算書"
[11] "売上高・営業収益・経常収益等[百万円]"	[12] "売上原価[百万円]"	[13] "差引売上総利益[百万円]"	[14] "売上総利益[百万円]"	[15] "販売費及び一般管理費・その

				他営業費用[百万円]"
[16] "営業利益[百万円]"	[17] "営業外収益[百万円]"	[18] "営業外費用[百万円]"	[19] "経常利益[百万円]"	[20] "特別利益[百万円]"
[21] "特別損失[百万円]"	[22] "税引前当期純利益[百万円]"	[23] "法人税等[百万円]"	[24] "当期純利益\r\n[百万円]"	[25] "非支配株主に帰属する当期純利益\r\n[百万円]"
[26] "（連）親会社株主に帰属する当期純利益／（単）当期純利益\r\n[百万円]"	[27] "その他の包括利益[百万円]"	[28] "包括利益[百万円]"	[29] "...29"	[30] "連結－要約貸借対照表"
[31] "資産の部[百万円]"	[32] "流動資産[百万円]"	[33] "当座資産[百万円]"	[34] "現金及び預金[百万円]"	[35] "棚卸資産[百万円]"
[36] "短期貸付金等[百万円]"	[37] "固定資産[百万円]"	[38] "有形固定資産[百万円]"	[39] "無形固定資産等[百万円]"	[40] "投資その他の資産[百万円]"
[41] "繰延資産[百万円]"	[42] "負債の部・純資産の部[百万円]"	[43] "負債の部[百万円]"	[44] "流動負債[百万円]"	[45] "固定負債[百万円]"
[46] "特別法上の準備金[百万円]"	[47] "特別法上の引当金[百万円]"	[48] "純資産の部[百万円]"	[49] "株主資本[百万円]"	[50] "資本金[百万円]"
[51] "新株式申込証拠金[百万円]"	[52] "資本剰余金[百万円]"	[53] "利益剰余金[百万円]"	[54] "自己株式[百万円]"	[55] "自己株式申込証拠金[百万円]"
[56] "その他の包括利益累計額（評価・換算差額等）[百万円]"	[57] "その他有価証券評価差額金[百万円]"	[58] "繰延ヘッジ損益[百万円]"	[59] "土地再評価差額金[百万円]"	[60] "為替換算調整勘定[百万円]"
[61] "その他の評価・換算差額等[百万円]"	[62] "新株予約権[百万円]"	[63] "自己新株予約権[百万円]"	[64] "少数株主持分[百万円]"	[65] "...65"
[66] "連結－要約キャッシュ・フロー計算書"	[67] "営業活動によるキャッシュ・フロー[百万円]"	[68] "小計[百万円]"	[69] "投資活動によるキャッシュ・フロー[百万円]"	[70] "定期預金の純増減額[百万円]"
[71] "有価証券及び投資有価証券の純増減額[百万円]"	[72] "関係会社株式・出資金の純増減額[百万円]"	[73] "有形固定資産及び無形固定資産の純増減額[百万円]"	[74] "連結の範囲の変更を伴う子会社株式の取得による収支の純増減額[百万円]"	[75] "連結の範囲の変更を伴う子会社株式の売却による収支の純増減額[百万円]"

[76] "貸付金等の純増減額[百万円]"	[77] "出資金の純増減額[百万円]"	[78] "利息及び配当金の受取額[百万円]"	[79] "営業譲受に伴う支出[百万円]"	[80] "営業譲渡に伴う収入[百万円]"
[81] "その他の投資活動によるキャッシュ・フロー[百万円]"	[82] "財務活動によるキャッシュ・フロー[百万円]"	[83] "借入金及びコマーシャル・ペーパー、社債の純増減額[百万円]"	[84] "株式の発行等による収入[百万円]"	[85] "自己株式の純増減額[百万円]"
[86] "配当金の支払額[百万円]"	[87] "利息の支払額[百万円]"	[88] "その他の財務活動によるキャッシュ・フロー[百万円]"	[89] "現金及び現金同等物に係る換算差額[百万円]"	[90] "現金及び現金同等物の増減額（△は減少）[百万円]"
[91] "現金及び現金同等物の期首残高[百万円]"	[92] "連結の範囲の変更に伴う現金及び現金同等物の増減額[百万円]"	[93] "合併に伴う現金及び現金同等物の増減額[百万円]"	[94] "現金及び現金同等物の期末残高[百万円]"	[95] "...95"
[96] "連結－要約株主資本等変動計算書"	[97] "株主資本 資本金 当期首残高[百万円]"	[98] "株主資本 資本金 当期変動額 当期変動額合計[百万円]"	[99] "株主資本 資本金 当期末残高[百万円]"	[100] "株主資本 新株式申込証拠金 当期変動額 当期変動額合計[百万円]"
[101] "株主資本 新株式申込証拠金 当期末残高[百万円]"	[102] "株主資本 資本剰余金 資本準備金 当期変動額 当期変動額合計[百万円]"	[103] "株主資本 資本剰余金 資本準備金 当期末残高[百万円]"	[104] "株主資本 資本剰余金 その他資本剰余金 当期変動額 当期変動額合計[百万円]"	[105] "株主資本 資本剰余金 その他資本剰余金 当期末残高[百万円]"
[106] "株主資本 資本剰余金 資本剰余金合計 当期変動額 当期変動額合計[百万円]"	[107] "株主資本 資本剰余金 資本剰余金合計 当期末残高[百万円]"	[108] "株主資本 利益剰余金 利益準備金 当期変動額 当期変動額合計[百万円]"	[109] "株主資本 利益剰余金 利益準備金 当期末残高[百万円]"	[110] "株主資本 利益剰余金 その他利益剰余金 圧縮積立金 当期変動額 当期変動額合計[百万円]"
[111] "株主資本 利益剰余金 その他利益剰余金 圧縮積立金 当期末残高[百万円]"	[112] "株主資本 利益剰余金 その他利益剰余金 その他の任意積立金 当期変動額 当期変動額合計[百万円]"	[113] "株主資本 利益剰余金 その他利益剰余金 その他の任意積立金 当期末残高[百万円]"	[114] "株主資本 利益剰余金 その他利益剰余金 繰越利益剰余金 当期変動額 当期変動額合計[百万円]"	[115] "株主資本 利益剰余金 その他利益剰余金 繰越利益剰余金 当期末残高[百万円]"
[116] "株主資本 利益剰余金 その他利益剰余金 その	[117] "株主資本 利益剰余金 その他利益剰余金 その	[118] "株主資本 利益剰余金 利益剰余金合計 当期変	[119] "株主資本 利益剰余金 利益剰余金合	[120] "株主資本 自己株式 当期変動

他利益剰余金 当期変動額 当期変動額合計[百万円]"	他利益剰余金 当期末残高[百万円]"	動額 当期変動額合計[百万円]"	計 当期末残高[百万円]"	額 当期変動額合計[百万円]"
[121] "株主資本 自己株式 当期末残高[百万円]"	[122] "株主資本 自己株式申込証拠金 当期変動額 当期変動額合計[百万円]"	[123] "株主資本 自己株式申込証拠金 当期末残高[百万円]"	[124] "株主資本 株主資本合計 当期変動額 当期変動額合計[百万円]"	[125] "株主資本 株主資本合計 当期末残高[百万円]"
[126] "評価・換算差額等 その他有価証券評価差額金 当期変動額 当期変動額合計[百万円]"	[127] "評価・換算差額等 その他有価証券評価差額金 当期末残高[百万円]"	[128] "評価・換算差額等 繰延ヘッジ損益 当期変動額 当期変動額合計[百万円]"	[129] "評価・換算差額等 繰延ヘッジ損益 当期末残高[百万円]"	[130] "評価・換算差額等 土地再評価差額金 当期変動額 当期変動額合計[百万円]"
[131] "評価・換算差額等 土地再評価差額金 当期末残高[百万円]"	[132] "評価・換算差額等 為替換算調整勘定 当期変動額 当期変動額合計[百万円]"	[133] "評価・換算差額等 為替換算調整勘定 当期末残高[百万円]"	[134] "評価・換算差額等 年金債務調整額 当期変動額 当期変動額合計[百万円]"	[135] "評価・換算差額等 年金債務調整額 当期末残高[百万円]"
[136] "評価・換算差額等 その他の評価・換算差額等 当期変動額 当期変動額合計[百万円]"	[137] "評価・換算差額等 その他の評価・換算差額等 当期末残高[百万円]"	[138] "評価・換算差額等 評価・換算差額等合計 当期変動額 当期変動額合計[百万円]"	[139] "評価・換算差額等 評価・換算差額等合計 当期末残高[百万円]"	[140] "少数株主持分 当期変動額 当期変動額合計[百万円]"
[141] "少数株主持分 当期末残高[百万円]"	[142] "新株予約権 当期変動額 当期変動額合計[百万円]"	[143] "新株予約権 当期末残高[百万円]"	[144] "自己新株予約権 当期変動額 当期変動額合計[百万円]"	[145] "自己新株予約権 当期末残高[百万円]"
[146] "純資産合計 当期変動額 当期変動額合計[百万円]"	[147] "純資産合計 当期末残高[百万円]"	[148] "...148"	[149] "連結－経営指標"	[150] "１株当たり当期純利益金額（EPS）[円]"
[151] "潜在株式調整後１株当たり当期純利益金額[円]"	[152] "１株当たり純資産額（BPS)[円]"	[153] "１株当たり配当額[円]"	[154] "配当利回り[%]"	[155] "株価収益率（PER)[倍]"
[156] "使用総資本[百万円]"	[157] "経営資本[百万円]"	[158] "他人資本[百万円]"	[159] "自己資本[百万円]"	[160] "事業利益[百万円]"
[161] "使用総資本事業利益率（ROA）[%]"	[162] "経営資本営業利益率[%]"	[163] "自己資本当期純利益率（ROE）[%]"	[164] "使用総資本経常利益率[%]"	[165] "財務レバレッジ[倍]"

[166] "売上高総利益率[%]"	[167] "売上高営業利益率[%]"	[168] "売上高事業利益率[%]"	[169] "売上高経常利益率[%]"	[170] "売上高当期純利益率[%]"
[171] "売上原価率[%]"	[172] "売上高販管費比率[%]"	[173] "売上高金融費用比率[%]"	[174] "使用総資本回転率[回]"	[175] "経営資本回転率[回]"
[176] "自己資本回転率[回]"	[177] "売上債権回転率[回]"	[178] "売上債権回転期間[月]"	[179] "棚卸資産回転率[回]"	[180] "棚卸資産回転期間[月]"
[181] "有形固定資産回転率[回]"	[182] "仕入債務回転率[回]"	[183] "仕入債務回転期間[月]"	[184] "従業員数[人]"	[185] "従業員１人当たり売上高[百万円]"
[186] "従業員１人当たり営業利益[百万円]"	[187] "従業員１人当たり経常利益[百万円]"	[188] "従業員１人当たり当期純利益[百万円]"	[189] "粗付加価値[百万円]"	[190] "労働生産性[円]"
[191] "付加価値率[%]"	[192] "労働装備率[円]"	[193] "設備生産性[円]"	[194] "労働分配率[%]"	[195] "設備分配率[%]"
[196] "実物資本分配率[%]"	[197] "公共分配率[%]"	[198] "他人資本分配率[%]"	[199] "株主分配率[%]"	[200] "１人あたり人件費[円]"
[201] "資本生産性[円]"	[202] "流動比率[%]"	[203] "当座比率[%]"	[204] "手元流動性比率[月]"	[205] "固定比率[%]"
[206] "固定長期適合率[%]"	[207] "負債比率[%]"	[208] "自己資本比率[%]"	[209] "有利子負債[百万円]"	[210] "有利子負債比率[%]"
[211] "有利子負債依存度[%]"	[212] "インタレスト・カバレッジ・レシオ[倍]"	[213] "売上高成長率[%]"	[214] "従業員１人当たり売上高成長率[%]"	[215] "売上総利益成長率[%]"
[216] "営業利益成長率[%]"	[217] "経常利益成長率[%]"	[218] "当期純利益成長率[%]"	[219] "総資本（総資産）成長率[%]"	[220] "自己資本成長率[%]"
[221] "従業員数の増加率[%]"	[222] "付加価値成長率[%]"	[223] "１株当たり配当成長率[%]"	[224] "営業キャッシュフロー比率（キャッシュフローマージン）[%]"	[225] "営業キャッシュフロー対流動負債比率[%]"
[226] "１株当たり営業キャッシュフロー（CFPS）[円]"	[227] "株価キャッシュフロー倍率（PCFR）[倍]"	[228] "収支に基づくインタレスト・カバレッジ・レシオ[倍]"	[229] "有利子負債返済年数[年]"	[230] "従業員１人当たり福利厚生費[千円]"
[231] "EBIT[百万円]"	[232] "EBITDA[百万円]"	[233] "EBITDA マージン[%]"	[234] "...234"	[235] "R & D"
[236] "研究開発費[円]"				