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(Revised)

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Windfalls? Costs and Benefits of Investment Tax Incentives due to Financial Constraints[1]

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Abstract

We find that financially unconstrained firms claim temporary investment tax incentives more frequently than their constrained counterparts. Notably, these extensive claims from unconstrained firms do not lead to an incremental total investment beyond pre-claim levels; instead, these firms appear to treat the tax cut as a windfall, increasing their cash holdings in subsequent years. In contrast, constrained firms increase their investments relative to pre-claim levels when they manage to claim tax incentives. Our analysis draws from a 2014 tax reform in Japan which introduced both an investment tax credit and bonus depreciation, available for nearly three years. We use a proprietary tax return survey that provides data on tax incentive claims across both public and private firms. Our findings highlight a novel tradeoff of investment tax incentives: while stimulating investments among financially constrained firms upon claiming tax incentives, they also disproportionately allocate tax benefits to unconstrained firms, not necessarily resulting in the intended investment stimulation.

Keywords: Financial Constraint; Investment Tax Incentive; Tax Claim; Cash holdings

JEL classification: G31; G38; H25; H32

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1. Introduction

The typical structure of tax laws requires firms to secure financing for their projects before claiming tax incentives for investments. One such instance is tax credits, where firms must spend on their capital expenditures before they become eligible to claim the benefit. Likewise, bonus depreciation does not provide any upfront monetary benefits; rather, it allows firms to write off a greater portion of their investment costs only post-investment. Despite these well-established mechanisms, potential consequences arising from the delay in receiving tax benefits after securing financing have received little attention in the literature on investment tax incentives.

We hypothesize that financially unconstrained firms claim investment tax incentives more frequently than their constrained counterparts. At first glance, this hypothesis may appear as a direct application of finance theory. Unconstrained firms, with better access to funds, may be less likely to forgo investment opportunities, thereby claiming investment tax incentives more extensively. Tax theory offers an alternative perspective. It proposes that constrained firms may exhibit a higher propensity to claim investment tax incentives because of the perceived high value of additional funding from the government, as indicated by several empirical studies (Zwick and Mahon 2017; Liu and Mao 2019). Notably, these theories highlight different stages in the investment timeline: finance theory emphasizes securing financing before investments or tax claims, while tax theory underscores obtaining tax refunds after investments and tax claims.

This study asks three related questions, all centered around claiming tax incentives: 1) Do financially unconstrained firms claim investment tax incentives more frequently than their constrained counterparts? 2) Does claiming tax incentives lead to an incremental total investment beyond pre-claim levels? 3) Do both constrained and unconstrained firms exhibit incremental investments upon claiming tax incentives? The first question serves as the primary test of our hypothesis, while the second question assesses the overall impact of tax incentives on investment behavior.

The third question is essential to our study, particularly when connected to the first question. The third question can assess whether unconstrained firms' extensive tax claims might simply reflect their potentially higher investment levels compared to constrained firms, irrespective of tax incentives. To alleviate such concerns, we examine firm-level investment changes over time, from before to after tax claims to mitigate firm-level heterogeneity, and cross-sectional differences in financial constraints based on a difference-in-differences framework. This approach can also expose patterns for both types of firms. Constrained firms, possibly under-investing before tax claims due to limited funding and being at an early lifecycle stage with substantial investment opportunities, can increase their investments after claiming the incentives. Conversely, unconstrained firms might not demonstrate a similar increase, given their contrasting circumstances. In such a scenario, unconstrained firms' extensive claims could take the form of exploiting tax incentives to lower their tax payments, a strategy possibly applicable to investments that are planned without considering these incentives.

The focus of our study is a 2014 tax reform in Japan. The reform introduced two tax incentives, specifically aimed at certain eligible domestic capital expenditures undertaken between January 2014 and March 2017: i) a 5% tax credit for capital expenditures up to 20% of corporate tax payments by March 2016 and 4% thereafter until March 2017, and ii) an immediate depreciation by March 2016 and a 50% bonus depreciation thereafter until March 2017. Firms could apply these incentives to different investments within a single year, although a specific investment project can only receive one particular incentive. Firms undertaking eligible capital expenditures are not allowed to carry the unclaimed amount back or forward. We use the phrase "claim tax incentives" or similar expressions throughout this paper as comprehensive terms that refer to both firms making eligible expenditures and the actual process of claiming these tax incentives themselves, unless otherwise specified. The national corporate income tax rates were 25.5% in 2014, 23.9% in 2015, and 23.4% in 2016-17. Local governments levy taxes at approximately 10%, with minor temporal and regional differences.

We select six proxies to determine which firms are financially unconstrained, considering their financial traits and data availability: i) stock market listing, ii) bond issuance, iii) cash holdings, iv) cash flow, v) firm size, and vi) a composite measure obtained through a principal component analysis. The first two proxies represent access to external markets, the next two capture internal financing, and the last two give an overall picture of the firm's financial capability.

We use proprietary data of Japanese firms to determine which firms claim the tax incentives, the amounts of eligible capital expenditures they spend, and the tax liabilities they reduce. We merge this tax data with a comprehensive financial dataset. The data are suitable for our purpose because of the considerable variations in financial constraints. For example, 69.0% of the sample consists of private firms that lack access to public stock markets and hence face higher costs of equity (Brav 2009), rendering them more likely to be financially constrained compared to public firms.

There are three preliminary observations to note from our data. First, 21.2% of the firms claim at least either the tax credit or bonus depreciation in each eligible year. This observed rate of 21.2% is broadly consistent with adoption rates documented in recent studies across various tax dimensions (Cui et al. 2022 and Kitchen and Knittel 2016 on bonus depreciation; Pham 2019 on corporate income tax reduction; Zwick 2021 on tax loss carryforwards). Second, only 3.7% of the firms use bonus depreciation in each year. Given this limited usage, we choose to focus on tax claiming as a whole, rather than examining the tax credit or bonus depreciation separately. Third, our data show that financially constrained firms spend more capital expenditures than their unconstrained counterparts, despite their relatively limited access to funds, in line with previous studies that compare public and private firms in the US (Asker et al., 2015) and in Japan (Orihara, 2017). This observation provides some indication that extensive tax claims from unconstrained firms are not likely due to cross-sectional differences in investment levels.

Our findings show that financially unconstrained firms claim tax incentives more extensively than their constrained counterparts. These results hold across all types of outcome variables, whether a binary indicator of tax claims, the amount of eligible capital expenditures, or the extent of tax savings. A further analysis suggests that high cash holdings stimulate tax claims among firms that are unlisted and lack access to bond markets. This finding is also consistent with our hypothesis that access to finance plays a critical role in tax claiming, as cash holdings are especially valuable for firms without access to external markets.

The first question furthermore sheds light on the interplay between two crucial economic policies, tax and monetary policy. We suggest that monetary easing should increase tax claims as a result of improved access to funds. Nonetheless, testing this possibility creates a difficulty, as monetary policy generally influences all firms. The Japanese monetary policy helps address this issue for public firms, at least. Since December 2010, the Bank of Japan has purchased publicly traded equities via exchange-traded funds that track representative indexes, such as the Nikkei 225 and the Tokyo Stock Price Index. Public firms included in these indices should have lower equity costs than those excluded, designating them as the treated firms concerning this monetary policy. We find that these treated public firms claim tax incentives more often than other public firms.

For the second question, we apply firm-fixed effect models and find that, overall, tax claimants increase capital expenditures in the years following their initial tax incentive claims. Moreover, we verify the absence of pre-trends in investments prior to these claims. Our findings for the third question show that financially constrained firms increase their capital expenditures upon managing to claim these incentives. In stark contrast, unconstrained firms do not necessarily increase their investments, instead appearing to retain the tax savings as cash holdings, treating them as a windfall.

Building on these findings, we turn our attention to the seemingly contradictory behavior of unconstrained firms who, despite extensive tax claims, do not increase their investments. We focus on instances where firms are relatively less likely to be able to claim tax incentives at the year's end, specifically due to having reported a negative taxable income in the previous year. Notably, even within this subset, unconstrained firms engage more in tax-eligible capital expenditures and tax claims compared to their constrained counterparts. By interpreting such circumstances as a counterfactual without tax incentives, we can infer that the investment decisions of unconstrained firms may not be primarily stimulated by tax incentives. Instead, these behaviors could reflect the execution of investments that would have been made even without the tax incentives. Furthermore, unconstrained firms appear opportunistically to claim tax incentives at the year's end if their taxable income turns out to be sufficient.

Examining the frequency of claiming tax incentives during the three-year eligible periods provides more insights. We find that, in the subset of firms claiming tax incentives in two or more different years, financially constrained firms increase their investments compared to the levels before their first claims. In contrast, unconstrained firms do not show a consistent increase. These contrasts further emphasize the differing behaviors between constrained and unconstrained firms, even among those that frequently utilize tax incentives.

Highlighting key contributions of our study, we shed light on the underexplored cost aspect of investment tax incentives, with a particular focus on financially unconstrained firms and their decisions to claim tax incentives. We demonstrate that financially unconstrained firms extensively claim investment tax incentives. However, these firms appear to primarily seek tax benefits for investments that might have occurred even without such incentives, rather than using these incentives to increase their investments. Despite this drawback, governments should not necessarily be deterred from introducing investment tax incentives, as our research also shows the benefits of encouraged investments in line with the literature (Fan and Liu 2020; Liu and Mao 2019; Zhang et al., 2018 in China; Ohrn 2019; Zwick and Mahon 2017 in the US; and Maffini et al., 2019 in the UK), especially for financially constrained firms (Liu and Mao 2019; Zwick and Mahon 2017)[2]. Overall, our study offers a comprehensive view of the costs and benefits of investment tax incentives, with a distinct emphasis on the cost aspect.[3]

Our study adds to the tax literature by revisiting prevalent assumptions from a finance perspective. These assumptions typically posit the potential value of tax benefits is the primary motivating factor behind tax applications and that treatment and control groups can be defined

[2] Empirical literature provides mixed evidence regarding the prediction that tax incentives stimulate investments of financially constrained firms more than their unconstrained counterparts. Previous studies use a sample split: they divide firms into two groups, constrained and unconstrained firms, and separately estimate the tax sensitivity of investment for each group. Liu and Mao (2019) and Zwick and Mahon (2017) support this prediction, with both studies reporting that tax incentives stimulate investment among financially constrained firms and not necessarily among their unconstrained counterparts. In contrast, Edgerton (2010), Fan and Liu (2020), and Maffini et al. (2019) do not support this conclusion.

[3] Eichfelder et al. (2023) conduct a notable study shedding light on potential issues of investment tax incentives in a German setting. They discover that bonus depreciation diminishes investment quality. This can happen because the investments encouraged by tax incentives are those that would not be made without such incentives, leading to a lower average quality than those made independently of tax incentives.

accordingly.[4] We depart from this standard approach by explicitly pinpointing tax claimants and evaluating whether they increase investments compared to pre-claim levels.[5]

Our paper is also related to the emerging literature on managerial decisions to pursue tax incentives (Cui et al., 2022; Kitchen and Knittel 2016; Pham 2019; Zwick 2021). While previous studies report modest tax adoption rates driven by tax-related factors[6], we introduce the role of financial considerations as a new contribution to this area of research. Beyond the process of decision-making, our study also investigates the consequences of claiming tax incentives. Notably, our findings demonstrate that, even among those firms that frequently claim tax incentives over several years, it is primarily the financially constrained firms that exhibit significant investment stimulation. This pattern further substantiates the trade-off we find in investment tax incentives, highlighting the importance of considering both the decision to claim tax incentives and its subsequent outcomes.

Our paper makes a relevant contribution to the literature on financial constraints, which has mostly focused on public firms within the finance domain. Our study is distinct in two dimensions: it covers private firms[7] and explores the relationship between financial constraints

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[4] The literature presents a variety of criteria for classifying treatment and control groups, based on the potential magnitude of tax benefits. Zwick and Mahon (2017) treat U.S. firms with long-lived equipment, likely to benefit from bonus depreciation, as their treatment group. The control group consists of firms with short-lived equipment. Ohrn (2019) examines the state-level adoption of policies implemented by the U.S. federal government, considering states that adopt bonus depreciation as the treatment group. Maffini et al. (2019) study accelerated capital allowances in the UK, treating small and medium-sized enterprises that can claim the allowances at more favorable rates than large firms as their treatment group. Fan and Liu (2020) investigate the accelerated depreciation in China, considering firms from certain industries that are eligible as the treatment group. Zhang et al. (2018) and Liu and Mao (2019) examine a value-added tax reform in China, treating firms from specific industries and regions as the treatment group.

[5] Hosono et al. (2023) present an exception by studying investment behavior of tax claimants with Japanese data. They report that claiming tax incentives increases investment, especially among financially constrained firms in their data. Three differences between our paper and theirs warrant emphasis. First, their study does not investigate managerial decisions related to claiming tax incentives. Second, their data primarily cover small and medium-sized enterprises, with a mean number of employees of only 15 as indicated by the reported log value, while our research includes large firms, with a mean employee count of 817. This distinction is crucial for examining financial constraints, as small firms in their data should be predominantly financially constrained. Lastly, their study does not explicitly analyze the investment behavior of unconstrained firms. These differences underscore the unique contributions of our research, which reveals that financially unconstrained firms claim tax incentives without a corresponding increase in investments.

[6] Cui et al. (2022) study accelerated depreciation in China and report that firms do not claim the tax benefit for over 80 percent of eligible investments. They attribute their finding to a lack of tax awareness and to tax losses. Kitchen and Knittel (2016) study bonus depreciation in the U.S. and report adoption rates of 40 to 60 percent. They argue loss positions and the use of loss carryforward as possible causes. Pham (2019) finds that only 40 to 60 percent of eligible firms in Vietnam claim a tax benefit from a corporate income tax cut. The author attributes the finding to tax unawareness and to concerns about tax audits. Zwick (2021) finds in the U.S that only 37% of firms claim a tax refund for loss carryforward due to tax complexity.

[7] There exists a body of literature that compares investment behavior between public and private firms. Asker et al. (2015) find that stock listing curtails corporate investment due to short-termism pressure

and taxation. Our research suggests that, apart from tax avoidance[8] (Alm et al. 2019: Bayar et al. 2018), stock market listing or, more generally, the state of being financially unconstrained promotes greater utilization of tax advantages. The literature also illustrates various differences in the cash policy between public and private firms (Bigelli and Sanchez-Vidal 2012; Hall, et al. 2014; Gao, et al. 2013; Mortal, et al. 2020). Our finding that cash holdings play different roles in tax claims across public and private firms represents a contribution to this line of research.

We also discover a potential mechanism for monetary and tax policy to interact. Monetary policy aims to eliminate financial frictions, thereby reducing the prevalence of financially constrained firms. Our findings imply that an increase in financially unconstrained firms leads to more tax claims; however, such claims may not stimulate investments. This argument carries implications for the design of economic policies against large shocks, including the coronavirus pandemic. A typical sequence in policy responses involves central banks first implementing monetary easing, followed by governments introducing temporary investment tax incentives to promote economic recovery. This conventional order of policy execution is at least partly because of the political intricacies involved in the latter.[9] Our findings caution that this particular sequence may result in the provision of unnecessary tax benefits to financially unconstrained firms, a group that can increase due to monetary policy.

The remaining sections of this paper are organized as follows: Section 2 describes the background information and hypothesis, Section 3 introduces the research design, Section 4 presents and discusses the results, and Section 5 states the conclusions.

2. Background and Hypothesis

2.1. Institutional Background

In October 2013, the Japanese government unveiled a tax reform plan for the upcoming year, aiming to encourage corporate investment. The motivation behind this reform was

from the stock market. Feldman et al. (2021) use U.S. tax return data to uncover short-term pressure in R&D investments, although this negative effect is not large enough to overshadow the advantages of stock listing. Orihara (2017) studies the costs and benefits of stock market listing in the Japanese context.

[8] The topic of tax aggressiveness sees considerable exploration in finance. For example, Hanlon and Slemrod (2009) report that stock markets react negatively to news on tax sheltering, even though it reduces tax liability, because such activities often involve managerial extraction of private benefits (Desai and Dharmapala 2006).

[9] For example, during the COVID-19 pandemic, the Bank of Japan promptly announced that it would increase its purchases of commercial paper from 2.2 to 3.2 trillion yen, corporate bonds from 3.2 to 4.2 trillion yen, and exchange-tradable funds from 6 to 12 trillion yen. The Japanese government later announced that it would introduce a temporary investment tax credit and bonus depreciation for certain types of capital spending, such as in information technology. Similarly, after the global financial crisis of 2008, in the United States, the Fed implemented massive monetary easing and the government reintroduced bonus depreciation. Regarding policy responses during the pandemic, Benmelech and Tzur-Ilan (2020) study the determining factors, while Devereux et al. (2020) focus on fiscal policies.

threefold. First, the government recognized sluggish corporate investment as the cause of the weak economic growth that followed the asset price bubble collapse in the 1990s. This period, extending from the 1990s to the early 2010s, is often referred to as the "lost two decades". Second, the government sought to mitigate possible economic harm resulting from a decline in consumption due to the rise in the consumption tax rate from 5% to 8% in April 2014. Third, Shinzo Abe, the prime minister of Japan from December 2012 to September 2020, implemented a comprehensive economic policy package known as Abenomics, which consisted of expansionary monetary and fiscal policies as well as various economic growth policies. The tax reform was introduced part of the fiscal policies under Abenomics.

The 2014 tax reform was unlikely to have been anticipated. In the previous year, the government had already implemented a tax reform which provided a 3% investment tax credit and a 30% bonus depreciation allowance for firms that increased their capital expenditures by more than 10% compared to the previous year. However, due to the difficulty in achieving the 10% increase, this 2013 tax system was not widely used. On August 29, 2013, the Nikkei, Japan's most widely read economic newspaper, reported that the government was planning to launch a new tax system without this stringent requirement. The plan was approved in September 2013 and swiftly implemented in January 2014.

The 2014 reform introduced an investment tax credit and bonus depreciation for domestic capital expenditures.[10] These tax incentives were available for almost three years, from January 2014 to March 2017. Firms could claim only one tax credit or bonus depreciation for each investment; however, they were allowed to use another tax benefit for a different investment. Firms could claim a 5% tax credit in FY2014-15[11] and a 4% credit in FY2016, both against their corporate tax liabilities up to 20%. The reform also allowed for immediate depreciation in FY2014-15 and an accelerated 50% depreciation in FY2016. In Japan, firms must file their tax returns within two months following the fiscal year-end. In the event that firms spent on eligible capital expenditures but did not generate sufficient taxable income by the year's end, they were not permitted to carry forward or backward any unclaimed amounts.

Not all domestic capital investments qualified for the tax incentives. This tax system classified eligible investments as either A-type or B-type. A-type investments represented the latest version of a property, plant, or equipment and had to achieve an annual productivity growth of 1% relative to the previous version. Industrial associations[12] were responsible for certifying whether the investment met this requirement, and they had the discretion to define

[10] The Japanese tax system accounts for income taxes in a similar way to the US. A tax credit decreases tax payments and results in a reduction of a firm's effective tax rate. Accelerated depreciation decreases taxable income rather than tax payments directly; hence, it has no impact on the effective tax rate.

[11] The fiscal year in Japan runs from April to March. This tax system was available from January 2014, which was in FY2013. For simplicity, we refer to the period between January 2014 and March 2016 as FY2014-15 or simply 2014-15.

[12] For example, the Japan Automobile Manufacturers Association has membership from representative Japanese car manufacturers, including Toyota Motor Corporation.

"productivity growth", such as an output per unit of time or energy efficiency. B-type investments were those with an expected return of at least 15%. This return is calculated as the projected three-year average of the sum of expected operating earnings and depreciation divided by the capital expenditures. It was the responsibility of accountants to assess the feasibility of achieving the projected return.

We can argue that these eligibility requirements did not pose a high obstacle for firms. For example, Hiromasa Yonekura, the chair of the *Keidanren*, one of the most influential industrial associations in Japan, stated that the requirements were easy to meet in a Nikkei article on October 19, 2013. Our data can only ascertain whether a firm has claimed tax benefits for type-A or type-B investments, and not on a firm-year basis. Firms tend to make type-A claims about three times more often than type-B claims. The flexible definition of productivity growth for type-A investments might have facilitated a larger number of these claims.

2.2. Theory and Our Three Hypotheses

2.2.1. Financial Constraints and Claiming Tax Incentives

We present our theoretical framework through a simple two-period model, following the structure and notation of Ohrn (2019). The key difference with Ohrn (2019) lies in our consideration of potential financial constraints, whereas Ohrn assumes firms have sufficient internal funds for investments. In the first stage, firms determine investment levels, represented by I. Implementing these investments requires a financing amount, denoted by X, which must be at least I. Once firms secure financing (i.e., $X \geq I$), they receive profits following a concave function $f(I)$ at the second period. Without the presence of investment tax incentives, and with the corporate income tax rate at τ_c, the after-tax profits are $(1-\tau_c)f(I)$.

Claiming tax credits or bonus depreciation increases the value of the investment. To simplify our framework, we assume that firms have enough taxable income to qualify for the maximum possible tax benefits once they secure financing. In the case of tax credits, firms can obtain a tax refund at rates of 5% in 2014-15 or 4% in 2016, represented as z_c, resulting in a rise in after-tax profits to $(1-\tau_c)f(I)+z_cI$. Bonus depreciation allows firms to deduct a certain ratio, denoted as z_b, of their eligible capital expenditures from taxable income, raising their after-tax profits to $(1-\tau_c)f(I)+\tau_C z_b I$.[13] Regardless of the choice between tax credits or bonus depreciation, an increase in after-tax investment returns can potentially incentivize the initiation of additional investments that might not be considered in the absence of these incentives.

Our first research question addresses how financial constraints affect firms' potential to fulfill the $X \geq I$ requirement in the first stage. This requirement can be an obstacle for

[13] Bonus depreciation merely adjusts the timeline of deductions without influencing the total amount that firms can deduct over the lifetime of their assets. However, due to discounting, deductions made earlier hold more value compared to those made later.

financially constrained firms, limiting their access to tax benefits in the second stage (Edgerton 2010). In contrast, financially unconstrained firms are more likely to meet the requirement given their greater access to funds, enabling them to claim tax incentives more frequently.

Hypothesis 1: Financially unconstrained firms claim tax incentives more frequently than their constrained counterparts.

2.2.2. Investment Behavior Following Tax Claims

In the second research question, we explore the overall impact of tax incentive claims on investments, without considering the firms' financial constraints status. Specifically, we examine change in investment levels under the condition that firms both satisfy the $X \geq I$ requirement and decide to claim tax incentives. We hypothesize that tax incentives encourage incremental investments because of the higher after-tax returns associated with these investments, compared to situations without these incentives. While it is evident that firms make investments when claiming tax incentives, empirical investigation is necessary to determine whether the total investments post-claim, including both those eligible for tax incentives and all other forms of investments, exceed the total investments made prior to these claims. We interpret these pre-claim investment levels as reflecting the hypothetical counterfactual scenario, suggesting what the firms would have invested in the absence of these tax incentives after controlling for various covariates.

Hypothesis 2: Firms increase their investments once claiming tax incentives compared to their prior investment levels.

For the third question, we examine potential differences in investment behavior between financially constrained and unconstrained firms following claiming tax incentives. Finance theory suggests that firms with limited access to funds may not be able to attain their optimal investment levels, denoted by I^*, which is evaluated under the assumption that no tax benefits are available.[14] Unconstrained firms, in contrast, are more likely already at or near I^*, especially compared to constrained firms. This comparison suggests that, prior to claiming tax incentives, financially constrained firms possess a wider range of investment opportunities compared to their unconstrained counterparts. Moreover, unconstrained firms are generally

[14] Beginning with the influential work of Fazzari et al. (1988), empirical studies have provided substantial evidence regarding how financial constraints affect investment behavior (see Almeida et al. 2014 for a survey). Numerous US studies, including but not limited to Fazzari et al. (1988), Kaplan and Zingales (1997), Gomes (2001), Rauh (2006), Hennessy et al. (2007), Almeida et al. (2010), and Lewellen and Lewellen (2016), have added to this body of work. Hoshi et al. (1991) is a notable Japanese study comparing the investment behavior of firms with strong ties to major banks, which are thus less likely to be financially constrained, to firms lacking such connections.

more mature and hence have limited set of investment opportunities compared to constrained firms, further underscoring the contrast between them.

We hypothesize that financially constrained firms, having potentially foregone investment opportunities due to binding financial constraints, significantly increase their investments once claiming tax incentives. As for unconstrained firms, however, the extent to which tax incentives affect their investment is less clear-cut. Despite an identical per unit tax benefit available to all firms, unconstrained firms may already be achieving their investment targets without these incentives, due to their superior access to finance and possibly fewer investment opportunities owing to their maturity. Consequently, any additional investments may yield minimal returns at best, potentially necessitating unconstrained firms to claim tax incentives to meet their hurdle rates. Alternatively, they might deem these additional investments as low-priority and unworthy of pursuit. Importantly, these possibilities do not contradict our first hypothesis. Even under these circumstances, unconstrained firms could still claim tax incentives either to undertake investments chosen independently of tax incentives, primarily as a tax reduction strategy, or to achieve their hurdle rates.

Hypothesis 3: Financially constrained firms increase their investments once claiming tax incentives compared to their prior investment levels, while the outcome for unconstrained firms remains uncertain.

Contrasting our hypotheses with existing studies helps clarify our arguments. While our hypothesis that tax incentives should stimulate investment among financially constrained firms is in line with some previous studies (Liu and Mao 2019; Zwick and Mahon 2017), our research presents a novel perspective. Specifically, we explore the idea that unconstrained firms, despite substantial claims for tax incentives, may not necessarily increase their investments compared to pre-claim levels. The rationale for posing our first research question, largely unaddressed in prior literature, arises from the potential to investigate an issue carrying significant implications for tax policy.

3. Research Design

3.1. The First Question

3.1.1. Base Specification

For the first question, we focus on cross-sectional variations to examine how individual firms' financial constraints affect their decision to claim these incentives. The primary outcome variable is a binary variable indicating if firm *i* claims at least one of the tax credit or bonus depreciation in year *t*, denoted by $Claim_{it}$. We also use either the natural log of one plus total eligible capital expenditures for these two tax incentives, $\ln{(1 + Eligible\ capex)_{it}}$, or the natural log of one plus total tax savings, ln(1+$Tax\ savings)_{it}$. Despite the high correlation among these three variables, we use the latter two in some analyses as they provide relevant interpretation and policy implications. We could have alternatively analyzed the tax credit and bonus depreciation separately. Our data, however, are not suitable for this type of analysis since only 3.7% of sample firms claim bonus depreciation while 20.3% claim the tax credit in each of the eligible years. We therefore utilize aggregated metrics without distinguishing between the two.

The key regressors are financially unconstrained measures from the previous year *t-1*, essentially representing the conditions at the beginning of year *t*. We choose the following six proxies based on their financial characteristics and data availability: i) stock market listing, $Public_{it-1}$, ii) bond issuance, $Bond_{it-1}$, iii) cash holdings, $Cash_{it-1}$, iv) cash flow, $Cash\ flow_{it-1}$, v) firm size, $Size_{it-1}$, and vi) a composite measure derived from a principal component analysis, $Principal\ component_{it-1}$.[15] These measures are commonly used in the literature, with the exception of $Public_{it-1}$.[16] $Public_{it-1}$ and $Bond_{it-1}$ indicate access to equity and bond markets, respectively. $Cash_{it-1}$ and $Cash\ flow_{it-1}$ represent internal financing, with the former being a stock and the latter a flow variable. $Size_{it-1}$ can serve as an overall indicator of financial constraints, given that larger firms should have better access to capital through any channel. $Principal\ component_{it-1}$ combines unconstrained measures into a single metric.

Our control variables follow the same structure as the unconstrained measures, being lagged by one year. They include positive taxable income dummy ($Taxable\ dummy_{it-1}$), which takes a value of one if the firm reports positive taxable income, and tax loss carryforwards offset dummy ($Loss\ offset\ dummy_{it-1}$), which takes a value of one if the firm offsets losses with taxable income[17], in line with the literature (Knittel 2016; Cui et al. 2022).

[15] We construct the composite measure from all the five unconstrained measures ($Public_{it-1}$, $Bond_{it-1}$, $Cash_{it-1}$, $Cash\ flow_{it-1}$, and $Firm\ size_{it-1}$). We extract the first principal component from this composite measure. It has eigenvalues greater than one in our estimation, which is a widely accepted criterion (e.g., Florackis and Sainani 2018; Francis et al. 2021). Another widely used measure is dividend payments. This measure, however, is not necessarily appropriate for our study since our data include both public and private firms. Shareholders of private firms may demand dividends for their own use, a tendency less prevalent among public firms. As a consequence, private firms may pay dividends even under financial difficulties.

[16] Studies in the investment tax literature employ a diverse range of unconstrained measures. Zwick and Mahon (2017) use firm size evaluated by sales, dividend payments, and cash holdings. Maffini et al. (2019) employ cash flow and corporate group structures. Fan and Liu (2020) adopt firm size measured by income, the cash-to-asset ratio, and credit accessibility that is determined by the provincial bank loan over GDP ratio. Zhang et al. (2018) use firm size based on the number of employees, the amount of capital stock, cash flow, and ownership structures. Edgerton (2010) utilizes dividends, cash holdings, and the Kaplan-Zingales index, which is positively associated with debt and Tobin's Q and negatively with cash flow. Liu and Mao (2019) apply dividend payments, firm size measured by assets, and ownership structures based on state ownership.

[17] We use a flow variable for tax loss carryforwards, which reflects firms' decisions to offset losses with income. An advantage of this variable is that it captures actual decisions to reduce taxable income,

These variables should be determinants of tax claims, since only firms with taxable income can claim tax incentives, and firms offsetting loss carryforwards against taxable income are less likely to claim investment tax incentives, given the potential substitution between these two tax benefits. According to the 2013 rule in Japan, firms have the option to carry losses forward for nine years, with an allowable maximum deduction constituting 80% of the taxable income. Regarding the temporal structures of control variables, we posit that firms reporting positive taxable income in year *t-1* would likely forecast similar positivity at the close of year *t*. One could also argue that taxable income in year *t* represents tax exhaustion and serves as a more direct determinant of tax claims. Substituting $Taxable\ dummy_{it-1}$ with $Taxable\ dummy_{it}$ does not significantly alter our results, likely due to our sample being comprised of firms with a relatively high taxable income.

We include two more control variables relevant to tax claiming. The first is the natural logarithm of firm age, $\ln{(Firm\ age)}_{it-1}$. We use the log form because, while older firms might find it easier to use the current tax system due to their familiarity with past systems, the marginal benefits of extra experience in tax claiming are expected to diminish. Another control variable is a binary indicator of whether the CEO has a college degree, $College_{it-1}$, which we expect to measure the CEO's knowledge, including tax awareness. This expectation is supported by survey evidence from Graham et al. (2017), suggesting that a higher educational background increases the likelihood of informed managerial choices on tax rates (e.g., marginal or average tax rates). While more direct measures exist in the literature focusing specifically on tax awareness, such as local tax authorities' resources (Cui et al. 2022) or accounting software usage (Pham 2019), we use these indirect measures due to data availability.

We include sales growth, $Sales\ growth_{it-1}$, to control for investment opportunities.[18] To further control for potential confounding factors, we include tangibility, $Tangibility_{it-1}$, defined as the fixed tangible assets-to-assets ratio. We posit that firms with greater tangibility, indicative of past capital investments, are likely to claim tax incentives extensively, considering the tendency to sustain their current operation over a certain period. We also include industry dummies[19], and standard errors are clustered at the industry level.

Equation (1) is our base specification for the first question:

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which in turn influences the decision to claim tax incentives. Alternatively, we could utilize a stock variable for tax losses, indicating accumulated past losses. The advantage of this variable is its capacity to reflect the potential for decreasing taxable income. However, due to data constraints, we rely on the flow variable.

[18] Since our data contain both public and private firms, we cannot include Tobin's Q, which requires data on firm-level stock prices. As an alternative, we could generate predicted Tobin's Q from public firms' data, as proposed by Badertscher et al. (2013), Campello and Graham (2013), Mortal and Reisel (2013), and Asker et al. (2015). In an untabulated table, we obtain similar results for primary coefficients when replacing sales growth with predicted Q as a control variable.

[19] Our data rely on the Japan Standard Industrial Classification that includes 99 distinct industrial categories. Although these categories include non-business entities such as religious organizations, our final sample still maintains a wide representation across as many as 84 sectors.

$$Tax_{it} = \alpha + \beta FUC_{it-1} + \gamma X^1_{it-1} + \mu_j + \nu_t + \varepsilon_{it}, \qquad (1)$$

where i, t, and j, respectively refer to the firm, the year, and the industry, Tax_{it} represents one of the outcome variables ($Claim_{it}$, $\ln(1 + Eligible\ capex)_{it}$, $\ln(1 + Tax\ savings)_{it}$), FUC_{it-1} represents one of the financially unconstrained measures ($Public_{it-1}$, $Bond_{it-1}$, $Cash_{it-1}$, $Cash\ flow_{it-1}$, $Size_{it-1}$, or $Principal\ component_{it-1}$), X^1_{it-1} represents control variables ($Taxable\ dummy_{it-1}$, $Loss\ offsett\ dummy_{it-1}$, $\ln(Firm\ age)_{it-1}$, $College_{it-1}$, $Sales\ growth_{it-1}$, $Tangibility_{it-1}$), μ_j and ν_t represent industry and year dummies, respectively, and ε_{it} is the error term. We employ a linear model when the dependent variable is either $\ln(1 + Eligible\ capex)_{it}$ or $\ln(1 + Tax\ savings)_{it}$. When it is $Claim_{it}$, we utilize a probit model, interpreting Equation (1) as a non-linear form. We predict a positive coefficient, β, for each FUC_{it-1}.

3.1.2 Cash Holdings and Access to External Markets

The heterogeneous role of cash holdings presents a different perspective on the relationship between financial constraints and tax claims. We focus particularly on private firms lacking access to the bond market as a source of heterogeneity. Private firms are inherently excluded from public equity markets, and those without access to the bond market should be even more reliant on cash holdings. This group should therefore place a higher value on cash holdings.[20]

To capture this relationship, we incorporate an interaction term of cash holdings with a dummy variable indicating the firm's lack of access to external (i.e., equity and bond) markets, $Noexternal_{it-1}$, in Equation (2):

$$Tax_{it} = \alpha + \beta_1 Cash_{it-1} * noexternal_{it-1} + \beta_2 Cash_{it-1} + \beta_3 Noexternal_{it-1} + \gamma X^1_{it-1} + \mu_j + \nu_t + \varepsilon_{it}. \qquad (2)$$

We expect the coefficient, β_1, to be positive. Note the difference between this measure, $Cash_{it-1} * noexternal_{it-1}$, and other unconstrained measures. Equation (1) specifically investigates the impact of the unconstrained measure on tax claims within a subset of firms, which are typically perceived as constrained due to their lack of access to external markets. Thus, bearing this unique context in mind can be necessary when interpreting results associated with $Cash_{it-1} * noexternal_{it-1}$.

3.2. The Second Question

[20] This idea is akin to that of Duchin et al. (2010), among others. They find that firms with more cash holdings prior to the 2008 global financial crisis do not reduce their investment levels relative to those with less holdings, despite the global capital market paralysis.

In the second question, we investigate whether claiming tax incentives lead to an incremental total investment beyond pre-claim levels. This analysis diverges from both the first question and the typical approach in the literature in two crucial aspects. First, we turn our attention to longitudinal changes in investment within individual firms, as opposed to comparing cross-sectional variations among firms. Second, in contrast to existing literature that generally compares investment behavior between firms with high and low potential tax benefits, we examine the difference in investments between actual tax claimants and non-claimants. This approach enables us to assess whether an observed change in investment can be directly attributed to tax claims.

Our estimation extends upon standard frameworks in the investment tax literature, incorporating adjustments to better reflect our focus on tax claiming. The outcome variable is the ratio of domestic capital expenditures to lagged fixed tangible assets, $Capex_{it}$. The main regressor, $Postclaim_{it}$, is a dummy variable that takes the value of one from the year t the firm first claims either the tax credit or bonus depreciation and retains this value for subsequent years. This variable is different from the $Claim_{it}$ variable used in our first question, which is set to one only in the tax claiming year t.[21]

As for the control variables, we include lagged sales growth, $Sales\ growth_{it-1}$, and cash flow, $Cash\ flow_{it-1}$, drawing from the models of Zwick and Mahon (2017) and Maffini et al. (2019).[22] We adopt the lagged structure to maintain consistency with the specification for the first question. Additionally, to account for potential confounding factors that could impact both tax claiming and investments, we include individual financially unconstrained measures and all other control variables from Equation (1). A key distinction from the first question is that the models for the second and third questions include firm-fixed effects to examine changes in investments over time. This difference implies that even when we add more control variables, such as individual unconstrained measures, as long as these variables are time-invariant or show small variation within a firm, these factors are likely absorbed by firm-fixed effects, suggesting that their inclusion would not substantially affect our results.

Equation (3) gives the model for the second question:

[21] A recognized difficulty in recent econometric literature in carrying out difference-in-differences analysis with two-way fixed effects is potential biases in treatment effects that stem from differences in treatment timing (Goodman-Bacon 2021). This issue is particularly relevant in studies like ours, where the timing of tax incentive claims can vary across firms and over time. We employ conventional estimation procedures and supplement our approach with the method proposed by Callaway and Sant'Anna (2021) as a robustness check, with results affirming our findings presented in untabulated tables. Moreover, considering features of our analysis, we perform further tests that only include observations from non-claimants and firms that claim once, as well as explicitly consider the tax claim counts, distinguishing between firms that claim in a single year versus those making claims across multiple years.

[22] Zwick and Mahon (2017) adopt a parsimonious model with only current cash flow and year- and firm-fixed effects. Maffini et al. (2019) extend their model to include growth potential indicators, such as sales or asset growth rates, to their model.

$$Capex_{it} = \alpha_i + \beta Postclaim_{it} + \gamma X_{it-1}^2 + \nu_t + \varepsilon_{it}, \qquad (3)$$

where $Capex_{it}$ represents the ratio of capital expenditures to lagged fixed tangible assets, $Postclaim_{it}$ represents a dummy variable that changes to one if the firm claims either the tax credit or bonus depreciation in year t and retains this value for subsequent years, X_{it-1}^2 represents control variables that include $Sales\ growth_{it-1}$, $Cash\ flow_{it-1}$, other control variables X_{it-1}^1 from Equation (1) ($Taxable\ dummy_{it-1}$, $Loss\ offsett\ dummy_{it-1}$, $\ln(Firm\ age)_{it-1}$, $College_{it-1}$, and $Tangibility_{it-1}$), other financially unconstrained measures ($Public_{it-1}$, $Bond_{it-1}$, $Cash_{it-1}$, and $Size_{it-1}$), as well as α_i and ν_t that represent the firm- and year-fixed effects, respectively. We expect the coefficient, β, to be positive. Note that for the second question, $Cash\ flow_{it-1}$ is not considered among the financially unconstrained measures. In the context of the second question, $Cash\ flow_{it-1}$ already exists as a control variable, following the standard specification in investment equations.

3.3. The Third Question

Our third question examines whether both constrained and unconstrained firms exhibit incremental investments upon claiming tax incentives. We add an interaction term of $Postclaim_{it}$ with individual unconstrained measures to Equation (4), resulting in Equation (4):

$$Capex_{it} = \alpha_i + \beta_1 Postclaim_{it} * FUC_{it-1} + \beta_2 Postclaim_{it} + \beta_3 FUC_{it-1} + \gamma X_{it-1}^2 + \nu_t + \varepsilon_{it}, \qquad (4)$$

where X_{it-1}^2 includes the same set of control variables as in Equation (3).

4. Data

We use two data sources compiled annually: proprietary tax return survey data collected by the Ministry of Economy, Trade, and Industry and accounting data provided by Tokyo Shoko Research. The first dataset is the primary source for our study. The ministry sends out a questionnaire requesting the tax return information of firms exceeding 100 million yen of legal capital, which is a component of equity capital in Japanese corporate law. Legal capital generally correlates positively with firm size, indicating that the survey focuses on relatively large firms. The exclusion of small firms due to this data coverage limitation is unlikely to affect our study. Our analysis focuses on the comparison between sizable firms, including those with access to capital markets such as public or bond-issuing firms, and their comparable counterparts. The inclusion of small firms, therefore, does not materially affect our estimation. In fact, almost all public firms have legal capital that significantly exceeds 100 million yen.

The response rate to the survey ranges from approximately 25 to 30%, varying by the year. These response rates are relatively high for a firm-level survey compared to others (e.g., 5-8% in Campello et al. 2010; 26% in Graham et al. 2017). Nevertheless, concerns regarding selection biases may still arise. To mitigate these concerns, we compare our data to the general population of firms, based on the aggregate data disclosed by the Ministry of Finance. According to their data, firms with legal capital over 100 million yen claim tax incentives a total of 9,814 times, while our data indicate 2,971 times. The ratio of tax incentive claims in our dataset to those in the Ministry's is 0.30, roughly in line with the survey response rate. This observation suggests that our data are likely representative of typical firms' behavior in terms of tax incentive claims.

We present summary statistics in Table 1. Panel A provides statistics for the entire sample, while Panel B separately lists the statistics for financially unconstrained and constrained firms. The classification in Panel B is based on the median value from the principal component analysis in 2013, i.e., $Principal\ component_{i2013}$. To ensure comparability across all three questions, we only retain firm-years that report the $Capex_{it}$ variable. The resulting number of firm-year observations is 7,288 for the first question and 9,750 for the second and third questions.[23] We winsorize the continuous variables at the 0.5% and 99.5% levels.

As can be seen in Panel A of Table 1, 21.2% of the firms claim either the tax credit or bonus deprecation in each of the three eligible years as indicated by the variable $Claim_{it}$. The data also show that 85.4% of the firms report positive taxable income in the previous year ($Taxable\ dummy_{it-1}$), indicating that tax exhaustion may not be a significant issue for a substantial proportion of firms.

Table 1 also details various characteristics of our sample firms. 31.0% are public ($Public_{it-1}$), and 17.2% are bond-issuing ($Bond_{it-1}$). We use bond issuance dummies as a measure of bond market access, despite its limitations as it may also contain other factors such as future investment opportunities. Bond ratings would have been a more desirable and common measure (e.g., Almeida et al. 2004); however, due to data availability, we resort to using bond issuance dummies. Outside of the data shown in Table 1, the mean and median total assets are 14.1 and 11.7 billion yen, respectively, which were roughly equivalent to 100-150 million US dollars in our data period. These values are lower than the average values reported in Zwick and Mahon (2017) in the US, 400 million dollars, and larger than their median of 24

[23] For the first question, we use three-year data, assessing outcome variables from 2014 to 2016 and using data from 2013 to 2015 for lagged covariates. For the second and third questions, we extend the timeframe to cover four years, evaluating outcome variables from 2013 to 2016 and using data from 2012 to 2015 for lagged covariates. The extended timeline is necessary for the latter two questions to compare changes in investments, which require data before the tax reform. However, due to data constraints, our pre-reform period is restricted to a single year.

million dollars. The lower median in their study implies that their data include a considerable number of US small firms.

Initial observations from Panel B indicate that financially unconstrained firms claim tax incentives more frequently than their constrained counterparts, with rates of 28.9%, more than double the 13.0% rate seen in their counterparts ($Claim_{it}$). Furthermore, as indicated by $Public_{it-1}$, over half of the firms classified as financially unconstrained are public, compared to less than 5% among their constrained counterparts. The taxable status between unconstrained and constrained firms shows marginal differences, with averages of $Taxable\ dummy_{it-1}$ at 0.86 and 0.85, respectively. This minor difference suggests that both types of firms, irrespective of their financial constraints, possess similar opportunities to claim investment tax incentives. Therefore, our data are suitable for isolating and examining the potential influence of financial constraints on the likelihood of claiming these incentives.

5. Results

5.1. The First Question: Decisions to Claim Tax Incentives

5.1.1. Base Results

We address the first question which corresponds to Hypothesis 1, regarding tax claiming decisions. Table 2 presents our baseline results, derived from Equation (1). Panels A-C respectively use different outcome variables: $Claim_{it}$ in Panel A [24], $\ln(1 + Eligible\ capex)_{it}$ in Panel B, and $\ln(1 + Tax\ savings)_{it}$ in Panel C. Each of columns (1)–(6) includes one of the six unconstrained measures as FUC_{it-1} in Equation (1). We observe positive coefficients for these measures, significant at the 1% level in most instances, with the exception of negative coefficients on $Cash_{it-1}$ in column (3). The role of cash holdings receives further examination in Table 3.[25] The impacts observed are of considerable economic significance. For instance, public firms claim tax incentives 12.0% more frequently than private firms when evaluated at the mean value, based on marginal effects. Moreover, these public firms' eligible capital expenditures are 66.9% higher, and their tax benefits are 35.8% greater, compared to those of their private counterparts.

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[24] One point of note is the differing number of observations across panels. While Panels B and C employ the full sample of 7,288 observations for estimation, the count in Panel A is slightly reduced to 7,092. This reduction stems from the nonlinear estimation process in Panel A. In this process, some observations from certain industries are excluded. These are industries with a scant number of observations, leading to situations where they perfectly predict either claiming or non-claiming of tax incentives. However, restricting our sample in Panels B and C to match that of Panel A does not significantly alter our results.

[25] In an untabulated table, we examine the validity of $Principal\ component_{it-1}$ used in columns (6), considering the negative effects of $Cash_{it-1}$ on tax claiming observed in columns (3). We construct a principal component measure that incorporates all other unconstrained measures, while excluding cash holdings. Our findings are similar to those presented in columns (6).

Control variables exhibit expected signs for the most part. Positive coefficients on $Sales\ growth_{it-1}$ observed especially in Panels B and C are in line with the idea that it can effectively represent investment opportunities. The measures of experience, specifically $\ln(Firm\ age)_{it-1}$ and, to a lesser degree, $College_{it-1}$, lead to more tax claiming. Moreover, coefficients for $Taxable\ dummy_{it-1}$ are consistently positive and statistically significant across all models, while those for $Loss\ offset\ dummy_{it-1}$ are negative and significant in most models. To evaluate the probit regression in Panel A, we report the area under the Receiver Operating Characteristic curve in Panel A. All the values exceed the threshold of 0.7 (e.g., Huang et al., 2015).

Table 3 further investigates cash holdings, following Equation (2). The interaction terms, $Cash_{it-1} * noexternal_{it-1}$, demonstrate positive coefficients in columns (1)[26], (3), and (5), consistent with our prediction. Columns (2), (4), and (6), which interact cash holdings with a dummy variable denoting a private firm ($Cash_{it-1} * private_{it-1}$), yield comparable results. In contrast, the coefficients for $Noexternal_{it-1}$ and $Private_{it-1}$ are negative. This suggests that firms with limited access to external markets or unlisted status, thus financially constrained, are less likely to claim tax incentives when they have zero or scant cash holdings. Collectively, these results underscore the importance of cash holdings for firms without access to capital markets when claiming tax incentives.

The negative coefficients on $Cash_{it-1}$ suggest that among unconstrained firms (where either $Noexternal_{it-1}$ or $Private_{it-1}$ equals zero), higher cash holdings reduce the likelihood of tax claims. One possible interpretation is that unconstrained firms, having encountered fewer investment opportunities in the past, have accumulated more cash holdings. One could thus interpret higher cash holdings as potentially indicating a scarcity of investment opportunities, which might then decrease the propensity to claim tax incentives.

5.1.3. Monetary Policy and Tax Policy

Our first research question motives an exploration of the relationship between tax and monetary policy. Monetary easing should alleviate financial frictions and encourage tax claims according to our hypothesis. While our findings suggest this possibility, a direct test provides a more straightforward evaluation of these policies.

Identification is complicated due to the pervasive influence of monetary policy, which affects all firms and makes it challenging to distinguish between treatment and control groups. However, the Japanese setting helps circumvent this problem at least among public firms. As

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[26] The econometric literature recognizes difficulties in interpreting coefficients for interaction terms in nonlinear models such as Probit regression (Ai, and Norton 2003). Puhani (2012) demonstrates that when the interaction term comprises two dummy variables, the sign of the coefficient is the same that of the marginal effects. In untabulated results, when we replace $Cash_{it-1}$ with a dummy variable indicating whether it is above the median, we find similar results. We undertake similar additional analyses for later tables that include interaction terms in Probit regression and find consistent results.

part of its monetary easing measures, the Bank of Japan purchases publicly traded equity, directly affecting certain public firms. The bank primarily targets two types of exchange-traded funds that track representative stock indexes: Tokyo Stock Price Index (TOPIX) and Nikkei 225 (or Nikkei Stock Average). The TOPIX is a value-weighted index of all firms listed on the first section of the Tokyo Stock Exchange, accounting for approximately half of the total listings on the exchange. This value weight is determined by the market capitalization of what is known as floating stocks. These are stocks more likely to be traded frequently, defined as holdings not owned by the ten largest shareholders, executives, other corporations, or held as treasury stocks. The Nikkei 225 is a price-weighted index comprising 225 representative Japanese public firms across diverse sectors.

This purchasing rule of the Bank of Japan generates a monetary policy-driven variation among public firms, enabling a direct evaluation of the interaction of tax and monetary policy. Public firms included in the TOPIX or Nikkei 225 indices should receive financial advantages via lower equity costs compared to other public firms (Charoenwong et al. 2021). These firms are thus more likely to claim tax incentives even among public firms. In our analysis, we include either $TOPIX_{it-1}$ or $Nikkei_{it-1}$; $TOPIX_{it-1}$ and $Nikkei_{it-1}$ are dummy variables that indicate an inclusion of the corresponding index. Moreover, following the methodology based on Harada and Okimoto (2021), we also use the weight of a firm in the bank's ETF purchase, denoted as $Weight_{it-1}$. The bank's purchasing strategy allocates 53% to Nikkei 225, 42% to TOPIX, and 4% to JPX 400, which comprises 400 representative Japanese firms selected by the Tokyo Stock Exchange. To illustrate, if a firm's weights in the Nikkei 225, TOPIX, and JPX 400 are respectively x, y, and z, then the firm's weight in the bank's ETF purchases is calculated as $0.53x + 0.42y + 0.04z$.

We use Equation (5):

$$Claim_{it} = \alpha + \beta_1 Index_{it-1} + \beta_2 Public_{it-1} + \gamma X^1_{it-1} + \mu_j + \nu_t + \varepsilon_{it}, \qquad (5)$$

where $Index_{it-1}$ is a dummy variable that indicates the inclusion in the TOPIX or Nikkei 225, or $Weight_{it-1}$ defined above.

Table 4 demonstrates positive coefficients for all the $Index_{it-1}$ variables on $Claim_{it}$. Given that $Public_{it-1}$ consistently exhibits positive coefficients across all columns, and considering that all firms with a strictly positive value of $Index_{it-1}$ are public, these positive coefficients can be interpreted as additional tax claiming effects for public firms attributable to monetary easing. This finding suggests that, at least among public firms, monetary and tax policies can operate in a complementary manner.

5.2. The Second Question: Investment Following Claiming Tax Incentives

We turn our attention to analyzing whether claiming tax incentives leads to an incremental investment compared to pre-claim levels, addressing our second question and Hypothesis 2. In Column (1) of Table 5, we use a parsimonious model with firm-fixed effects and year dummies based on Equation (3).[27] The result, demonstrated by the significant coefficient of 0.013 for $Postclaim_{it}$, suggests that claiming tax incentives indeed increases firms' capital expenditures, providing support for Hypothesis 2. Given that the average $Capex_{it}$ in our sample is 0.105, tax claiming contributes to a 12.4% rise in capital expenditures.

Adding more control variables in columns (2) to (4) yields statistically significant results regarding $Postclaim_{it}$ at a level of at least 10%. The specification of column (2) follows standard investment equation that includes $Cash\ flow_{it-1}$ and growth potential measured by $Sales\ growth_{it-1}$. Although the coefficients for $Sales\ growth_{it-1}$ are not statistically significant, an untabulated result shows that replacing $Sales\ growth_{it-1}$ with $Sales\ growth_{it}$, following the estimation of Maffini et al. (2019), yield positive coefficients, while leaving the effect of $Postclaim_{it}$ on $Capex_{it}$ almost unchanged. Column (3) includes control variables potentially affecting tax claiming, represented by X^1_{it-1} ($Taxable\ dummy_{it-1}$, $Loss\ offset\ dummy_{it-1}$, $\ln(Firm\ age)_{it-1}$, $College_{it-1}$, and $Tangibility_{it-1}$) to consider that factors influencing tax claiming can also affect capital expenditures.

Column (4) furthermore includes all the financially unconstrained measures ($Public_{it-1}$, $Bond_{it-1}$, $Cash_{it-1}$, and $Size_{it-1}$) since financial constraints have the potential to impact investments. We observe similar coefficients of $Postclaim_{it}$ across the columns. We also observe negative coefficients for $Size_{it-1}$, suggesting that as firms grow larger and mature, they tend to invest less intensively. Moreover, columns (2)-(4) show positive investment sensitivity to cash flows, suggesting the presence of financial constraints in our data.

One might raise questions about the statistical robustness of these results, as the coefficients for $Postclaim_{it}$ in columns (2) and (3) only exhibit significance at the 10% level. This marginal level of statistical significance might be indicative of a considerable degree of heterogeneity in the impact of tax claiming on investments. The next subsection focuses on heterogeneity arising from financial constraints, addressing the third question.

5.3. The Third Question: Financial Constraints and Investment

To examine the third question, Table 6 uses Equation (4) that includes an interaction term of $Postclaim_{it}$ with financially unconstrained measures. To streamline the presentation of results, Panel A uses $Principal\ component_{it-1}$ as the measure. This panel shows positive and significant coefficients on $Postclaim_{it}$ across all columns, implying that constrained firms increase their investments conditional on claiming tax incentives. In contrast, the

[27] In Table 5, the number of observations is higher relative to those in Table 4 or preceding tables. For further details, refer to footnote 22.

negative and significant coefficients on $Postclaim_{it} * principal\ component_{it-1}$ at the 1% level in all columns show that the incentive effect is weaker for unconstrained firms.

Critically, the joint F-test suggests that the change in investment among unconstrained firms relative to pre-claim levels is not different from zero at the 5% level in all columns, with only a marginal significance observed at the 10% level in column (4). This finding provides our primary policy message about the costs and benefits of investment tax incentives: while effectively stimulating investments among constrained firms, they give unnecessary tax benefits for unconstrained counterparts without the indented investment stimulation. We also observe negative coefficients on $Principal\ component_{it-1}$, consistent with the finding for $Size_{it-1}$ in Table 5. Moreover, given that we observe only slight changes in the coefficients on $Postclaim_{it} * principal\ component_{it-1}$ and $Postclaim_{it}$ across columns with a different set of control variables, the choice of control variable appears not to materially influence our results. This can be attributed to the firm-fixed effects, which absorb much of the variation in the control variables, X^2_{it-1}, across firms.

Panel B uses individual unconstrained measures as components of interaction terms with $Postclaim_{it-1}$: $Public_{it-1}$ in columns (1) and (2), $Bond_{it-1}$ in columns (3) and (4), $Cash * noexternal_{it-1}$ in columns (5) and (6), and $Size_{it-1}$ in columns (7) and (8). Given the multitude of outcome variables in this panel, we restrict our examination to models from columns (1) and (2) of Panel A for a more concise presentation of results. The rationale behind this choice is twofold: first, the models from these columns yield similar results compared with other models that incorporate more control variables; second, these models are widely used in the investment tax literature.

Generally, Panel B supports our finding in Panel A. The first two columns show that private firms increase their capital expenditures following tax claims, as indicated by the positive coefficients of $Postclaim_{it}$. In contrast, we observe negative coefficients for $Postclaim_{it} * public_{it-1}$. This negative effect completely nullifies the positive effect, with the p-value of the joint test being well above the 10% level, implying that public firms do not increase investments despite extensive tax claims.

The key takeaway from columns (3) and (4) is that firms with the bond market access do not show a significant increase in their investments following tax claims, as indicated by the p-value of the joint F-test exceeding the 10% level. However, these columns are different with the previous two in that, while they show positive coefficients on $Postclaim_{it} * bond_{it-1}$, they are statistically insignificant, potentially due to issues with using debt issuance, rather than credit ratings, as an unconstrained measure.

The coefficients on $Postclaim_{it-1} * cash_{it-1} * noexternal_{it-1}$ in columns (5) and (6) are positive, requiring a more careful interpretation. This finding may seem inconsistent with previous findings, considering the negative coefficients for other unconstrained measures such as $Postclaim_{it-1} * public_{it-1}$. This apparent inconsistency may become more complex when we recall from Table 3 that, like other unconstrained measures, $Cash * no\ external_{it-1}$ shows positive coefficients on tax claims. However, a closer look reveals that these observations indeed support our main argument. For private firms without external market access, cash represents a crucial source for investments. In other words, what distinguishes $Cash * no\ external_{it-1}$ from the other unconstrained measures is that it represents the internal financial capability of firms facing these specific constraints. Consequently, the results from columns (5) and (6) indicate that, among such constrained firms, possessing financial capacity encourages investment upon claiming tax incentives.

Columns (7) and (8) of Panel B provide insights into which firms increase their investments upon claiming tax incentives. As in Panel A and columns (1)-(2) of Panel B, we observe positive coefficients for $Postclaim_{it}$ and negative coefficients for $Postclaim_{it} * size_{it-1}$. The sum of these coefficients turns zero when $Size_{it-1}$ equals 12.3, according to column (8), corresponding to the 91.5th percentile of the size distribution. This suggests that the top 8.5% of large firms in our sample may benefit from tax incentives without increasing their investments.

Panel C substitutes $Postclaim_{it-1}$ with $Postcredit_{it-1}$, which represents a dummy variable that changes to one if the firm claims the tax credit in year *t* and retains this value for subsequent years. The only difference between these two variables is that the former includes both tax credit and bonus depreciation claims, while the latter accounts only for tax credit claims. Since tax credits comprise the majority of claims in our data, this step helps determine the main driver of our findings.

The results in Panel C are similar with those in Panel A: constrained firms increase investments relative to pre-claim levels, while unconstrained firms do not necessarily exhibit a similar increase. It is worth noting that Panel C presents a reduced number of observations compared to Panel A. This is due to the exclusion of observations that claim bonus depreciation. Without this exclusion, firms assigned a zero value for $Postcredit_{it-1}$, indicating non-claimants of tax credits, could still be claimants of bonus depreciation.

5.4. Returning to the First Question: Heterogeneity in Previous Year's Tax Status

Up to this point, our findings present a seemingly puzzling pattern among unconstrained firms: they are more likely to claim tax incentives, yet these claims do not necessarily lead to higher investments compared to pre-claim levels. A plausible explanation could be that these firms plan capital expenditures that have the potential to qualify for tax incentives, irrespective of their ultimate eligibility to claim these incentives. If tax incentives become available, these firms seize the opportunity and claim them, without necessarily altering their initial investment plans. This opportunistic behavior could explain the observed paradoxical pattern.

We investigate heterogeneity based on a firm's tax status in the previous year. Specifically, we consider the interaction between financially unconstrained measures and the firm's tax status in the previous year, $Taxable\ dummy_{it-1}$. A straightforward prediction, which is fully consistent with Hypothesis 1, is that among firms likely to be in a position to claim tax incentives at year-end *t*, such as those with positive taxable income in year *t-1*, unconstrained firms would claim these incentives more extensively than their constrained counterparts.

We also consider another crucial group with contrasting tax statuses: those reporting negative taxable income in year *t-1*. This implies a reduced likelihood of claiming tax incentives at year-end *t*. Nonetheless, even when less favorable tax conditions for year-end *t* are predicted at *t-1*, financially unconstrained firms, with their financial flexibility and the potential for future tax benefits, may still choose to invest in tax-eligible capital expenditures during year *t*. We estimate the parameters in Equation (6):

$$Tax_{it} = \alpha + \beta_1 Principal\ component_{it-1} * taxable\ dummy_{it-1} + \beta_2 Principal\ component_{it-1} + \gamma X^1_{it-1} + \mu_j + \nu_t + \varepsilon_{it}, \quad (6)$$

where Tax_{it} represents one of the outcome variables: $Claim_{it}$, $\ln(1 + Eligible\ capex)_{it}$, or $\ln(1 + Tax\ savings)_{it}$. We expect the coefficient, β_1, to be positive, in line with our Hypothesis 1. The key issue for this subsection concerns the sign of β_2. This coefficient captures the impact of being financially unconstrained on tax claims among firms that had no taxable income in the previous year. Should β_2 be positive, it would suggest that unconstrained firms continue to undertake eligible capital expenditures and claim tax incentives, even when the prospects for having positive income at year-end *t* are low relative to those firms having positive income in *t-1*.

Table 7 provides contrasting findings between the coefficients for $Principal\ component_{it-1} * taxable\ dummy_{it-1}$ and $Principal\ component_{it-1}$. Across all columns, we consistently observe positive coefficients for $Principal\ component_{it-1}$ at the 1% level. These findings, particularly the observation in column (2) where the outcome variable is $\ln(1 + Eligible\ capex)_{it}$, suggest that unconstrained firms may incur eligible capital expenditures even when they do not necessarily expect the availability of tax incentives at year-end *t*.

The link between unconstrained measures and tax claims is more pronounced among firms with taxable income in the previous year, as shown by the positive coefficients on $Principal\ component_{it-1} * taxable\ dummy_{it-1}$ in columns (2) and (3). In contrast, we do not observe significant coefficients when the outcome variable is $Claim_{it}$. This finding may suggest that even without taxable income in the previous year, unconstrained firms still claim nominal amounts of tax incentives, and thus we do not detect any significant differences in claims between these firms and those with positive taxable income in the previous year.

Furthermore, the positive coefficients on $Taxable\ income_{it-1}$ suggest that the previous year's taxable income is linked to increased tax claims. This finding strengthens our assumption that a firm's taxable status in *t-1* can serve as a predictor of its taxable income at the end of *t*, which in turn allows firms to claim tax incentives.

5.5. Frequent Tax Claimants

We propose the notion of frequent tax claimants to further connect our first question with the subsequent two questions. Considering the tax incentives are accessible for almost three years, we can distinguish between firms that frequently claim these tax incentives more than twice in different years and those that claim only once. We aim to investigate whether, among frequent claimants, the increase in investments following tax claims is more pronounced for financially constrained firms compared to their unconstrained counterparts. If this reasoning holds empirically, we could suggest that while the multi-year access to tax incentives work effectively for constrained firms beyond just their availability, it might provide unnecessary repeated tax benefits to unconstrained firms.

We use Equation (7) that includes interaction terms between $Postclaim_{it}$ and the variables $Count_i^1$ and $Count_i^2$. The former equals one when a firm claims the incentives in only one year during the three-year eligibility period, while the latter equals one when a firm claims the incentives in two or more different years within the same period. Panel B of Table 1 shows that 25.0% of unconstrained observations claim tax incentives twice or more, whereas this figure is only 10.5% for their constrained counterparts. These contrasting numbers are consistent with Hypothesis 1. We use $Principal\ component_{it-1}$ as the unconstrained measure for simplicity:

$$Capex_{it} = \alpha_i + \sum_{n=1}^{2} \beta_1^n Postclaim_{it} * count_i^n + \sum_{n=1}^{2} \beta_2^n Postclaim_{it} * count_i^n * principal\ component_{it-1} + \gamma X_{it-1}^2 + \nu_t + \varepsilon_{it}.^{28} \quad (7)$$

Table 8 shows clear contrasts between financially constrained and unconstrained firms among frequent tax claimants. The positive coefficients on $Postclaim_{it} * count_i^2$ indicate that, within the group of frequent claimants, financially constrained firms show a greater

[28] We also include all relevant terms associated with $\sum_{n=1}^{2} Postclaim_{it} * count_i^n * principal\ component_{it-1}$, namely : $Count_i^n * principal\ component_{it-1}$ for $n \in \{1,2\}$, $Postclaim_{it} * principal\ component_{it-1}$, $Postclaim_{it}$, and $Principal\ component_{it-1}$.

increase in capital expenditures relative to pre-claim levels. For financially unconstrained firms, the incentive effect is less pronounced, as shown by the negative coefficients on $Postclaim_{it} * count_i^2 * principal\ component_{it-1}$. The joint F-test suggests that, despite being frequent claimants, unconstrained firms do not increase their investments across most model specifications, with exception of column (4) at the 5% level.[29] While we observe a similar pattern among one-time claimants, as indicated by positive coefficients on $Postclaim_{it} * count_i^1$ and negative coefficients on $Postclaim_{it} * count_i^1 * principal\ component_{it-1}$, the insights from the behavior of frequent tax claimants are of particular importance for policymakers when determine the duration of tax incentive availability.

5.6. Time-Series Pattern

In this subsection, we address two time-series aspects. Section 5.6.1 contrasts the investments made in the first year of tax claims with those made in each individual year surrounding the claim. This approach differs from previous analyses where we examine the overall changes in investments, making only broad comparisons between pre-claim and post-claim periods. This analysis also helps ascertain the absence of a pre-trend. Section 5.6.2 investigates how the choice of a specific year for the first tax claims might affect investment changes. This analysis can clarify how our research relates to the existing literature, a point we will discuss in Section 5.6.2. Broadly, the former analysis is concerned with the timeline relative to the first year of tax claims, while the latter considers the absolute time in calendar years.

5.6.1. Pre-Trend and Post-Investment Changes

An essential assumption underpinning the second and third research questions is the absence of any pre-existing investment trends. Furthermore, we anticipate that, except for cases where firms claim tax incentives across multiple years, there should be no significant changes in investments relative to pre-claim levels in the years following the tax incentive claim. To test these possibilities, we estimate the parameters of Equation (8), where we interact $Postclaim_{it}$ with the time indicators, $Time_{it}^{-3}$, $Time_{it}^{-2}$, $Time_{it}^{0}$, $Time_{it}^{+1}$, and $Time_{it}^{+2}$:

[29] In an untabulated result, we observe that the positive effect in column (4) for frequent claimants that are financially unconstrained is not necessarily robust. For example, when we substitute $Principal\ component_{it-1}$ with $Public_{it-1}$ as the unconstrained measure, we find that, among frequent claimants, public firms do not exhibit an increase in investments relative to pre-claim levels based on the same specification as in column (4).

$$Capex_{it} = \alpha_i + \sum_{n=-3,n\neq-1}^{+2} \beta_1^n Postclaim_{it} * time_{it}^n$$
$$+ \sum_{n=-3,n\neq-1}^{+2} \beta_2^n Postclaim_{it} * time_{it}^n * principal\ component_{it-1} + \gamma X_{it-1}^2$$
$$+ \nu_t + \varepsilon_{it},^{30} \qquad (8)$$

where the variable $Time_{it}^0$ denotes the first year the firm claims the tax incentives, $Time_{it}^{-2}$ is two years before the claim, $Time_{it}^{+1}$ is the year following the claim, and other variables follow a similar interpretation. We omit $Time_{it}^{-1}$ as it serves as the reference year to evaluate investment changes.

Panel A of Table 9, where we do not include the interaction terms with $Principal\ component_{it-1}$, shows that firms increase their investments only in $Time_{it}^0$, relative to $Time_{it}^{-1}$. This finding suggests the absence of a pre-trend or a change in investments afterwards. Nevertheless, this observation comes with a caveat concerning the latter: firms could claim tax incentives multiple times across different years after the first claim, which could stimulate investment in $Time_{it}^{+1}$ or $Time_{it}^{+2}$. In fact, we observe positive and relatively large coefficients, especially for $Postclaim_{it} * time_{it}^{+2}$, although these are not statistically significant due to large standard errors. In Panel B, we exclude firms that engage in multiple claims of tax incentives. As with Panel A, significant coefficients appear solely in $Time_{it}^0$.

Panel C reports similar results to Panel A of Table 6. Constrained firms demonstrate an increase in their investments in $Time_{it}^0$, as reflected by the positive coefficients on $Postclaim_{it} * time_{it}^0$. We also observe negative coefficients on $Postclaim_{it} * time_{it}^0 * principal\ component_{it-1}$. We note a positive effect of tax claims on investments among unconstrained firms, as indicated by the p-value of the F-test for $Time_{it}^0$. However, the statistical significance of the increase remains largely marginal, reaching the 10% level in columns (1) to (3), and the 5% level only in column (4).

5.6.2. When to Claim Tax Incentives and Investments

Tax incentives are often available for multiple years. The literature shows a subdued investment stimulation effect during the early phase of tax incentive implementation, compared to more pronounced effects observed in subsequent years in the US (Zwick and Mahon 2017;

[30] We also include all relevant terms associated with $\sum_{n=-3,n\neq-1}^{+2} Postclaim_{it} * time_{it}^n * principal\ component_{it-1}$, namely : $time_{it}^n * principal\ component_{it-1}$, and $time_{it}^n$ for $n \in \{-3, -2, 0, +1, +2\}$, as well as $Postclaim_{it} * principal\ component_{it-1}$, $Postclaim_{it}$, and $Principal\ component_{it-1}$.

Ohrn 2019). We first corroborate this finding within our own Japanese sample using Equation (9):

$$Capex_{it} = \alpha_i + \sum_{n=2014}^{2016} \beta_1^n Postclaim_{it} * firstyear_i^n$$
$$+ \sum_{n=2014}^{2016} \beta_2^n Postclaim_{it} * firstyear_i^n * principal\ component_{it-1} + \gamma X_{it-1}^2$$
$$+ \nu_t + \varepsilon_{it},^{31} \qquad (9)$$

where $firstyear_i^n$ refers to a dummy variable that takes a value of one in the first year $n \in \{2014, 2015, 2016\}$ the firm first claims tax incentives. Panel A of Table 1 shows that the highest frequency of first-time tax claims occurs in 2015. Tax claims, however, do not necessarily correspond with changes in investment. We further investigate whether firms that first claim tax incentives in 2015 exhibit any changes in their investment behaviors.

Panel A of Table 10 shows that only when the first year to claim tax incentives is 2015 do financially constrained firms significantly increase their investments, as represented by the positive coefficients of $Postclaim_{it} * firstyear_i^{2015}$. The insignificant effects observed in 2014 represented by the coefficients on $Postclaim_{it} * firstyear_i^{2014}$, are consistent with the findings in the literature regarding weak first-year incentive effects. The coefficients for $Postclaim_{it} * firstyear_i^{2016}$ are twice as large as those for 2015. They are, however, not statistically significant. The sizable standard errors accompanying these coefficients point to the presence of significant heterogeneity among constrained firms. For unconstrained firms, we observe negative coefficients on $Postclaim_{it} * firstyear_i^n * principal\ component_{it-1}$ for $n \in \{2014, 2015\}$. However, these coefficients do not suggest a decrease in investments post-tax claiming, as confirmed by the joint test showing no significant investment changes in either year at the 5% levels.

Panel B examines more heterogeneities among financially constrained firms, motivated by the large standard errors associated with the coefficients on $Postclaim_{it} * firstyear_i^{2016}$. We define firms as "highly financially constrained" if they rank within the bottom 30th percentile based on $Principal\ component_{it-1}$.[32] While our findings from the first question suggest these firms are less likely to claim tax incentives, we expect a considerable increase in their

[31] We also include all relevant terms associated with $\sum_{n=2014}^{2016} Postclaim_{it} * firstyear_i^n * principal\ component_{it-1}$, namely : $firstyear_i^n * principal\ component_{it-1}$ for $n \in \{2014, 2015, 2016\}$, $Postclaim_{it} * principal\ component_{it-1}$, $Postclaim_{it}$, and $Principal\ component_{it-1}$. The same applies to Equation (10), except that $Principal\ component_{it-1}$ is replaced with $HighFC_{it-1}$, a variable we will define in this section.

[32] We observe similar results when we change the threshold to either the bottom 25th or 35th percentile.

investments upon claiming them. This is because, in the absence of such tax incentives, these firms might have had to settle for investment levels considerably lower than optimal, even when compared to other constrained firms. We estimate Equation (10), which replaces $Principal\,component_{it-1}$ with $HighFC_{it-1}$ that represents a dummy for highly constrained firms:

$$Capex_{it} = \alpha_i + \sum_{n=2014}^{2016} \beta_1^n Postclaim_{it} * firstyear_i^{2016} + \sum_{n=2014}^{2016} \beta_2^n Postclaim_{it} * firstyear_i^{2016} * highFC_{it-1} + \gamma X_{it-1}^2 + \nu_t + \varepsilon_{it}. \quad (10)$$

We find that highly constrained firms increase their investments relative to other firms when their first claim of tax incentives is made in 2014, as represented by positive coefficients on $Postclaim_{it} * firstyear_i^{2014} * highFC_{it-1}$. For the year 2016, the coefficients for $Postclaim_{it} * firstyear_i^{2016} * highFC_{it-1}$ are generally positive and significant, with the exception in column (4). According to the F-test, when we consider the sum of these coefficients along with those for $Postclaim_{it} * firstyear_i^{2016}$, we find statistically significant evidence of an increase in investments among highly constrained firms, at least at the 10% level. Although the 2015 coefficients, $Postclaim_{it} * firstyear_i^{2015} * highFC_{it-1}$, are not significant on their own, the aggregate impact with $Postclaim_{it} * firstyear_i^{2015}$ is positive and bears significance. These findings suggest that, provided the opportunity to claim tax incentives, firms under relatively severe financial constraints utilize them effectively, regardless of when they first claim these incentives.

5.7. Windfalls?

The final aspect we examine is whether financially unconstrained firms utilize the funds acquired through extensive tax claims in specific ways, or treat the tax cut simply as a windfall gain. We consider three potential outlets based on their respective economic implications and data availability, in addition to the accumulation of cash holdings: R&D expenses, which could reflect the expansion of economic activities; dividend payments, indicative of shareholder returns; and wage expenses, reflecting the compensation of general employees. we use these variables normalized by lagged assets, as well as applying a log-plus-one transformation, which collectively gives us eight distinct outcome variables.

We use Equation (8), where we substitute $Capex_{it}$ with one of the outcome variables, and expect to see a change in these variables in $Time_{it}^{+1}$ or later since firms can receive tax refunds in the years subsequent to their tax claims. We only consider the model corresponding to column (1) in Table 9, which includes only firm- and year-fixed effects, due to the similarity of results when introducing additional control variables.

Table 11 most remarkably reveals that unconstrained firms tend to accumulate cash holdings relative to their constrained counterparts, as illustrated by the positive coefficients on both $Postclaim_{it} * time_{it}^{+1} * principal\ component_{it-1}$ and $Postclaim_{it} * time_{it}^{+2} * principal\ component_{it-1}$ in columns (7) and (8). These findings suggest that tax incentives eventually result in cash windfalls for unconstrained firms.

We do not consistently observe increases in other outcome variables. While we notice positive coefficients for $Postclaim_{it} * time_{it}^{+2} * principal\ component_{it-1}$ when the outcome variable is dividend payments in column (3) or wage payments in columns (5), the statistical significance vanishes when we use log-plus-one transformation in columns (4) and (6). Furthermore, these effects are not apparent in $Time_{it}^{+1}$, which raises questions about whether the increase in these variables in $Time_{it}^{+2}$ could be attributed to tax refunds. We do not find changes in R&D among unconstrained firms in $Time_{it}^{+1}$ or $Time_{it}^{+2}$ in columns (1) and (2). Although we cannot exclude the possibility that other outcomes could be influenced due to data availability, we can conclude that investment tax incentives at least contribute to an increase in subsequent cash holdings.

6. Conclusion

While the existing economic literature primarily emphasizes the benefits of investment tax incentives, especially for financially constrained firms, our research shifts the focus more towards unconstrained firms. We uncover a potential downside: these firms claim tax incentives extensively, without necessarily increasing their investments beyond pre-claim levels. An observed rise in their cash holdings after tax claims implies that investment tax incentives might function as a cash transfer from the government to these firms, essentially serving as windfalls.

Possible policy measures to address these issues might themselves introduce further complications. Policymakers could limit the provision of tax incentives to certain types of firms, such as small businesses, which are more likely to use them for productive investment activities based on our findings. However, this approach may incentivize firms to change their organizational structures to obtain tax benefits, as suggested by the bunching literature (e.g., Almunia and Lopez-Rodriguez 2018). Another approach might involve requiring firms to provide comprehensive investment plans. This, however, could lead to high enforcement and compliance costs for both tax authorities and firms. All things considered, governments implementing investment tax incentives inevitably have to endure the associated costs.

Our examination of tax claims can provide insights for future research on investment tax incentives. Difference-in-differences identification strategies in the literature typically classify treatment and control groups based on potential tax benefits, determined from data prior to the implementation of the tax systems under study. Future studies might consider the managerial decisions regarding tax incentive claims more explicitly and estimate the tax sensitivity of investment.

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Table 1: Summary Statistics

These tables report summary statistics. Panel A presents data across all firms, while Panel B splits the sample into financially unconstrained and constrained firms. We classify firms as financially unconstrained according to the median value derived from the principal component analysis in 2013, i.e., $Principal\ component_{i2013}$. These tables organize data items under headings primarily corresponding to our three research questions: 1) Do financially unconstrained firms claim investment tax incentives more frequently than their constrained counterparts? 2) Does claiming tax incentives lead to an incremental total investment beyond pre-claim levels? 3) Do both constrained and unconstrained firms exhibit incremental investments upon claiming tax incentives? For the first question, we use three-year data, assessing outcome variables from 2014 to 2016 and using data from 2013 to 2015 for lagged covariates. For the second and third questions, we extend the timeframe to cover four years, evaluating outcome variables from 2013 to 2016 and using data from 2012 to 2015 for lagged covariates. See the Appendix for the variable definitions.

Panel A: All Firms

	Mean	SD	p25	Median	p75	N
Outcome variables for the first question						
$Claim_{it}$ [dummy]	0.212	0.409	0.000	0.000	0.000	7,288
$\ln(1 + Eligible\ capex)_{it}$	0.809	1.850	0.000	0.000	0.000	7,288
$\ln(1 + Tax\ savings)_{it}$	0.368	1.043	0.000	0.000	0.000	7,288
Financially unconstrained measures						
$Public_{it-1}$ [dummy]	0.310	0.462	0.000	0.000	1.000	7,288
$Bond_{it-1}$ [dummy]	0.172	0.377	0.000	0.000	0.000	7,288
$Cash_{it-1}$ [divided by assets]	0.146	0.140	0.039	0.106	0.207	7,288
$Cash\ flow_{it-1}$ [divided by assets]	0.050	0.060	0.020	0.043	0.075	7,288
$Size_{it-1}$ [ln]	9.552	1.824	8.391	9.367	10.554	7,288
$Principal\ component_{it-1}$	0.015	1.347	-0.870	-0.211	0.752	7,288
Control variables primarily for the first question, X_{it}^{1}						
$Taxable\ dummy_{it-1}$	0.854	0.354	1.000	1.000	1.000	7,288
$Loss\ offset\ dummy_{it-1}$	0.257	0.437	0.000	0.000	1.000	7,288
$\ln(Firm\ age)_{it-1}$	3.765	0.683	3.466	3.970	4.220	7,288
$College_{it-1}$ [dummy]	0.729	0.444	0.000	1.000	1.000	7,288
$Sales\ growth_{it-1}$ [ratio]	0.039	0.239	-0.030	0.010	0.070	7,288
$Tangibility_{it-1}$ [divided by assets]	0.285	0.239	0.090	0.227	0.426	7,288
Other variables primarily for the first question						
$No\ external_{it-1}$ [dummy]	0.602	0.490	0.000	1.000	1.000	7,288

$Nikkei_{it-1}$ [dummy]	0.041	0.199	0.000	0.000	0.000	7,288
$TOPIX_{it-1}$ [dummy]	0.193	0.395	0.000	0.000	0.000	7,288
$Weight_{it-1}$	0.018	0.133	0.000	0.000	0.000	7,288
Main variables for the second/third question						
$Capex_{it-1}$ [divided by lagged fixed tangible assets]	0.105	0.217	0.016	0.050	0.112	9,750
$Postclaim_{it}$ [dummy]	0.228	0.419	0.000	0.000	0.000	9,750
$Postcredit_{it}$ [dummy]	0.206	0.404	0.000	0.000	0.000	9,750
Other variables for the second/third question						
$Firstyear_i^{2014}$ [dummy]	0.135	0.342	0.000	0.000	0.000	9,750
$Firstyear_i^{2015}$ [dummy]	0.162	0.368	0.000	0.000	0.000	9,750
$Firstyear_i^{2016}$ [dummy]	0.033	0.178	0.000	0.000	0.000	9,750
$Count_i^1$ [dummy]	0.148	0.355	0.000	0.000	0.000	9,750
$Count_i^2$ [dummy]	0.182	0.386	0.000	0.000	0.000	9,750
$\ln(1 + R\&D)_{it}$	2.162	3.012	0.000	0.000	4.382	9,750
$\ln(1 + Dividend)_{it}$	3.727	2.872	0.000	3.829	5.778	9,083
$\ln(1 + Wage)_{it}$	7.168	2.146	6.261	7.370	8.447	9,750
$\ln(1 + Cash)_{it}$	6.895	2.087	5.723	7.006	8.255	9,750
$R\&D_{it}$ [divided by lagged assets]	0.008	0.022	0.000	0.000	0.005	9,750
$Dividend_{it}$ [divided by lagged assets]	0.010	0.018	0.000	0.004	0.012	9,083
$Wage_{it}$ [divided by lagged assets]	0.201	0.230	0.072	0.137	0.238	9,750
$Cash_{it}$ [divided by lagged assets]	0.155	0.164	0.034	0.106	0.221	9,750

Panel B: Financially Unconstrained and Constrained Firms

	Unconstrained		Constrained	
	Mean	SD	Mean	SD
Outcome variables for the first question				
$Claim_{it}$ [dummy]	0.289	0.453	0.130	0.337
$\ln(1 + Eligible\ capex)_{it}$	1.167	2.188	0.425	1.294
$\ln(1 + Tax\ savings)_{it}$	0.556	1.293	0.166	0.618
Financially unconstrained measures				
$Public_{it-1}$ [dummy]	0.560	0.497	0.042	0.200
$Bond_{it-1}$ [dummy]	0.313	0.464	0.020	0.142
$Cash_{it-1}$ [divided by assets]	0.099	0.089	0.196	0.164
$Cash\ flow_{it-1}$ [divided by assets]	0.049	0.046	0.052	0.072
$Size_{it-1}$ [ln]	10.716	1.562	8.305	1.129
$Principal\ component_{it-1}$	1.002	1.057	-1.043	0.629

Control variables primarily for the first question, X1				
$Taxable\ dummy_{it-1}$	0.860	0.347	0.847	0.360
$Loss\ offset\ dummy_{it-1}$	0.267	0.443	0.245	0.430
$\ln\ (Firm\ age)_{it-1}$	3.927	0.646	3.592	0.679
$College_{it-1}$ [dummy]	0.791	0.407	0.663	0.473
$Sales\ growth_{it-1}$ [ratio]	0.039	0.213	0.040	0.263
$Tangibility_{it-1}$ [divided by assets]	0.270	0.222	0.301	0.255
Other variables primarily for the first question				
$No\ external_{it-1}$ [dummy]	0.288	0.453	0.938	0.241
$Nikkei_{it-1}$ [dummy]	0.080	0.271	0.000	0.000
$TOPIX_{it-1}$ [dummy]	0.369	0.483	0.005	0.069
$Weight_{it-1}$	0.034	0.183	0.000	0.000
Main variables for the second/third question				
$Capex_{it-1}$ [divided by lagged fixed tangible assets]	0.100	0.202	0.110	0.234
$Postclaim_{it}$ [dummy]	0.297	0.457	0.148	0.355
$Postcredit_{it}$ [dummy]	0.280	0.449	0.121	0.326
Other variables for the second/third question				
$Firstyear_i^{2014}$ [dummy]	0.170	0.376	0.096	0.295
$Firstyear_i^{2015}$ [dummy]	0.217	0.412	0.099	0.299
$Firstyear_i^{2016}$ [dummy]	0.042	0.200	0.023	0.150
$Count_i^1$ [dummy]	0.179	0.383	0.113	0.316
$Count_i^2$ [dummy]	0.250	0.433	0.105	0.307
$\ln\ (1 + R\&D)_{it}$	3.310	3.419	0.853	1.693
$\ln\ (1 + Dividend)_{it}$	5.009	2.823	2.228	2.101
$\ln\ (1 + Wage)_{it}$	7.864	2.342	6.375	1.555
$\ln\ (1 + Cash)_{it}$	7.631	2.020	6.056	1.831
$R\&D_{it}$ [divided by lagged assets]	0.012	0.024	0.004	0.018
$Dividend_{it}$ [divided by lagged assets]	0.010	0.014	0.009	0.022
$Wage_{it}$ [divided by lagged assets]	0.163	0.180	0.243	0.270
$Cash_{it}$ [divided by lagged assets]	0.107	0.109	0.210	0.196

Table 2: Decisions to Claim Tax Incentives

We examine whether financially unconstrained firms claim tax incentives more extensively. We use data from 2014 to 2016 and apply Equation (1): $Tax_{it} = \alpha + \beta FUC_{it-1} + \gamma X^1_{it-1} + \mu_j + \nu_t + \varepsilon_{it}$. The outcome variable, Tax_{it}, varies across panels: it is a tax claim dummy, $Claim_{it}$, in Panel A; the natural log of one plus eligible capital expenditures, $\ln(1 + Eligible\ capex)_{it}$, in Panel B; and the natural log of one plus reduced tax payments, $\ln(1 + Tax\ savings)_{it}$, in Panel C. The main regressor, FUC_{it-1}, is represented by each of the following in separate columns: $Public_{it-1}$ in column (1), $Bond_{it-1}$ in column (2), $Cash_{it-1}$ in column (3), $Cash\ flow_{it-1}$ in column (4), $Size_{it-1}$ in column (5), and $Principal\ component_{it-1}$ in column (6). Equation (1) includes control variables, X^1_{it-1} ($Taxable\ dummy_{it-1}$, $Loss\ offset\ dummy_{it-1}$, $\ln(Firm\ age)_{it-1}$, $College_{it-1}$, $Sales\ growth_{it-1}$, and $Tangibility_{it-1}$), as well as industry- and year-fixed effects. We use a probit model in Panel A and a linear model in Panels B and C. In Panel A, the "Marginal effects" row represents the marginal effects of each unconstrained measure evaluated at the mean, and the "ROC" row denotes the area under a Receiver Operating Characteristic (ROC) curve. Standard errors are clustered at the industry-level and reported in parentheses. Significance at the 1%, 5%, 10% levels are denoted by ***, **, and *, respectively. See the Appendix for the variable definitions.

Panel A: $Claim_{it}$ as the Outcome Variable

	$Claim_{it}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$Public_{it-1}$	0.510***					
	(0.059)					
$Bond_{it-1}$		0.361***				
		(0.067)				
$Cash_{it-1}$			-0.907***			
			(0.264)			

$Cash\ flow_{it-1}$				1.916***		
				(0.583)		
$Size_{it-1}$					0.284***	
					(0.015)	
$Principal\ component_{it-1}$						0.324***
						(0.022)
$Taxable\ dummy_{it-1}$	0.727***	0.733***	0.724***	0.610***	0.716***	0.753***
	(0.093)	(0.089)	(0.087)	(0.078)	(0.092)	(0.092)
$Loss\ offset\ dummy_{it-1}$	-0.145**	-0.141**	-0.139**	-0.088	-0.150**	-0.175***
	(0.058)	(0.057)	(0.056)	(0.055)	(0.064)	(0.065)
$\ln\ (Firm\ age)_{it-1}$	0.246***	0.313***	0.335***	0.358***	0.154**	0.154**
	(0.079)	(0.082)	(0.081)	(0.087)	(0.063)	(0.070)
$College_{it-1}$	0.130**	0.173***	0.178***	0.180***	0.070	0.094*
	(0.051)	(0.047)	(0.047)	(0.048)	(0.051)	(0.051)
$Sales\ growth_{it-1}$	0.112	0.140*	0.152*	0.100	0.106	0.101
	(0.079)	(0.077)	(0.080)	(0.083)	(0.086)	(0.086)
$Tangibility_{it-1}$	0.448**	0.320	0.148	0.346*	0.825***	0.522**
	(0.198)	(0.201)	(0.217)	(0.207)	(0.207)	(0.214)
Marginal effects	0.120***	0.086***	-0.218***	0.460***	0.062***	0.073***
	(0.013)	(0.016)	(0.064)	(0.137)	(0.003)	(0.005)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
ROC	0.801	0.793	0.790	0.790	0.835	0.823
Observations	7,092	7,092	7,092	7,092	7,092	7,092

Panel B: $\ln(1 + Eligible\ capex)_{it}$ as the Outcome Variable

	$\ln(1 + Eligible\ capex)_{it}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$Public_{it-1}$	0.669***					
	(0.092)					
$Bond_{it-1}$		0.530***				
		(0.109)				
$Cash_{it-1}$			-0.802***			
			(0.207)			
$Cash\ flow_{it-1}$				1.504***		
				(0.518)		
$Size_{it-1}$					0.305***	
					(0.027)	
$Principal\ component_{it-1}$						0.382***
						(0.037)
$Taxable\ dummy_{it-1}$	0.555***	0.580***	0.565***	0.471***	0.422***	0.506***
	(0.085)	(0.086)	(0.084)	(0.069)	(0.082)	(0.084)
$Loss\ offset\ dummy_{it-1}$	-0.175***	-0.174***	-0.164***	-0.128**	-0.133**	-0.179***
	(0.061)	(0.062)	(0.061)	(0.057)	(0.063)	(0.065)
$\ln(Firm\ age)_{it-1}$	0.211***	0.278***	0.308***	0.320***	0.099**	0.107**
	(0.057)	(0.063)	(0.065)	(0.066)	(0.044)	(0.050)
$College_{it-1}$	0.079	0.128***	0.138***	0.145***	0.007	0.025

	(0.050)	(0.045)	(0.045)	(0.046)	(0.047)	(0.048)
$Sales\ growth_{it-1}$	0.154**	0.178**	0.209**	0.167**	0.169**	0.162**
	(0.069)	(0.072)	(0.080)	(0.076)	(0.070)	(0.069)
$Tangibility_{it-1}$	0.108	-0.003	-0.155	0.028	0.294*	0.034
	(0.157)	(0.172)	(0.196)	(0.175)	(0.161)	(0.171)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.167	0.155	0.147	0.146	0.213	0.203
Observations	7,288	7,288	7,288	7,288	7,288	7,288

Panel C: $\ln(1 + Tax\ savings)_{it}$ as the Outcome Variable

	$\ln(1 + Tax\ savings)_{it}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$Public_{it-1}$	0.358***					
	(0.054)					
$Bond_{it-1}$		0.397***				
		(0.085)				
$Cash_{it-1}$			-0.457***			
			(0.131)			
$Cash\ flow_{it-1}$				0.822**		
				(0.338)		
$Size_{it-1}$					0.188***	

					(0.020)	
$Principal\ component_{it-1}$						0.234***
						(0.027)
$Taxable\ dummy_{it-1}$	0.260***	0.277***	0.266***	0.215***	0.178***	0.229***
	(0.043)	(0.045)	(0.043)	(0.034)	(0.042)	(0.043)
$Loss\ offset\ dummy_{it-1}$	-0.071**	-0.074**	-0.065**	-0.045*	-0.047	-0.075**
	(0.030)	(0.030)	(0.029)	(0.027)	(0.030)	(0.031)
$\ln\ (Firm\ age)_{it-1}$	0.119***	0.146***	0.170***	0.177***	0.041*	0.047*
	(0.029)	(0.032)	(0.035)	(0.035)	(0.022)	(0.025)
$College_{it-1}$	0.004	0.027	0.035	0.039	-0.046	-0.034
	(0.029)	(0.026)	(0.028)	(0.028)	(0.028)	(0.028)
$Sales\ growth_{it-1}$	0.096**	0.105**	0.126***	0.103**	0.102*	0.098*
	(0.044)	(0.045)	(0.044)	(0.045)	(0.053)	(0.056)
$Tangibility_{it-1}$	-0.008	-0.065	-0.153	-0.050	0.117	-0.044
	(0.089)	(0.097)	(0.118)	(0.103)	(0.091)	(0.094)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.130	0.130	0.113	0.112	0.192	0.180
Observations	7,288	7,288	7,288	7,288	7,288	7,288

Table 3: Cash Holdings and Access to External Markets

We examine whether high cash holdings affect a firm's decision to claim tax incentives differently, particularly when the firm lacks access to external markets. We use data from 2014 to 2016 and apply Equation (2): $Tax_{it} = \alpha + \beta_1 Cash_{it-1} * noexternal_{it-1} + \beta_2 Cash_{it-1} + \beta_3 Noexternal_{it-1} + \gamma X^1_{it-1} + \mu_j + \nu_t + \varepsilon_{it}$. The outcome variable, Tax_{it}, varies across columns: it is a tax claim dummy, $Claim_{it}$, in columns (1) and (2); the natural log of one plus eligible capital expenditures, $\ln(1 + Eligible\ capex)_{it}$, in columns (3) and (4); and the natural log of one plus reduced tax payments, $\ln(1 + Tax\ savings)_{it}$, in columns (5) and (6). We include the interaction term of $Cash_{it-1}$ with $No\ external_{it-1}$ in columns (1), (3), and (5). $No\ external_{it-1}$ is a dummy variable that equals one if the firm is unlisted and does not issue bonds. In the remaining columns, we substitute $No\ external_{it-1}$ with $Private_{it-1}$, a dummy variable equal to one if the firm is unlisted. While Equation (2) includes control variables, X^1_{it-1}, as well as industry- and year-fixed effects, we show only key coefficients. The "Other controls" row indicates the inclusion of $Taxable\ dummy_{it-1}$, $Loss\ offset\ dummy_{it-1}$, $\ln(Firm\ age)_{it-1}$, $College_{it-1}$, $Sales\ growth_{it-1}$, and $Tangibility_{it-1}$. We use a probit model in columns (1)-(2) and a linear model in columns (3)-(6). The "ROC" row denotes the area under a Receiver Operating Characteristic (ROC) curve. In untabulated results, when we replace $Cash_{it-1}$ with a dummy variable indicating whether it is above the median following Puhani (2012), we find similar results. Standard errors are clustered at the industry-level and reported in parentheses. Significance at the 1%, 5%, 10% levels are denoted by ***, **, and *, respectively. See the Appendix for the variable definitions.

	$Claim_{it}$		$\ln(1 + Eligible\ capex)_{it}$		$\ln(1 + Tax\ savings)_{it}$	
	(1)	(2)	(3)	(4)	(5)	(6)
$Cash_{it-1} * noexternal_{it-1}$	1.463***		2.297***		1.441***	
	(0.523)		(0.485)		(0.296)	
$Cash_{it-1} * private_{it-1}$		1.573***		2.510***		1.596***
		(0.552)		(0.510)		(0.338)
$Cash_{it-1}$	-1.865***	-1.968***	-2.454***	-2.693***	-1.492***	-1.663***
	(0.482)	(0.533)	(0.465)	(0.500)	(0.290)	(0.330)
$Noexternal_{it-1}$	-0.628***		-0.858***		-0.503***	
	(0.087)		(0.111)		(0.069)	
$Private_{it-1}$		-0.703***		-1.029***		-0.587***
		(0.097)		(0.130)		(0.081)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
ROC	0.803	0.805				
Adjusted R^2			0.169	0.175	0.136	0.141
Observations	7,092	7,092	7,288	7,288	7,288	7,288

Table 4: Monetary and Tax Policy

This table examines whether the Bank of Japan's purchase of publicly traded equity, which should improve access to finance for firms included in TOPIX (Tokyo Stock Price Index) or Nikkei 225 indexes, encourages firms to claim tax incentives more frequently. We use data from 2014 to 2016 and apply Equation (5): $Claim_{it} = \alpha + \beta_1 Index_{it-1} + \beta_2 Public_{it-1} + \gamma X^1_{it-1} + \mu_j + \nu_t + \varepsilon_{it}$. The outcome variable, $Claim_{it}$, represents a tax claim dummy that equals one if the firm claims either a tax credit or bonus deprecation. $Index_{it-1}$ is either a dummy variable indicating the inclusion of the firm in the TOPIX or Nikkei 225 indices, or $Weight_{it-1}$, which is defined as the firm's weight in the bank's stock purchases. While Equation (5) includes control variables, X^1_{it-1}, as well as industry- and year-fixed effects, we show only key coefficients. The "Other controls" row indicates the inclusion of $Taxable\ dummy_{it-1}$, $Loss\ offset\ dummy_{it-1}$, ln $(Firm\ age)_{it-1}$, $College_{it-1}$, $Sales\ growth_{it-1}$, and $Tangibility_{it-1}$. We use a probit model. The "ROC" row denotes the area under a Receiver Operating Characteristic (ROC) curve. Standard errors are clustered at the industry-level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. See the Appendix for the variable definitions.

	$Claim_{it}$		
	(1)	(2)	(3)
$TOPIX_{it-1}$	0.437***		
	(0.074)		
$Nikkei_{it-1}$		0.730***	
		(0.134)	
$Weight_{it-1}$			1.031***
			(0.222)
$Public_{it-1}$	0.424***	0.233***	0.458***
	(0.059)	(0.078)	(0.057)
Other controls	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
ROC	0.807	0.805	0.806
Observations	7,092	7,092	7,092

Table 5: Investment Following Claiming Tax Incentives

This table examines whether claiming tax incentives lead to an incremental total investment beyond pre-claim levels. We use data from 2013 to 2016 and apply Equation (3): $Capex_{it} = \alpha_i + \beta Postclaim_{it} + \gamma X_{it-1}^{2} + \nu_t + \varepsilon_{it}$. The outcome variable is capital expenditures-to-lagged fixed tangible assets ratio. The main regressor, $Postclaim_{it}$, represents a dummy variable that changes to one if the firm claims either the tax credit or bonus depreciation in year *t* and retains this value for subsequent years. Equation (3) includes firm- and year-fixed effects within a linear model. Column (1) presents a parsimonious model with only these fixed effects. Column (2) expands on this model and incorporates $Sales\ growth_{it-1}$ and $Cash\ flow_{it-1}$. Column (3) further adds control variables used for the first question, X_{it-1}^{1}, expect for $Sales\ growth_{it-1}$, which is already considered in column (2): $Taxable\ dummy_{it-1}$, $Loss\ offset\ dummy_{it-1}$, $\ln(Firm\ age)_{it-1}$, $College_{it-1}$, and $Tangibility_{it-1}$. Finally, column (4) controls for individual financially unconstrained measures as well, except for $Cash\ flow_{it-1}$, which is already accounted for in column (2): $Public_{it-1}$, $Bond_{it-1}$, $Cash_{it-1}$, and $Size_{it-1}$. Standard errors are clustered at the firm-level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. See the Appendix for the variable definitions.

	$Capex_{it}$			
	(1)	(2)	(3)	(4)
$Postclaim_{it}$	0.013**	0.011*	0.011*	0.014**
	(0.006)	(0.006)	(0.006)	(0.006)
$Sales\ growth_{it-1}$		-0.009	-0.012	-0.005
		(0.012)	(0.012)	(0.013)
$Cash\ flow_{it-1}$		0.462***	0.351***	0.360***
		(0.121)	(0.119)	(0.119)
$Taxable\ dummy_{it-1}$			0.003	0.003
			(0.007)	(0.007)
$Loss\ offset\ dummy_{it-1}$			-0.004	-0.005
			(0.006)	(0.006)
$\ln\ (Firm\ age)_{it-1}$			-0.002	0.052
			(0.076)	(0.074)
$College_{it-1}$			-0.015	-0.015
			(0.011)	(0.011)
$Tangibility_{it-1}$			-0.826***	-0.847***
			(0.127)	(0.127)
$Public_{it-1}$				0.036
				(0.037)
$Bond_{it-1}$				-0.006
				(0.011)
$Cash_{it-1}$				-1.562
				(2.599)
$Size_{it-1}$				-0.143***
				(0.033)
Firm-fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.490	0.493	0.509	0.515
Observations	9,750	9,750	9,750	9,750

Table 6: Financial Constraints and Investment

This table examines whether both constrained and unconstrained firms exhibit incremental investments upon claiming tax incentives. We use data from 2013 to 2016 and apply Equation (4) in Panels A and B: $Capex_{it} = \alpha_i + \beta_1 Postclaim_{it} * FUC_{it-1} + \beta_2 Postclaim_{it} + \beta_3 FUC_{it-1} + \gamma X^2_{it-1} + \nu_t + \varepsilon_{it}$. The outcome variable is capital expenditures-to-lagged fixed tangible assets ratio. The main regressor in Panels A and B, $Postclaim_{it}$, represents a dummy variable that changes to one if the firm claims either the tax credit or bonus depreciation in year t and retains this value for subsequent years. In Panel C, we replace $Postclaim_{it}$ with $Postcredit_{it}$, which only considers the tax credit. The FUC_{it-1} variable is $Principal\ component_{it-1}$ in Panels A and C. In Panel B, FUC_{it-1} is represented by each of the following in separate columns: $Public_{it-1}$ in columns (1) and (2), $Bond_{it-1}$ in columns (3) and (4), $Cash_{it-1} * noexternal_{it-1}$ in columns (5) and (6), and $Size_{it-1}$ in columns (7) and (8). Panels A and B include all observations, while Panel C excludes those that claim bonus depreciation. While Equation (4) includes control variables, X^2_{it-1}, as well as firm- and year-fixed effects within a linear model, we show only key coefficients. The "Other controls" row indicates the inclusion of $Sales\ growth_{it-1}$, $Cash\ flow_{it-1}$, $Taxable\ dummy_{it-1}$, $Loss\ offset\ dummy_{it-1}$, $\ln(Firm\ age)_{it-1}$, $College_{it-1}$, and $Tangibility_{it-1}$. In this row, "Partial" refers to the first two variables: $Sales\ growth_{it-1}$ and $Cash\ flow_{it-1}$. The "FC measures" row indicates the inclusion of $Public_{it-1}$, $Bond_{it-1}$, $Cash_{it-1}$, and $Size_{it-1}$. The "P-value of F-test" row assesses the statistical significance of the sum of the coefficients on $Postclaim_{it} * principal\ component_{it-1}$ and $Postclaim_{it}$ in Panel A, with $Postclaim_{it}$ being replaced by $Postcredit_{it}$ in Panel C. A similar interpretation can be applied to other unconstrained measures in Panel B. Standard errors are clustered at the firm-level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. See the Appendix for the variable definitions.

Panel A: $Principal\ component_{it-1}$ as the Unconstrained Measure

	$Capex_{it}$			
	(1)	(2)	(3)	(4)
$Postclaim_{it}$	-0.011***	-0.012***	-0.013***	-0.012***
$* principal\ component_{it-1}$	(0.004)	(0.004)	(0.004)	(0.004)
$Postclaim_{it}$	0.020***	0.019**	0.019***	0.022***
	(0.008)	(0.008)	(0.007)	(0.007)
$Principal\ component_{it-1}$	-0.030**	-0.027**	-0.026**	-0.376***
	(0.012)	(0.012)	(0.012)	(0.088)
P-value of F-test	0.125	0.200	0.201	0.078
Other controls	No	Partial	Yes	Yes
FC measures	No	No	No	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.491	0.494	0.510	0.516
Observations	9,750	9,750	9,750	9,750

Panel B: Individual Unconstrained Measures

	$Capex_{it}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Postclaim_{it} * public_{it-1}$	-0.033***	-0.034***						
	(0.008)	(0.008)						
$Postclaim_{it} * bond_{it-1}$			-0.010	-0.012				
			(0.009)	(0.009)				
$Postclaim_{it} * cash_{it-1} * noexternal_{it-1}$					0.215***	0.212***		
					(0.080)	(0.080)		
$Postclaim_{it} * size_{it-1}$							-0.007**	-0.007**
							(0.003)	(0.003)
$Postclaim_{it}$	0.028***	0.027***	0.015**	0.014**	0.000	-0.001	0.087**	0.086**
	(0.008)	(0.008)	(0.007)	(0.007)	(0.006)	(0.006)	(0.038)	(0.037)
$Public_{it-1}$	0.017	0.010						
	(0.036)	(0.036)						
$Bond_{it-1}$			-0.010	-0.009				
			(0.012)	(0.012)				
$Cash_{it-1} * noexternal_{it-1}$					0.031	0.037		
					(0.139)	(0.140)		
$Size_{it-1}$							-0.124***	-0.129***
							(0.032)	(0.034)
P-value of F-test	0.396	0.238	0.600	0.830	0.006	0.007	0.020	0.019
Other controls	No	Partial	No	Partial	No	Partial	No	Partial

Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.490	0.494	0.489	0.493	0.490	0.494	0.495	0.499
Observations	9,750	9,750	9,750	9,750	9,750	9,750	9,750	9,750

Panel C: Only Tax Credit

	$Capex_{it}$			
	(1)	(2)	(3)	(4)
$Postcredit_{it}$	-0.010**	-0.011**	-0.013***	-0.013***
$* \; principal\ component_{it-1}$	(0.005)	(0.005)	(0.005)	(0.005)
$Postcredit_{it}$	0.019**	0.017**	0.018**	0.021**
	(0.009)	(0.009)	(0.008)	(0.008)
$Principal\ component_{it-1}$	-0.031**	-0.029**	-0.029**	-0.370***
	(0.013)	(0.013)	(0.013)	(0.090)
P-value of F-test	0.125	0.200	0.201	0.078
Other controls	No	Partial	Yes	Yes
FC measures	No	No	No	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.511	0.514	0.531	0.536
Observations	9,111	9,111	9,111	9,111

Table 7: Heterogeneity in Previous Year's Taxable Status for Claiming Tax Incentives

This table examines how the heterogeneity of the previous year's tax status affects tax claiming. We use data from 2014 to 2016 and apply Equation (6): $Tax_{it} = \alpha + \beta_1 Principal\ component_{it-1} * taxable\ dummy_{it-1} + \beta_2 Principal\ component_{it-1} + \gamma X^1_{it-1} + \mu_j + \nu_t + \varepsilon_{it}$.The outcome variable, Tax_{it}, varies across columns: it is a tax claim dummy, $Claim_{it}$, in column (1); the natural log of one plus eligible capital expenditures, $\ln(1 + Eligible\ capex)_{it}$, in column (2); and the natural log of one plus reduced tax payments, $\ln(1 + Tax\ savings)_{it}$, in column (3). We use a probit model in column (1) and a linear model in columns (2)-(3). While Equation (6) includes control variables, X^1_{it-1}, as well as industry- and year-fixed effects, we show only key coefficients. The "Other controls" row indicates the inclusion of $Loss\ offset\ dummy_{it-1}$, $\ln(Firm\ age)_{it-1}$, $College_{it-1}$, $Sales\ growth_{it-1}$, and $Tangibility_{it-1}$. In untabulated results, when we replace $Principal\ component_{it-1}$ with a dummy variable indicating whether it is above the median following Puhani (2012), we find similar results. Standard errors are clustered at the industry-level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. See the Appendix for the variable definitions.

	$Claim_{it}$	$\ln(1 + Eligible\ capex)_{it}$	$\ln(1 + Tax\ savings)_{it}$
	(1)	(2)	(3)
$Principal\ component_{it-1}$	-0.056	0.195***	0.141***
$* taxable\ dummy_{it-1}$	(0.039)	(0.049)	(0.030)
$Principal\ component_{it-1}$	0.373***	0.219***	0.116***
	(0.045)	(0.051)	(0.031)
$Taxable\ dummy_{it-1}$	0.787***	0.517***	0.238***
	(0.083)	(0.082)	(0.040)
Other controls	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
ROC	0.824		
Adjusted R^2		0.205	0.184
Observations	7,092	7,288	7,288

Table 8: Frequent Tax Claimants

This table examines whether our arguments are more prominent among frequent tax incentive claimants, i.e., firms that claim tax incentives in multiple years. We use data from 2013 to 2016 and apply Equation (7): $Capex_{it} = \alpha_i + \sum_{n=1}^{2} \beta_1^n Postclaim_{it} * count_i^n + \sum_{n=1}^{2} \beta_2^n Postclaim_{it} * count_i^n * principal\ component_{it-1} + \gamma X_{it-1}^2 + \nu_t + \varepsilon_{it}$. The outcome variable is capital expenditures-to-lagged fixed tangible assets ratio. The main regressor, $Postclaim_{it}$, represents a dummy variable that changes to one if the firm claims either the tax credit or bonus depreciation in year *t* and retains this value for subsequent years. $Count_i^1$ equals one when a firm claims the incentives only once during the three-year eligibility period, while $Count_i^2$ equals one when a firm claims the incentives twice or more during the same period. While Equation (7) includes control variables, X_{it-1}^2, as well as firm- and year-fixed effects within a linear model, we show only key coefficients. The "Other controls" row indicates the inclusion of $Sales\ growth_{it-1}$, $Cash\ flow_{it-1}$, $Taxable\ dummy_{it-1}$, $Loss\ offset\ dummy_{it-1}$, $\ln(Firm\ age)_{it-1}$, $College_{it-1}$, and $Tangibility_{it-1}$. In this row, "Partial" refers to the first two variables: $Sales\ growth_{it-1}$ and $Cash\ flow_{it-1}$. The "FC measures" row indicates the inclusion of $Public_{it-1}$, $Bond_{it-1}$, $Cash_{it-1}$, and $Size_{it-1}$. We also include all relevant terms associated with $\sum_{n=1}^{2} Postclaim_{it} * count_i^n * principal\ component_{it-1}$, namely : $Count_i^n * principal\ component_{it-1}$ for $n \in \{1,2\}$, $Postclaim_{it} * principal\ component_{it-1}$, $Postclaim_{it}$, and $Principal\ component_{it-1}$. "P-value of F-test for $Count_i^n$" assesses the statistical significance of the sum of the coefficients on $Postclaim_{it} * count_i^n * principal\ component_{it-1}$ and $Postclaim_{it} * count_i^n$ for $n \in \{1,2\}$. Standard errors are clustered at the firm-level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. See the Appendix for the variable definitions.

	$Capex_{it}$			
	(1)	(2)	(3)	(4)
$Postclaim_{it} * count_i^1$	-0.015**	-0.015*	-0.018**	-0.017**
$* \, principal \, component_{it-1}$	(0.008)	(0.008)	(0.007)	(0.007)
$Postclaim_{it} * count_i^2$	-0.012***	-0.012***	-0.012***	-0.011***
$* \, principal \, component_{it-1}$	(0.004)	(0.004)	(0.004)	(0.004)
$Postclaim_{it} * count_i^1$	0.018*	0.017*	0.019**	0.020**
	(0.010)	(0.010)	(0.010)	(0.010)
$Postclaim_{it} * count_i^2$	0.023**	0.022**	0.021**	0.025***
	(0.009)	(0.009)	(0.009)	(0.009)
P-value of F-test for $Count_i^1$	0.641	0.694	0.810	0.649
P-value of F-test for $Count_i^2$	0.101	0.171	0.191	0.048
Other controls	No	Partial	Yes	Yes
FC measures	No	No	No	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.491	0.494	0.510	0.516
Observations	9,750	9,750	9,750	9,750

Table 9: Pre-Trends and Post-Claim Investment Changes

These tables examine year-by-year investment dynamics of tax claimants in the years surrounding their first tax claims. We use data from 2013 to 2016 and apply Equation (8): $Capex_{it} = \alpha_i + \sum_{n=-3,n\neq-1}^{+2} \beta_1^n Postclaim_{it} * time_{it}^n + \sum_{n=-3,n\neq-1}^{+2} \beta_2^n Postclaim_{it} * time_{it}^n * principal\ component_{it-1} + \gamma X_{it-1}^2 + \nu_t + \varepsilon_{it}$. The outcome variable is capital expenditures-to-lagged fixed tangible assets ratio. The main regressor, $Postclaim_{it}$, represents a dummy variable that changes to one if the firm claims either the tax credit or bonus depreciation in year *t* and retains this value for subsequent years. The variable $Time_{it}^0$ refers to the first year when the firm claims the tax incentives, $Time_{it}^{-2}$ is two years before the first claim, $Time_{it}^{+1}$ is the year after the claim, and other variables follow a similar interpretation. The variable $Time_{it}^{-1}$ represents the reference year to evaluate investment changes. While Equation (8) includes control variables, X_{it-1}^2, as well as firm- and year-fixed effects within a linear model, we show only key coefficients. The "Other controls" row indicates the inclusion of $Sales\ growth_{it-1}$, $Cash\ flow_{it-1}$, $Taxable\ dummy_{it-1}$, $Loss\ offset\ dummy_{it-1}$, ln $(Firm\ age)_{it-1}$, $College_{it-1}$, and $Tangibility_{it-1}$. In this row, "Partial" refers to the first two variables: $Sales\ growth_{it-1}$ and $Cash\ flow_{it-1}$. The "FC measures" row indicates the inclusion of $Public_{it-1}$, $Bond_{it-1}$, $Cash_{it-1}$, and $Size_{it-1}$. Panels A and C include all firms, while Panel B excludes firms that claim tax incentives in multiple years. Only Panel C includes interaction terms, $\sum_{n=-3,n\neq-1}^{+2} Postclaim_{it} * time_{it}^n * principal\ component_{it-1}$ in Equation (8). In this panel, we also include all relevant terms associated with $\sum_{n=-3,n\neq-1}^{+2} Postclaim_{it} * time_{it}^n * principal\ component_{it-1}$, namely : $time_{it}^n * principal\ component_{it-1}$, and $time_{it}^n$ for $n \in \{-3,-2,0,+1,+2\}$, as well as $Postclaim_{it} * principal\ component_{it-1}$, $Postclaim_{it}$, and $Principal\ component_{it-1}$. The "P-value of F-test for $Time_{it}^n$" row in Panel C assesses the statistical significance of the sum of the coefficients on $Postclaim_{it} * time_{it}^n * principal\ component_{it-1}$ and $Postclaim_{it} * time_{it}^n$ where $n \in \{0,+1,+2\}$. Standard errors are clustered at the firm-level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. See the Appendix for the variable definitions.

Panel A: All Firms

	$Capex_{it}$			
	(1)	(2)	(3)	(4)
$Postclaim_{it} * time_{it}^{-3}$	-0.098	-0.102	-0.097	-0.096
	(0.101)	(0.101)	(0.098)	(0.098)
$Postclaim_{it} * time_{it}^{-2}$	0.002	0.001	0.001	0.002
	(0.015)	(0.015)	(0.015)	(0.015)
$Postclaim_{it} * time_{it}^{0}$	0.016***	0.015**	0.014**	0.017***

	(0.006)	(0.006)	(0.006)	(0.006)
$Postclaim_{it} * time_{it}^{+1}$	0.004	0.002	0.003	0.007
	(0.008)	(0.008)	(0.007)	(0.007)
$Postclaim_{it} * time_{it}^{+2}$	0.012	0.010	0.012	0.018
	(0.012)	(0.012)	(0.012)	(0.012)
Other controls	No	Partial	Yes	Yes
FC measures	No	No	No	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.490	0.494	0.510	0.516
Observations	9,750	9,750	9,750	9,750

Panel B: One-Time Claimants

	$Capex_{it}$			
	(1)	(2)	(3)	(4)
$Postclaim_{it} * time_{it}^{-3}$	-0.093	-0.097	-0.092	-0.093
	(0.100)	(0.100)	(0.097)	(0.097)
$Postclaim_{it} * time_{it}^{-2}$	0.008	0.006	0.003	0.003
	(0.019)	(0.019)	(0.018)	(0.018)
$Postclaim_{it} * time_{it}^{0}$	0.022***	0.021**	0.020**	0.021***
	(0.009)	(0.008)	(0.008)	(0.008)
$Postclaim_{it} * time_{it}^{+1}$	-0.017	-0.019	-0.017	-0.015
	(0.012)	(0.012)	(0.012)	(0.012)
$Postclaim_{it} * time_{it}^{+2}$	-0.022	-0.017	-0.010	-0.011
	(0.032)	(0.032)	(0.032)	(0.032)
Other controls	No	Partial	Yes	Yes
FC measures	No	No	No	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.488	0.491	0.508	0.515
Observations	7,973	7,973	7,973	7,973

Panel C: Financially Constrained and Unconstrained Firms

	$Capex_{it}$			
	(1)	(2)	(3)	(4)
$Postclaim_{it} * time_{it}^{-3}$	0.041	0.045	0.041	0.041
$* principal\ component_{it-1}$	(0.053)	(0.052)	(0.051)	(0.051)
$Postclaim_{it} * time_{it}^{-2}$	0.007	0.007	0.005	0.005
$* principal\ component_{it-1}$	(0.010)	(0.010)	(0.009)	(0.009)
$Postclaim_{it} * time_{it}^{0}$	-0.016***	-0.016***	-0.016***	-0.016***
$* principal\ component_{it-1}$	(0.004)	(0.004)	(0.004)	(0.004)
$Postclaim_{it} * time_{it}^{+1}$	-0.004	-0.004	-0.007*	-0.007*
$* principal\ component_{it-1}$	(0.004)	(0.004)	(0.004)	(0.004)
$Postclaim_{it} * time_{it}^{+2}$	-0.001	-0.001	-0.003	-0.003
$* principal\ component_{it-1}$	(0.006)	(0.006)	(0.006)	(0.006)
$Postclaim_{it} * time_{it}^{-3}$	-0.128	-0.134	-0.127	-0.123
	(0.136)	(0.135)	(0.131)	(0.131)
$Postclaim_{it} * time_{it}^{-2}$	-0.001	-0.002	-0.000	0.001
	(0.018)	(0.018)	(0.017)	(0.017)
$Postclaim_{it} * time_{it}^{0}$	0.026***	0.025***	0.025***	0.027***
	(0.008)	(0.008)	(0.008)	(0.008)
$Postclaim_{it} * time_{it}^{+1}$	0.006	0.004	0.007	0.011
	(0.009)	(0.009)	(0.009)	(0.009)
$Postclaim_{it} * time_{it}^{+2}$	0.011	0.009	0.013	0.019
	(0.015)	(0.015)	(0.015)	(0.015)
P-value of F-test for $Time_{it}^{0}$	0.052	0.082	0.091	0.031
P-value of F-test for $Time_{it}^{+1}$	0.780	0.938	0.962	0.535
P-value of F-test for $Time_{it}^{+2}$	0.368	0.468	0.338	0.140
Other controls	No	Partial	Yes	Yes
FC measures	No	No	No	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.491	0.495	0.511	0.511
Observations	9,750	9,750	9,750	9,750

Table 10: When to Claim Tax Incentives and Investments

These tables examine how the choice of a specific year for the first tax claims affects investment changes following the tax claims. We use data from 2013 to 2016 and apply Equation (9) for Panel A: $Capex_{it} = \alpha_i + \sum_{n=2014}^{2016} \beta_1^n Postclaim_{it} * firstyear_i^n + \sum_{n=2014}^{2016} \beta_2^n Postclaim_{it} * firstyear_i^n * principal\ component_{it-1} + \gamma X_{it-1}^2 + \nu_t + \varepsilon_{it}$. We also use Equation (10) for Panel B that replaces $Principal\ component_{it-1}$ with $HighFC_{it-1}$, which is a dummy variable that takes a value of one if the firm falls below the 30th percentile based on $Principal\ component_{it-1}$. The outcome variable is capital expenditures-to-lagged fixed tangible assets ratio in both equations. The main regressor, $Postclaim_{it}$, represents a dummy variable that changes to one if the firm claims either the tax credit or bonus depreciation in year *t* and retains this value for subsequent years. The variable $firstyear_i^n$ refers to a dummy variable that takes a value of one in the first year $n \in \{2014, 2015, 2016\}$ the firm claims tax incentives. While both equations include control variables, X_{it-1}^2, as well as firm- and year-fixed effects within a linear model, we show only key coefficients. The "Other controls" row indicates the inclusion of $Sales\ growth_{it-1}$, $Cash\ flow_{it-1}$, $Taxable\ dummy_{it-1}$, $Loss\ offset\ dummy_{it-1}$, ln $(Firm\ age)_{it-1}$, $College_{it-1}$, and $Tangibility_{it-1}$. In this row, "Partial" refers to the first two variables: $Sales\ growth_{it-1}$ and $Cash\ flow_{it-1}$. The "FC measures" row indicates the inclusion of $Public_{it-1}$, $Bond_{it-1}$, $Cash_{it-1}$, and $Size_{it-1}$. We also include all relevant terms associated with $\sum_{n=2014}^{2016} Postclaim_{it} * firstyear_i^n * principal\ component_{it-1}$, namely: $firstyear_i^n * principal\ component_{it-1}$ for $n \in \{2014, 2015, 2016\}$, $Postclaim_{it} * principal\ component_{it-1}$, $Postclaim_{it}$, and $Principal\ component_{it-1}$. "P-value of F-test *n*" assesses the statistical significance of the sum of the coefficients on $Postclaim_{it} * firstyear_i^n * principal\ component_{it-1}$ and $Postclaim_{it} * firstyear_i^n$ where $n \in \{2014, 2015, 2016\}$. Standard errors are clustered at the firm-level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. See the Appendix for the variable definitions.

Panel A: $\boldsymbol{Principal\ component_{it-1}}$ as the Unconstrained Measure

	$Capex_{it}$			
	(1)	(2)	(3)	(4)
$Postclaim_{it} * firstyear_i^{2014} *$	-0.012***	-0.013***	-0.013***	-0.012***
$principal\ component_{it-1}$	(0.004)	(0.004)	(0.004)	(0.004)
$Postclaim_{it} * firstyear_i^{2015} *$	-0.008**	-0.009**	-0.010**	-0.009**
$principal\ component_{it-1}$	(0.004)	(0.004)	(0.004)	(0.004)
$Postclaim_{it} * firstyear_i^{2016} *$	-0.037	-0.036	-0.035	-0.035
$principal\ component_{it-1}$	(0.028)	(0.028)	(0.027)	(0.027)
$Postclaim_{it} * firstyear_i^{2014}$	0.011	0.009	0.010	0.015
	(0.011)	(0.011)	(0.010)	(0.010)
$Postclaim_{it} * firstyear_i^{2015}$	0.019**	0.018**	0.019**	0.021**
	(0.009)	(0.009)	(0.009)	(0.009)
$Postclaim_{it} * firstyear_i^{2016}$	0.039	0.038	0.040	0.040
	(0.026)	(0.026)	(0.026)	(0.026)
P-value of F-test 2014	0.930	0.731	0.663	0.762
P-value of F-test 2015	0.113	0.148	0.166	0.085
P-value of F-test 2016	0.874	0.861	0.689	0.736
Other controls	No	Partial	Yes	Yes
FC measures	No	No	No	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.491	0.494	0.510	0.516
Observations	9,750	9,750	9,750	9,750

Panel B: Highly Financially Constrained Firms

	$Capex_{it}$			
	(1)	(2)	(3)	(4)
$Postclaim_{it} * firstyear_i^{2014} * highFC_{it-1}$	0.092***	0.094***	0.101***	0.096***
	(0.024)	(0.023)	(0.024)	(0.025)
$Postclaim_{it} * firstyear_i^{2015} * highFC_{it-1}$	0.036	0.034	0.037	0.037
	(0.026)	(0.025)	(0.025)	(0.024)
$Postclaim_{it} * firstyear_i^{2016} * highFC_{it-1}$	0.090**	0.092**	0.074*	0.062
	(0.044)	(0.044)	(0.044)	(0.045)
$Postclaim_{it} * firstyear_i^{2014}$	-0.009	-0.012	-0.014	-0.007
	(0.009)	(0.009)	(0.009)	(0.009)
$Postclaim_{it} * firstyear_i^{2015}$	0.010	0.009	0.008	0.010
	(0.007)	(0.007)	(0.007)	(0.007)
$Postclaim_{it} * firstyear_i^{2016}$	0.006	0.005	0.010	0.011
	(0.014)	(0.014)	(0.014)	(0.014)
P-value of F-test 2014	0.001	0.001	0.000	0.000
P-value of F-test 2015	0.073	0.088	0.062	0.048
P-value of F-test 2016	0.026	0.026	0.050	0.097
Other controls	No	Partial	Yes	Yes
FC measures	No	No	No	Yes
Firm-fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.492	0.496	0.512	0.518
Observations	9,750	9,750	9,750	9,750

Table 11: Windfalls?

This table examines whether financially unconstrained firms utilize the funds acquired through extensive tax claims in specific ways, or treat the tax cut simply as a windfall gain. We use data from 2013 to 2016 and apply Equation (8): $Outcome_{it} = \alpha_i + \sum_{n=-3,n\neq-1}^{+2} \beta_1^n Postclaim_{it} * time_{it}^n + \sum_{n=-3,n\neq-1}^{+2} \beta_2^n Postclaim_{it} * time_{it}^n * principal\ component_{it-1} + \nu_t + \varepsilon_{it}$. The outcome variable varies across the columns: the R&D expenses-to-assets ratio, $R\&D_{it}$, in column (1); the natural log of one plus R&D expenses, $\ln(1 + R\&D_{it})$, in column (2); the dividend payments-to-assets ratio, $Dividend_{it}$, in column (3); the natural log of one plus dividend payments, $\ln(1 + Dividend_{it})$, in column (4); the wage payments-to-assets ratio, $Wage_{it}$, in column (5); the natural log of one plus wage payments, $\ln(1 + Wage_{it})$, in column (6); the cash holdings-to-assets ratio, $Cash_{it}$, in column (7); the natural log of one plus cash holdings, $\ln(1 + Cash_{it})$, in column (8). The main regressor, $Postclaim_{it}$, represents a dummy variable that changes to one if the firm claims either the tax credit or bonus depreciation in year *t* and retains this value for subsequent years. The variable $Time_{it}^0$ refers to the first year when the firm claims the tax incentives, $Time_{it}^{-2}$ is two years before the first claim, $Time_{it}^{+1}$ is the year after the claim, and other variables follow a similar interpretation. The variable $Time_{it}^{-1}$ represents the reference year to evaluate investment changes. We also include all relevant terms associated with $\sum_{n=-3,n\neq-1}^{+2} Postclaim_{it} * time_{it}^n * principal\ component_{it-1}$, namely : $time_{it}^n * principal\ component_{it-1}$, and $time_{it}^n$ for $n \in \{-3, -2, 0, +1, +2\}$, as well as $Postclaim_{it} * principal\ component_{it-1}$, $Postclaim_{it}$, and $Principal\ component_{it-1}$. The "P-value of F-test for $Time_{it}^n$" row assesses the statistical significance of the sum of the coefficients on $Postclaim_{it} * time_{it}^n * principal\ component_{it-1}$ and $Postclaim_{it} * time_{it}^n$ where $n \in \{0, +1, +2\}$. Standard errors are clustered at the firm-level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. See the Appendix for the variable definitions.

	$R\&D_{it}$	$\ln(1 + R\&D_{it})$	$Dividend_{it}$	$\ln(1 + Dividend_{it})$	$Wage_{it}$	$\ln(1 + Wage_{it})$	$Cash_{it}$	$\ln(1 + Cash_{it})$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Postclaim_{it} * time_{it}^{-3}$	0.000	-0.099	-0.000	0.122	0.006	0.062	-0.000	-0.079
$* \, principal\ component_{it-1}$	(0.000)	(0.092)	(0.000)	(0.160)	(0.004)	(0.045)	(0.008)	(0.096)
$Postclaim_{it} * time_{it}^{-2}$	-0.000	0.016	-0.000	-0.035	-0.005*	-0.018	0.004	-0.073*
$* \, principal\ component_{it-1}$	(0.000)	(0.059)	(0.000)	(0.065)	(0.003)	(0.059)	(0.003)	(0.039)
$Postclaim_{it} * time_{it}^{0}$	-0.000	0.027*	0.000**	-0.027	-0.000	0.085*	0.002	0.034*
$* \, principal\ component_{it-1}$	(0.000)	(0.015)	(0.000)	(0.035)	(0.002)	(0.045)	(0.002)	(0.019)
$Postclaim_{it} * time_{it}^{+1}$	-0.000	0.019	-0.000	-0.042	0.004	0.079	0.004**	0.068***
$* \, principal\ component_{it-1}$	(0.000)	(0.024)	(0.000)	(0.039)	(0.003)	(0.060)	(0.002)	(0.022)
$Postclaim_{it} * time_{it}^{+2}$	-0.000	-0.009	0.001**	-0.022	0.007**	0.081	0.007***	0.081***
$* \, principal\ component_{it-1}$	(0.000)	(0.023)	(0.001)	(0.059)	(0.003)	(0.095)	(0.002)	(0.024)
$Postclaim_{it} * time_{it}^{-3}$	-0.001	0.122	0.002***	-0.403	-0.002	0.003	0.000	0.004
	(0.002)	(0.100)	(0.001)	(0.463)	(0.007)	(0.095)	(0.012)	(0.083)
$Postclaim_{it} * time_{it}^{-2}$	-0.000	-0.076	0.001***	0.150*	-0.005	-0.140	-0.012**	-0.078*
	(0.000)	(0.058)	(0.001)	(0.077)	(0.004)	(0.089)	(0.005)	(0.047)
$Postclaim_{it} * time_{it}^{0}$	0.000	0.047*	-0.001*	0.038	0.003	0.023	0.001	0.046*
	(0.000)	(0.027)	(0.000)	(0.045)	(0.003)	(0.031)	(0.003)	(0.026)
$Postclaim_{it} * time_{it}^{+1}$	0.000	0.033	0.000	0.091	-0.001	0.057	0.001	0.055
	(0.000)	(0.039)	(0.001)	(0.066)	(0.005)	(0.046)	(0.004)	(0.034)
$Postclaim_{it} * time_{it}^{+2}$	-0.000	0.019	-0.003**	-0.001	-0.003	0.062	-0.004	0.047
	(0.001)	(0.055)	(0.001)	(0.115)	(0.007)	(0.082)	(0.006)	(0.046)

$Principal\ component_{it-1}$	-0.001*	0.056	0.001	0.203***	-0.042***	0.015	-0.031***	0.026
	(0.001)	(0.060)	(0.001)	(0.077)	(0.007)	(0.080)	(0.007)	(0.038)
P-value of F-test for $Time_{it}^{0}$	0.299	0.005	0.288	0.831	0.370	0.058	0.186	0.005
P-value of F-test for $Time_{it}^{+1}$	0.815	0.167	0.627	0.440	0.489	0.096	0.177	0.001
P-value of F-test for $Time_{it}^{+2}$	0.653	0.841	0.048	0.834	0.472	0.284	0.535	0.006
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.947	0.976	0.662	0.905	0.923	0.864	0.864	0.945
Observations	9,750	9,750	8,974	8,974	9,750	9,750	9,750	9,750

Appendix: Variable Definitions

	Definition
Outcome variables for the first question	
$Claim_{it}$ [dummy]	A dummy equals one if the firm claims either a tax credit or bonus deprecation.
ln $(1 + Eligible\ capex)_{it}$	Natural logarithm of one plus capital expenditures claimed for a tax credit or bonus depreciation
ln $(1 + Tax\ savings)_{it}$	Natural logarithm of one plus reduced tax payments due to a tax credit or bonus depreciation
Financially unconstrained measures	
$Public_{it-1}$ [dummy]	A dummy equals one if the firm's stocks are listed on an exchange.
$Bond_{it-1}$ [dummy]	A dummy equals one if the firm issues bonds.
$Cash_{it-1}$ [divided by assets]	Cash divided by assets
$Cash\ flow_{it-1}$ [divided by assets]	Earnings before extraordinary items plus depreciation divided by assets
$Size_{it-1}$ [ln]	Natural logarithm of assets
$Principal\ component_{it-1}$	A composite measure created using a principal component analysis based on all the five financially unconstrained measures
Other variables primarily for the first question	
$Taxable\ dummy_{it-1}$	A dummy equals one if the firm reports positive taxable income.
$Loss\ offset\ dummy_{it-1}$	A dummy equals one if the firm offsets losses with income.
ln $(Firm\ age)_{it-1}$	Natural logarithm of firm age
$College_{it-1}$ [dummy]	A dummy equals one if the firm's CEO holds a college degree.
$Sales\ growth_{it-1}$ [ratio]	Change in sales relative to the previous year
$Tangibility_{it-1}$ [divided by assets]	Fixed tangible assets divided by assets

$No\ external_{it-1}$ [dummy]	A dummy equals one if the firm is neither listed nor bond-issuing.
$Nikkei_{it-1}$ [dummy]	A dummy equals one if the firm is included in the Nikkei 225 Index.
$TOPIX_{it-1}$ [dummy]	A dummy equals one if the firm is included in the Tokyo Stock Price Index (TOPIX).
$Weight_{it-1}$	The weight of the firm in the Bank of Japan's ETF purchase
$HighFC_{it-1}$ [dummy]	A dummy equals one if the firm ranks within the bottom 30th percentile based on "Principal component"
$Capex_{it-1}$ [divided by lagged fixed tangible assets]	Capital expenditures divided by lagged fixed tangible assets
$Postclaim_{it}$ [dummy]	A dummy changes to one if the firm claims either a tax credit or bonus depreciation, and this value persists in subsequent years.
$Postcredit_{it}$ [dummy]	A dummy changes to one if the firm claims a tax credit, and this value persists in subsequent years.
Other variables for the second/third question	
$Firstyear_i^{2014}$ [dummy]	A dummy equals one if the year the firm first claims tax incentives is 2014.
$Firstyear_i^{2015}$ [dummy]	A dummy equals one if the year the firm first claims tax incentives is 2015.
$Firstyear_i^{2016}$ [dummy]	A dummy equals one if the year the firm first claims tax incentives is 2016.
$Count_i^1$ [dummy]	A dummy equals one if the firm claims tax incentives in only one of the three eligible years.
$Count_i^2$ [dummy]	A dummy equals one if the firm claims tax incentives in two or more of the eligible years.
$\ln(1 + R\&D)_{it}$	Natural logarithm of one plus R&D expenses
$\ln(1 + Dividend)_{it}$	Natural logarithm of one plus dividend payments
$\ln(1 + Wage)_{it}$	Natural logarithm of one plus wage payments
$\ln(1 + Cash)_{it}$	Natural logarithm of one plus cash holdings

$R\&D_{it}$ [divided by lagged assets]	R&D expenses divided by lagged assets
$Dividend_{it}$ [divided by lagged assets]	Dividend payments divided by lagged assets
$Wage_{it}$ [divided by lagged assets]	Wage payments divided by lagged assets
$Cash_{it}$ [divided by lagged assets]	Cash holdings divided by lagged assets