# Tax-Induced Changes in Competitive Dynamics: Firms' Strategic Responses to Peers' Tax Rate Increases

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November 2024

**Running Head**: Strategic Responses to Peers' Tax Rate Increases

We are grateful for constructive comments and suggestions from Harald Amberger, Hyungjin Cho, Heesun Chung, Jaewoo Kim, Rachel Yoon, and the seminar participants at Hanyang University and Seoul National University. Sunhwa Choi appreciates the support from the Institute of Management Research at Seoul National University. Taejin Jung appreciates financial support from the Seegene Medical Foundation Research Fund of Hanyang University Business School.

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**JEL Classification:** H25, M40, L10.

**Data Availability:** All data are available from the public sources cited in the text.

**Does this article have supplemental material(s) that are intended for publication?** Yes

**Financial Conflict of Interest**: No

# Tax-Induced Changes in Competitive Dynamics: Firms' Strategic Responses to Peers' Tax Rate Increases


## Abstract

This study examines how firms respond to statutory tax rate increases imposed on their industry peers, using a unique policy change in Korea. The introduction of a new corporate tax bracket in 2018 raised rates for some firms, creating two groups of unaffected firms: those indirectly affected through shifts in competitive dynamics and those entirely unaffected. A difference-in-differences analysis on a sample of unaffected firms indicates that those indirectly affected by their peers' higher tax rates significantly increase capital investment while reducing R&D spending, suggesting a reallocation of resources toward fixed assets. These firms also experience increases in subsequent sales growth, market share, and profitability. We further show that failing to account for peers' responses can bias estimates of tax effects on corporate investment among directly affected firms. Overall, this study provides evidence on how tax policies with heterogeneous effects influence competitive dynamics, offering valuable insights into their broader implications.



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# I. INTRODUCTION

Tax policies significantly influence various business decisions, particularly corporate investment, which is a key driver of economic growth (Scholes et al. 2014; Shevlin, Shivakumar, and Urcan 2019; Jacob 2022).[1] Therefore, governments often implement tax policies to stimulate corporate investment and employment growth.[2] However, the impact of these policies is not uniform across firms. For example, U.S. repatriation tax holidays in 2004 primarily benefited multinational corporations but had little impact on domestic firms (Donohoe, Jang, and Lisowsky 2022).[3] Even changes in statutory corporate income tax rates, which might appear universally applicable, do not directly affect firms incurring tax losses (Hanlon, Shroff, and Yoon 2023). These heterogeneous tax effects, whether intentional or not, can create competitive advantages or disadvantages for certain firms, thereby altering competitive dynamics in product markets.

While previous studies have primarily focused on the behavior of firms directly affected by changes in tax policies, relatively little is known about the responses of firms that are *not directly* affected by these policies (Lester and Olbert 2024). Prior literature often assumes that such firms remain unaffected, yet they are likely to take strategic actions in response to tax-induced shifts in competitive dynamics.[4] Understanding these responses is important for both academics and policymakers, as they provide valuable insights into the broader economic impacts of tax

[1] The literature has extensively examined the relation between tax policies and corporate investment, as discussed in Section III. While there is a general consensus on the negative effects of tax rates on corporate investment, conclusive evidence from clean settings remains limited (Dobbins and Jacob 2016).

[2] Some tax policies are specifically designed to stimulate targeted activities or benefit particular groups of firms. Examples include bonus depreciation (Zwick and Mahon 2017), R&D tax credits (Agrawal, Rosell, and Simcoe 2020), deductions for domestic production activities (Lester 2019), tax holidays for unrepatriated earnings (Amberger, Markle, and Samuel 2021), and intellectual property (IP) boxes (Bradley, Robinson, and Ruf 2021).

[3] Similarly, the OECD's global minimum taxes target the largest multinationals (OECD 2021).

[4] For example, prior research has compared firms in states with and without corporate tax rate changes to infer the effects of tax policies on corporate investment and innovation (Asker, Farre-Mensa, and Ljungqvist 2015; Ljungqvist, Zhang, and Zuo 2017; Mukherjee, Singh, and Žaldokas 2017; Giroud and Rauh 2019; Atanassov and Liu 2020).

policy changes. Moreover, failing to account for the strategic actions of these firms could lead to biases in estimating the effects of tax policies on directly affected firms and obscure the full extent of tax policies' influence on the overall economy. In this study, we examine how firms not directly affected by tax rate changes adjust their investment strategies in response to the tax rate increases imposed on their industry peers.

To address our research question, we utilize a unique setting in South Korea (hereafter Korea). In 2018, the Korean government introduced a new top corporate tax bracket for firms with taxable income exceeding KRW 300 billion (approximately $230 million), increasing the marginal statutory tax rate by 3 percentage points—from 22% to 25% (or from 24.2% to 27.5% including local tax)—for these firms.[5] This policy change allows us to clearly distinguish between firms directly affected by the tax increase and those not affected. More importantly, it also creates variation within the *unaffected* firms. Firms in industries with affected peers are indirectly influenced by shifts in industry-level competitive dynamics ("firms with affected peers"), while those in industries without affected peers are entirely unaffected ("firms without affected peers"). Taking advantage of this variation, we employ a difference-in-differences (DID) model on a sample of unaffected firms to examine how firms with affected peers adjust their capital investment and research and development (R&D) spending, compared to firms without affected peers.

To illustrate our research design, consider Firms A and B in Industry 1, and Firm C in Industry 2. Suppose only Firm A is subject to the tax rate increase (i.e., the affected firm). In conventional DID specifications assessing the impact of tax changes on corporate investment, Firm A's investment changes would be compared with those of Firms B and C, implicitly assuming that

[5] The 2018 tax increase in Korea was introduced by a newly elected government to promote social fairness, reducing concerns that the policy was driven by underlying economic conditions (Romer and Romer 2010).

both Firms B and C are unaffected. However, we focus on strategic responses by Firm B, which is indirectly influenced by the tax-induced shifts in competitive dynamics. Thus, we compare the investment changes of Firm B (treated group, a firm with affected peers) with those of Firm C (control group, a firm without affected peers). Later in this study, we also analyze the investment changes of Firm A by comparing them with Firms B and C together, Firm B alone, and Firm C alone, to quantify any potential bias introduced by conventional approaches in estimating the investment response of affected firms.

As economic theory suggests, we expect Firm A to reduce its investment following the tax rate increase (Jorgenson 1963; Hall and Jorgenson 1967), which, in turn, could harm its ability to compete in the market. Increased tax burdens on certain firms within an industry can weaken overall market competition, particularly if the affected ones are among the largest and most profitable, as is the case in our setting. However, the investment effect on Firm B, which does not directly benefit or suffer from the tax changes, is less clear.

When their peers face higher tax burdens, unaffected firms operating in the same industry may see an opportunity to strengthen their market position. Research on competitive dynamics shows that firms often exploit the vulnerabilities of struggling rivals by taking competitive actions against them (Ferrier, Smith, and Grimm 1999; Ferrier 2001; Guo, Sengul, and Yu 2020; Buchard, Proelss, Schäffer, and Schweizer 2021). For example, Buchard et al. (2021) find that when a firm experiences top management turnover, its industry peers increase their investments to take advantage of the firm's weakened ability to respond. Similarly, unaffected firms in our setting may respond strategically by increasing their corporate investment to expand production capacity, enter new markets, or improve operational efficiency.

However, if affected firms suffer from higher tax burdens, unaffected firms may reduce

their investment, as their incentive to differentiate themselves or deter potential new entrants diminishes (Dixit 1980; Khanna and Tice 2000; Bloom, Draca, and Van Reenen 2016; Kim, Nessa, and Wilson 2021).[6] Alternatively, in the absence of direct tax benefits or costs, unaffected firms may not significantly alter their investment behavior, and might instead focus on other strategic adjustments such as pricing or marketing.

Our main analysis focuses on a sample of firms that are not directly affected by the 2018 tax rate increase. Firms are classified as a treated group if they operate in industries with at least one affected firm, and as a control group if they operate in industries without any affected firms. We analyze how firms adjust two key types of corporate investment: gross property, plant, and equipment (PP&E) and R&D expenditures. These two types differ in tax treatment, where capital investments are depreciated over time, while R&D investments are fully deductible immediately. They also differ in terms of risks and the certainty of payoffs, given that capital investments generally offer more immediate and predictable returns than R&D investment, which typically involves greater uncertainty but is crucial for long-term competitiveness (Flammer and Bansal 2017). In addition, following Livdan and Nezlobin (2021), we decompose total capital investment into two components: net investment (the net growth in capital stock in excess of replacement) and replacement investment (the amount required to maintain the existing capital stock). Since net investment, rather than replacement investment, is positively related to future sales growth (Livdan and Nezlobin 2021), this decomposition allows for a more direct link between firms' strategic investment decisions and their subsequent economic implications.

Using DID models with firm- and year-fixed effects on 9,080 firm-year observations from

[6] Consistent with this view, Kim et al. (2021) find that U.S. domestic firms increase capital expenditures and R&D in response to heightened competition stemming from foreign tax cuts.

2015 to 2020, we find that firms in industries with affected peers significantly increase their capital investments following the 2018 tax increase. The results from the subcomponents of capital investment indicate that this increase is primarily driven by net investment, rather than replacement investment, suggesting potential improvements in the subsequent market positions of these firms. In economic terms, the DID estimates indicate a 3.4 percentage point increase in the ratio of total annual investment to gross PP&E, representing a 23% increase relative to the mean of this variable. This corresponds to an average increase of KRW 7.5 billion (approximately $5 million) per firm.

Our results also indicate a relatively modest *reduction* in R&D investment by firms with affected peers, amounting to 0.2% of lagged total assets, or 9% of the mean value of this variable. This reduction translates to KRW 0.9 billion (approximately $0.7 million) per firm, implying that the decrease in R&D investment is relatively modest compared to the increase in capital investment. This contrast between capital and R&D investments suggests that, in the absence of direct tax benefits from the tax policy change, these firms prioritize capital investment over R&D. One possible explanation is that capital investment tends to be more sensitive to higher tax rates than R&D investment, leading affected firms to reduce capital investment more significantly.[7] Alternatively, indirectly affected firms may focus on capital investments to achieve short-term, predictable returns, rather than investing in R&D, which offers long-term, uncertain payoffs.

We conduct cross-sectional tests based on financial constraints and product market competition. First, we find that our results are primarily driven by financially unconstrained firms, suggesting that these firms have enough resources to take strategic actions, unlike their constrained

[7] Because capital investments are expensed through depreciation, the tax benefits are lower than the actual investment cost (Jacob 2022). In contrast, R&D investments are typically fully tax deductible, helping offset the tax burden (Li, Ma, and Shevlin 2021; Lester and Olbert 2024). As shown in Section VII, affected firms in our setting do not significantly reduce their R&D investments.

counterparts (Fazzari, Hubbard, and Petersen 1988; Frésard 2010; Guenther, Njoroge, and Williams 2020). Second, the effects are more pronounced in firms operating in highly competitive markets, where the incentive to enhance market power is stronger (Khanna and Tice 2000; Bloom et al. 2016). These findings emphasize the importance of both resources and market conditions in shaping the responses of unaffected firms to tax-induced shifts in competitive dynamics.

To assess the economic consequences, we analyze the changes in the competitive positions of firms in industries with affected peers. Our results indicate that these firms experience subsequent increases in sales growth, market share, and profitability following the 2018 tax increase. This suggests that firms not directly targeted by the tax increase capitalize on the weakened positions of their affected peers, thereby enhancing their own market power. Increased capital investments, as previously documented, may serve as one specific mechanism driving this improved performance. Overall, our findings indicate that tax-induced shifts in competitive dynamics create opportunities for firms with affected peers to strengthen their market positions.

Finally, we examine the investment responses of *affected* firms to assess how neglecting the strategic actions of unaffected peers influences the estimation of tax effects on investment. Using DID models, we analyze changes in investment by affected firms across three control groups: (1) a combined group of firms in industries both with and without affected peers (Control #1), (2) firms in industries with affected peers (Control #2), and (3) firms in industries without affected peers (Control #3). Our results show that using Control #1 as a control, a conventional approach widely used in prior literature, overestimates the tax effects on investment. This overestimation occurs because it captures both the reduction in investment by affected firms and the increase in investment by their unaffected industry peers. Specifically, the estimated decrease in net investment by affected firms is 9.5% of gross PP&E when using Control #1, and intensifies to

11.5% when using Control #2. However, this effect falls to 5.6% when using Control #3. These findings highlight the importance of accounting for the strategic responses of unaffected firms when estimating the effects of tax policies on affected firms.

To check the robustness of our findings, we conduct several additional tests. First, we confirm the pre-treatment parallel trends assumption in our DID models, showing that changes in capital and R&D investments occurred only after the 2018 tax rate increase. Second, the results remain robust when using entropy balancing to account for differences in firm characteristics (Hainmueller 2012). Third, a placebo test using 2014 as a pseudo-event year shows no significant changes in capital or R&D investments, reinforcing the validity of our main results. Fourth, we find no significant changes in advertising expenditure or total wage. Fifth, our results are robust to alternative sample periods.

This study makes several contributions to the literature and offers insights for policymakers. First, it highlights how tax-induced changes in competitive dynamics influence corporate behavior, an area that has received limited attention. A small but growing body of research examines the competitive externalities of tax policies. For example, Donohoe et al. (2022) find that firms benefiting from a repatriation tax holiday adopt competitive strategies that weaken their competitors' performance.[8] Similarly, Hanlon et al. (2023) show that after the 1986 Tax Reform Act (TRA), profitable airlines use tax savings to implement predatory pricing strategies against loss-making competitors. Our study is also related to research on the spillover effects of foreign tax cuts on domestic firms (Kim et al. 2021; Glaeser, Olbert, and Werner 2023). For

[8] Our study is closely related to Donohoe et al. (2022), who also examine firms not directly impacted by repatriation tax holidays. While their focus is on the competitive strategies of repatriating firms, our study examines the investment responses of firms unaffected by tax rate changes.

example, Kim et al. (2021) show that foreign tax cuts intensify domestic competition, leading domestic firms to increase capital investment and R&D. In contrast, Glaeser et al. (2023) find that these competitive pressures lead to employment declines. We extend this line of research by focusing on the strategic investment responses of firms *not directly* affected by domestic tax policy changes, providing evidence on the investment channel of externalities.[9]

Second, our findings provide valuable insights for policymakers. By showing that tax policies with heterogeneous effects can alter competitive dynamics and influence the investment decisions of firms not directly targeted, we highlight the broader economic implications of such policies. Our results on the substitution effect between capital investment and R&D also help policymakers better understand the strategic reallocation of resources in response to tax policies. Our focus on tax rate increases is particularly relevant to ongoing policy debates in many countries, where raising corporate tax rates is considered a strategy to reduce federal deficits.[10] Furthermore, our findings suggest that higher tax burdens on larger firms may weaken their market power, creating opportunities for smaller competitors. These insights are particularly relevant when evaluating the potential consequences of policies such as global minimum taxes, which primarily target the largest and most profitable multinational firms.

Finally, we emphasize the importance of considering the strategic responses of unaffected

[9] Our study is also related to the literature on the spillover effects of foreign tax rate changes on corporate investment through multinational networks (Lester 2019; Hoopes, Klein, Lester, and Olbert 2023; De Vito et al. 2023). For example, Lester (2019) and Hoopes et al. (2022) find that multinational firms increase investments in their foreign subsidiaries following tax cuts in their home countries. Similarly, De Vito et al. (2023) show that local subsidiaries reduce investments when tax rates increase in a foreign country where another subsidiary of the same multinational operates. Our study differs as we focus on tax-induced competitive dynamics between firms, rather than resource allocation within multinational firms.

[10] For example, the Biden Administration proposed increasing the U.S. corporate tax rate from 21% to 28% in its 2024 budget submitted to Congress (The White House 2023). In the U.K., the corporate tax rate increased from 19% to 25% as of April 1, 2023. While several studies focus on the effects of tax cuts (Dobbins and Jacob 2016; Lester 2019; Crawford and Markarian 2024), firms' responses to tax increases may differ (Mukherjee et al. 2017).

firms when assessing the impact of tax policy changes on affected firms. Our study quantifies the extent of biases in estimating the investment effects on affected firms. We caution researchers and policymakers to account for these strategic responses, as failing to do so could lead to inaccurate conclusions about the true impact of tax policies.

## II. INSTITUTIONAL BACKGROUND

Korea has a progressive corporate income tax system.[11] Before 2018, there were three tax brackets: (i) 10% for taxable income up to KRW 200 million (approximately $0.15 million), (ii) 20% for taxable income between KRW 200 million and KRW 20,000 million (approximately $15 million), and (iii) 22% for taxable income exceeding KRW 20,000 million. In addition to the corporate income tax, firms are subject to a local income tax levied at 10% of the corporate tax, resulting in statutory tax rates ranging from 11% to 24.2%.[12]

In December 2017, the newly elected Korean government introduced a tax reform aimed at promoting social equity and funding expanded welfare programs. The reform introduced a fourth tax bracket, imposing a 25% tax rate on taxable income exceeding KRW 300 billion (approximately $230 million).[13] Effective in January 2018, this change increased the marginal statutory tax rate for the largest and most profitable firms from 22% to 25% (or from 24.2% to

[11] Korea is a member of the OECD and ranks as the 13th largest economy in the world by GDP (IMF 2023 World Economic Outlook Database).

[12] Korea's progressive corporate tax system, which is less common in other countries, is often viewed as a tool for promoting economic equity, primarily targeting large, family-owned conglomerates known as *chaebol*s. Among 38 OECD countries, Costa Rica has the highest number of corporate tax brackets with five, followed by Korea and Portugal, each with four (Tax Foundation 2023).

[13] In 2018, Korea's corporate tax rates were structured as follows: (i) 10% for taxable income up to KRW 200 million, (ii) 20% for taxable income between KRW 200 million and KRW 20,000 million, (iii) 22% for taxable income between KRW 20,000 million and KRW 300,000 million, and (iv) 25% for taxable income exceeding KRW 300,000 million. Prior to this reform, the last significant adjustment to corporate tax rates occurred in 2012, when the second bracket rate was reduced from 22% to 20%.

27.5% when including local tax), while tax rates for other firms remained unchanged (Reuters 2017).

This reform made Korea's corporate tax rates, particularly for large firms, higher compared to those in other developed economies. For example, the U.S. lowered its corporate tax rate to 21% in the 2017 Tax Cuts and Jobs Act. These international tax disparities raised concerns among Korean multinational firms about their ability to stay competitive, given their reliance on export-driven business models. Business associations and some policymakers warned that higher taxes on large firms could discourage investment and innovation, potentially weakening Korea's global competitiveness. Despite these concerns, the Korean government emphasized that the policy would help reduce income disparity and promote fairness by targeting only the most profitable firms, which it argued were well-positioned to bear the increased tax burden without major disruption to their operations.[14] The government chose not to introduce significant exemptions or phased adjustments for these firms, requiring them to adapt to the increased tax rate immediately starting in 2018.

## III. RELATED LITERATURE AND PREDICTIONS

### Tax Rates and Corporate Investment

Economic theory predicts a negative relation between tax rates and corporate investment, as higher taxes increase the investment hurdle and reduce after-tax cash flows (Jorgenson 1963; Hall and Jorgenson 1967). However, empirically testing this prediction is challenging because tax

[14] Unlike many tax cuts aimed at stimulating economic growth (Romer and Romer 2010), the 2018 tax increase was not motivated by economic instability or deficits. From 2013 to 2017, the Korean economy remained stable, with GDP growth between 2.8% and 3.2% and an increasing government surplus.

rate changes often affect all firms simultaneously and are typically implemented in response to broader economic conditions (Romer and Romer 2010). For example, tax cuts introduced during economic downturns make it difficult to distinguish their effects on investment behavior from those of other confounding factors such as macroeconomic conditions.

To address these challenges, some studies use international data, distinguish between domestic and multinational firms, or focus on state-level tax rate changes. Djankov et al. (2010) find a negative relation between effective corporate tax rates and aggregate investment. However, they report no significant effect of statutory rates on investment.[15] Dobbins and Jacob (2016) show that, following tax cuts, domestic German firms increase investment more than foreign-owned firms, suggesting that domestic firms are more sensitive to tax rate changes. Giroud and Rauh (2019) find a negative association between state tax rates and the number of business establishments, though they acknowledge that this finding can be attributed to the effect of relocations rather than new investments. Other studies, such as Ljungqvist et al. (2017) and Asker et al. (2015), report no significant effects of state tax changes on fixed assets or R&D investments. Regarding research on the effects of taxes on corporate innovation, Atanassov and Liu (2020) find that both state tax cuts and increases influence corporate innovation, while Mukherjee et al. (2017) fail to find significant impacts of tax cuts on innovation-related investments.

**Competitive Externalities of Tax Policies**

Tax policy changes can create heterogeneous effects among firms, leading to competitive externalities. Donohoe et al. (2022) examine the consequences of the 2004 repatriation tax holiday under the American Jobs Creation Act (AJCA) of 2004, which exclusively benefited multinational

[15] As the effective tax rate combines elements of both the tax rate and tax base, isolating the effect of the statutory tax rate from these findings is challenging.

firms. They find that non-repatriating firms experience a decline in operating performance as their repatriating rivals use tax savings to implement competitive strategies, such as increasing advertising and acquisitions. However, repatriating firms do not significantly alter their capital expenditures or R&D investments. Similarly, Hanlon et al. (2023) explore the asymmetric effects of tax cuts on profitable and loss-making firms in the airline industry. They find that, after the 1986 Tax Reform Act (TRA), profitable airlines use their tax savings to engage in predatory pricing strategies against loss-making competitors, gaining market share in the process.

Another line of research investigates how foreign tax cuts influence competition in domestic markets. Foreign tax cuts can alter competitive dynamics by allowing foreign firms to subsidize their U.S. subsidiaries, intensifying competition in U.S. markets. In addition, tax cuts abroad can increase imports, as foreign firms use tax savings to invest in new or improved export products. Recent studies support these claims. Kim et al. (2021) report that U.S. domestic manufacturing firms lose market power after tax cuts in their foreign competitors' home countries, prompting them to *increase* investments in R&D and fixed assets. Using data from the European Economic Area (EEA), Glaeser et al. (2023) also find that domestic firms lose market power due to foreign tax cuts. However, their results indicate that domestic firms respond by *reducing*, rather than increasing, employment. These studies suggest that the effects of foreign tax cuts on domestic firms' investment decisions vary depending on the specific context and the types of investments.[16]

**Predictions**

[16] Gaertner, Hoopes, and Williams (2020) also examine the externalities of foreign tax policies by analyzing stock returns of non-U.S. firms around key event dates leading to the TCJA in the U.S. They find that most non-U.S. firms experience positive stock returns, reflecting expectations of tax benefits from lower taxes on their U.S. operations and increased U.S. demand. However, Chinese firms show negative stock returns, likely due to the stronger competitive position of U.S. firms after the tax reform. Overall, the literature suggests that tax policy changes in one country can have spillover effects in other countries through multinational networks and import competition.

While previous studies have extensively examined the relation between taxes and corporate investment, relatively little is known about how firms that are not directly affected by tax changes adjust their real decisions. When their industry peers suffer from higher tax burdens, unaffected firms may view this as an opportunity to strengthen their market position. Prior research suggests that firms often take advantage of constrained competitors, particularly when those constraints arise from external factors (Ferrier et al. 1999; Buchard et al. 2021). One potential response is to increase corporate investment, such as expanding production capacity, entering new markets, or improving operational efficiency. Supporting this, Buchard et al. (2021) find that firms tend to increase investments when industry peers experience top management turnover, which limits those peers' ability to respond effectively.[17]

In contrast, when the market position of industry peers is weakened due to increased tax burdens, unaffected firms may reduce their investment, as they now face less competitive pressure to invest in fixed assets or innovation (Dixit 1980; Khanna and Tice 2000; Bloom et al. 2016; Kim et al. 2021). Alternatively, unaffected firms may not significantly change their investment behavior, as their own tax burdens remain unchanged. Instead, they might pursue other strategic actions, such as adjusting pricing or marketing strategies. Thus, our first prediction, stated in null form, is as follows:

*P1: Following the 2018 tax rate increase, firms indirectly affected by their peers' higher tax rates do not significantly change their investment.*

Another important issue we examine in this study is how unaffected firms adjust different

[17] This view is also consistent with studies on the negative relation between product market competition and corporate investment (Frésard and Valta 2016; Autor et al. 2020; Glaeser et al. 2023). For example, Frésard and Valta (2016) find that firms reduce capital investment in response to large reductions in import tariffs. Similarly, Glaeser et al. (2023) find that U.S. domestic firms reduce employment levels in response to competitive pressures from foreign tax cuts.

types of investments. While much of the existing research on taxes and investment focuses on capital investment, R&D investment is increasingly important for firms seeking to remain competitive in the market. Therefore, we consider both fixed assets and R&D as key types of corporate investment. We expect that unaffected firms evaluate the relative costs and benefits of allocating funds to fixed assets versus R&D, considering the impact of tax rate increases on the investment behavior of their affected peers. Specifically, higher tax rates reduce after-tax cash flows and raise the hurdle rate for new projects, but the effects may differ between capital investment and R&D. Since capital investments are expensed over time through depreciation, their tax benefits are smaller than the actual investment cost (Jacob 2022). In contrast, R&D investments are typically fully tax deductible immediately, which helps offset the tax burden (Li et al. 2021; Lester and Olbert 2024).[18] In other words, when the tax rate increases, the government's effective subsidy for R&D spending rises as well. Thus, we expect that for affected firms, higher tax rates are likely to have a more adverse impact on capital investment than on R&D. Unaffected firms may take this into account when deciding how to allocate resources between fixed assets and R&D. Furthermore, capital and R&D investments differ in terms of risks and uncertainties. If unaffected firms aim to achieve short-term gains, they may prioritize capital investments, which typically offer more immediate and predictable returns compared to R&D. These discussions suggest that unaffected firms may strategically adjust their investment portfolios in response to the increased tax burdens imposed on their industry peers.

## IV. RESEARCH DESIGN

[18] Thus, theories predict that changes in statutory tax rates do not significantly affect R&D investment (e.g., Hall and Jorgenson 1969; Jorgenson 1963).

**Variable Measurement: Corporate Investment**

In our main analyses, we focus on investment in fixed assets and R&D as strategic responses to tax rate increases. Prior studies have primarily used capital expenditures from the cash flow statement as a measure of a firm's capital investment (e.g., Kim et al. 2021; Donohoe et al. 2022). However, as noted by Livdan and Nezlobin (2021), this approach does not account for investments made through non-cash transactions, such as capital leases and business combinations. Livdan and Nezlobin (2021) propose a more comprehensive measure of total fixed asset investment by using data from two consecutive balance sheets. Following their approach, we estimate total investment in fixed assets (*TOTALINV*) as follows:

$$TOTALINV_{it} = (PPENT_{it} - PPENT_{it-1} + WDP_{it} + DPC_{it})/PPEGT_{it-1} \quad (1)$$

where, for firm *i* in year *t*, *PPENT* represents the net book value of PP&E, *WDP* is the write-down of PP&E, and *DPC* is the depreciation expense reported in the cash flow statement. Thus, *TOTALINV* captures the comprehensive changes in PP&E over the year, excluding the effects of write-downs and depreciation, and is scaled by the gross book value of PP&E (*PPEGT*) at the beginning of the year.

Total investment can be further decomposed into two components: replacement investment and net investment (Chambers, Jennings, and Thompson 1999; Nwaeze 2005; Livdan and Nezlobin 2021). Replacement investment refers to the spending required to maintain the current capital stock, driven by the vintage composition of existing assets. In contrast, net investment reflects spending intended to expand the capital stock, typically driven by expected growth opportunities. Livdan and Nezlobin (2021) find that only the net investment component is positively associated with future sales growth. We decompose total investment into net investment (*NETINV*) and replacement investment (*REPLACEINV*) as follows:

$$NETINV_{it} = (PPEGT_{it} - PPEGT_{it-1})/PPEGT_{it-1} \quad (2)$$

$$REPLACEINV_{it} = TOTALINV_{it} - NETINV_{it} \quad (3)$$

where *NETINV* represents the increase in gross PP&E (*PPEGT*), and *REPLACEINV* is the difference between *TOTALINV* and *NETINV*.[19] If increases in tax rates lead to significant changes in net investment—rather than replacement investment—by firms with affected peers, this may have direct economic implications for future sales growth and, consequently, for competitive dynamics within the industry. To capture a firm's R&D investment, we use R&D expenditures scaled by lagged total assets (*RDINV*).[20]

**Regression Model**

Our main DID model examines the effect of the 2018 tax rate increase on the investment decisions of firms with affected peers, compared to those without affected peers. Firms directly affected by the 2018 tax increase are excluded from the sample for our main analyses. We use data from three years before and three years after the tax rate increase (i.e., the [−3, +3] period). Specifically, we estimate the following ordinary least squares (OLS) model:

$$\begin{aligned} INV_{it} = {} & \beta_0 + \beta_1 TREAT\_PEER_{it} \times POST_{it} + \beta_2 SIZE_{it-1} + \beta_3 LEV_{it-1} + \beta_4 MTB_{it-1} + \beta_5 CASH_{it-1} \\ & + \beta_6 ROA_{it-1} + \beta_7 CFO_{it-1} + \beta_8 LOSS_{it-1} + \beta_9 SALESGROWTH_{it-1} + \beta_{10} DIVIDNED_{it-1} \\ & + \beta_{11} KZINDEX_{it-1} + \beta_{12} INVHHI_{it-1} + \beta_{13} RC_{it-1} + \beta_{14} INVLIFE_{it-1} + \beta_{15} FIRMAGE_{it-1} \\ & + \text{Firm FE} + \text{Year FE} + \varepsilon_{it}, \end{aligned} \quad (4)$$

where, for firm *i* in year *t*, *INV* represents one of the following: *TOTALINV*, *NETINV*, *REPLACEINV*, or *RDINV*. The variable *TREAT_PEER* takes the value of one for firms in

[19] Livdan and Nezlobin (2021) present empirical evidence showing that variations in future sales growth are predominantly driven by changes in net investment rates. They further demonstrate that the sensitivity of total investment to Tobin's Q and cash flow is largely attributable to net investment.

[20] This amount represents total R&D expenditures, including both expensed and capitalized development costs under International Financial Reporting Standards (IFRS), as disclosed in the financial statement notes. Missing R&D expenditure data are replaced with a value of zero.

industries with at least one affected firm, and zero otherwise, where the industry is defined by two-digit Korean Standard Industry Classification (K-SIC) codes. We classify a firm as an affected firm if its estimated taxable income in 2017 exceeds KRW 300 billion.[21] *POST* is equal to one for the years 2018, 2019, and 2020, and zero for 2015, 2016, and 2017.

The regression model includes several control variables to account for factors influencing firms' investment decisions. These include firm size (*SIZE*), pre-tax profitability (*ROA*), leverage (*LEV*), market-to-book ratio (*MTB*), sales growth (*SALESGROWTH*), cash holdings (*CASH*), dividend payments (*DIVIDEND*), financial constraints (*KZINDEX*), operating cash flows (*CFO*), and an indicator for negative pre-tax income (*LOSS*) (Fazzari et al. 1988; Chen, Goldstein, and Jiang 2007; Jacob, Michaely, and Müller 2019). To control for product market competition, we use the inverse of the Herfindahl-Hirschman Index (*INVHHI*). Following Livdan and Nezlobin (2021), we further include the ratio of *PPENT* to *PPEGT* (*RC*), the inverse of asset useful life (*INVLIFE*), and firm age (*AGE*).[22] Finally, firm- and year-fixed effects are included to account for time-invariant firm characteristics and time-specific trends in investment. Standard errors are clustered at the firm level (Petersen 2009). Variable definitions are provided in the Appendix.

To quantify potential bias in estimating the effect of the tax rate increase on the investment of affected firms, we use data from both affected and unaffected firms and estimate the following model:

$$INV_{it} = \beta_0 + \beta_1 TREAT_{it} \times POST_{it} + \beta_2 SIZE_{it-1} + \beta_3 LEV_{it-1} + \beta_4 MTB_{it-1} + \beta_5 CASH_{it-1} + \beta_6 ROA_{it-1} + \beta_7 CFO_{it-1} + \beta_8 LOSS_{it-1} + \beta_9 SALESGROWTH_{it-1} + \beta_{10} DIVIDNED_{it-1}$$

[21] To estimate taxable income, we calculate the current tax expense by adding changes in deferred tax assets to total tax expense, and then subtracting changes in deferred tax liabilities. Taxable income is estimated by dividing the current tax burden by the statutory tax rate.

[22] The useful life of capital investments is assumed to remain constant over time, estimated as the rounded ratio of the average beginning and ending balances of *PPEGT* to the depreciation expense for that year.

$$+ \beta_{11} KZINDEX_{it-1} + \beta_{12} INVHHI_{it-1} + \beta_{13} RC_{it-1} + \beta_{14} INVLIFE_{it-1} + \beta_{15} FIRMAGE_{it-1} + \text{Firm FE} + \text{Year FE} + \varepsilon_{it}, \quad (5)$$

where, for firm $i$ in year $t$, *TREAT* takes a value of one for firms with taxable income in 2017 exceeding KRW 300 billion, and zero otherwise. Our main variable of interest is the interaction term, *TREAT*×*POST*, which captures changes in the investment behavior of affected firms relative to control groups. We employ different combinations of control groups (see Section VII) to isolate the investment response of firms that are not directly affected by the tax increase but are indirectly influenced by shifts in competitive dynamics. All other variables are as previously defined.

## V. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

### Sample Selection

Our initial sample consists of firms listed on the Korea Stock Exchange (KSE) and the Korea Securities Dealers Automated Quotations (KOSDAQ), which are comparable to the NYSE and NASDAQ in the U.S., respectively. The sample period is from 2015 to 2020, covering the six years around the 2018 tax rate increase.[23] Financial data are collected from the DataGuide database.[24] Firm-year observations are excluded if they meet any of the following criteria: (1) they operate in the financial or utility industries, (2) they have non-December fiscal year-ends, or (3) they have missing financial data or negative total equity. To ensure comparability between the pre- and post-tax rate increase periods, we require firms to have at least one observation in each period. The final sample consists of 9,080 firm-year observations from 2015 to 2020, including 5,414 observations (939 unique firms) from firms with affected peers (the treated group) and 3,666

[23] In our robustness test, we limit the sample period to 2016–2019 to exclude the potential confounding effects of the COVID-19 pandemic. Our inferences are not affected, as reported in Table 9.

[24] We use unconsolidated financial statements to be consistent with corporate income tax calculations.

observations (638 unique firms) from firms without affected peers (the control group).[25]

**Descriptive Statistics and Correlations**

Table 1 presents the descriptive statistics for the variables used in our analyses. To mitigate the influence of outliers, all continuous variables are winsorized at the 1st and 99th percentiles of the distributions for each year. The mean value of *TREAT_PEER* (0.596) indicates that 59.6% of the firm-year observations belong to industries with at least one affected firm. *TOTALINV* has a mean (median) of 0.148 (0.051), while the mean (median) values for *NETINV* and *REPLACEINV* are 0.099 (0.028) and 0.050 (0.013), respectively.[26] On average, firms invest 2.2% of their total assets in R&D activities (*RDINV*).

In Table 2, we present the correlation matrix for the variables used in our main analysis. The Pearson correlation between *TOTALINV* and *NETINV* is 0.87, while it is 0.21 between *TOTALINV* and *REPLACEINV*, suggesting that net investment is the primary driver of changes in total fixed assets. *RDINV* exhibits a positive correlation with *MTB* and *CASH*, suggesting the role of growth opportunities and liquidity in R&D activities.

## VI. EMPIRICAL RESULTS

**Corporate Investment of Firms with Affected Peers**

Table 3 presents the results of estimating Equation (4). In column (1), the coefficient on *TREAT_PEER*×*POST* is positive and significant at the 5% level (0.034, $t$ = 2.08). This suggests

[25] As previously discussed, firms directly affected by the tax rate increase (147 firm-year observations) are excluded from the main analysis. However, these observations are included as the treated group in the analysis for affected firms, as reported in Table 6.

[26] For comparison, Livdan and Nezlobin (2021) report mean values of total investment, net investment, and replacement investment as 0.198, 0.134, and 0.063, respectively.

that firms with affected peers significantly increase their investment in fixed assets following the tax rate increase faced by those peers, compared to firms without affected peers. The magnitude of this increase is economically significant. Specifically, the estimated coefficient of 0.034 corresponds to an increase of approximately 23.0% relative to the mean value of total investment (0.148), translating to about KRW 7.5 billion (approximately $5 million) per firm.[27]

To examine whether this increase in total investment reflects a strategic growth response or merely an adjustment to maintain current capital stocks, we decompose total investment (*TOTALINV*) into net investment (*NETINV*) and replacement investment (*REPLACEINV*). In column (2), using *NETINV* as the dependent variable, the coefficient on *TREAT_PEER*×*POST* remains positive and significant (0.042, $t = 2.44$). Given that net investment contributes to future growth (Livdan and Nezlobin 2021), this increase suggests that firms with affected peers are likely to experience subsequent sales growth. In column (3), with *REPLACEINV* as the dependent variable, the coefficient on *TREAT_PEER*×*POST* is statistically insignificant (−0.001, $t = -0.13$). This indicates that the increase in total investment is driven primarily by growth-oriented net investment rather than replacement investment.

In column (4), when R&D investment (*RDINV*) is used as the dependent variable, the coefficient on *TREAT_PEER* × *POST* is negative and significant at the 5% level (−0.002, $t = -2.53$), indicating that firms with affected peers significantly reduce their R&D expenditures relative to the control group. Economically, this reduction in R&D is relatively modest. It amounts to 0.2% of lagged total assets, equivalent to 9% of the average R&D value. In monetary terms, this reduction represents KRW 0.9 billion (approximately $0.7 million) per firm, or about 12% of the

[27] With the gross book value of PP&E at the beginning of the year amounting to KRW 219 billion (untabulated), the change in *TOTALINV* following the tax rate increase is calculated as 0.034 × KRW 219 billion.

increase in capital investment by firms with affected peers. These findings are consistent with a substitution effect between fixed assets and R&D, suggesting that firms may reallocate resources away from the uncertain returns of R&D toward capital investments, which typically offer more immediate and predictable payoffs.[28]

**Cross-Sectional Tests: Heterogeneity in the Response of Firms with Affected Peers**

In this section, we conduct two cross-sectional tests to explore the heterogeneity in the responses of firms with affected peers.[29]

***Financial Constraints***

We examine how financial constraints influence the investment behavior of firms with affected peers. We expect that financial constraints may limit the ability of these firms to strategically increase their investments, particularly as they do not benefit directly from the 2018 tax rate increase (Fazzari et al. 1987; Frésard 2010; Guenther et al. 2020). To test this prediction, we create a binary variable (*HIGHCSVAR*) to identify financially constrained firms—those with a Kaplan and Zingales (1997) index (*KZINDEX*) above the median—and interact this variable with *TREAT_PEER* × *POST*.

Columns (1) and (2) of Table 4 present the results. In column (1), the coefficient on *TREAT_PEER* × *POST* is positive, while the three-way interaction term (*TREAT_PEER* × *POST* × *HIGHCSVAR*) is negative and significant at the 1% level. The sum of the coefficients on *TREAT_PEER* × *POST* and *TREAT_PEER* × *POST* × *HIGHCSVAR* is insignificant (*p*-value =

[28] While our discussion focuses on the substitution relation between fixed assets and R&D within a firm, a firm's decision on one type of investment is also likely influenced by competitors' investment decisions and whether these investments serve as strategic complements or substitutes.

[29] From this section onward, we focus on net investment (*NETINV*) as a proxy for investment in fixed assets, given that the findings for *NETINV* and total investment (*TOTALINV*) are qualitatively similar. *NETINV* provides a clearer indicator of growth potential, as it excludes replacement investments aimed at maintaining the existing capital stock. In the Online Appendix OA1 (Table A1), we provide cross-sectional analyses of *TOTALINV* and *REPLACEINV*.

0.997). These findings suggest that financially unconstrained firms increase their investment in fixed assets, whereas financially constrained firms do not exhibit a significant increase. The results imply that financially constrained firms may struggle to take advantage of competitive opportunities arising from the higher tax burdens faced by their competitors.

Column (2) presents results with *RDINV* as the dependent variable. The coefficient on the three-way interaction term (*TREAT_PEER* × *POST* × *HIGHCSVAR*) is not significant, while the coefficient on *TREAT_PEER* × *POST* is significantly negative. This indicates that reductions in R&D expenditures are similar for both financially constrained and unconstrained firms. While the results for financially unconstrained firms are consistent with those in Table 3, the significant decrease in R&D for constrained firms, without a corresponding increase in capital investment, suggests that these firms may be reallocating resources to areas other than capital investment.

***Product Market Competition***

We investigate how the intensity of product market competition influences the investment responses of firms with affected peers. In highly competitive markets, firms may be more inclined to enhance their market position by increasing their investment levels (Khanna and Tice 2000; Bloom et al. 2016; Kim et al. 2021). Therefore, we expect our results to be more pronounced in competitive industries. To measure product market competition (*INVHHI*), we use the inverse of the Herfindahl-Hirschman Index (HHI), where higher values of *INVHHI* indicate more intense competition. We then create a binary variable to represent high market competition based on the median value of *INVHHI* (*HIGHCSVAR*) and interact it with *TREAT_PEER* × *POST*.

In column (3), where net investment is the dependent variable, the coefficient on *TREAT_PEER* × *POST* × *HIGHCSVAR* is positive and significant (0.051, $t$ = 1.95), while the coefficient on *TREAT_PEER* × *POST* is positive but not significant (0.023, $t$ = 1.22). The sum of

these two coefficients is statistically significant, as shown at the bottom of the table. These findings suggest that firms in highly competitive industries increase their net investment in fixed assets to a greater extent than those in less competitive industries. For R&D investment, as shown in column (4), we observe a negative and significant coefficient on *TREAT_PEER* × *POST* × *HIGHCSVAR* (−0.002, $t = -1.94$) and an insignificant coefficient on *TREAT_PEER* × *POST* (−0.001, $t = -1.46$). These results indicate that a shift in resources away from R&D toward fixed assets primarily occurs in competitive industries.

**Economic Consequences of the Corporate Tax Rate Increase**

In this section, we examine whether the 2018 tax rate increase led to significant changes in the performance of firms indirectly affected by shifts in competitive dynamics. Specifically, we estimate the following model:

$$\begin{aligned}\Delta PERFORMANCE_{it+1} = {} & \beta_0 + \beta_1 TREAT_{it} \times POST_{it} + \beta_2 SIZE_{it-1} + \beta_3 LEV_{it-1} + \beta_4 MTB_{it-1} \\ & + \beta_5 CASH_{it-1} + \beta_6 ROA_{it-1} + \beta_7 CFO_{it-1} + \beta_8 LOSS_{it-1} + \beta_9 SALESGROWTH_{it-1} \\ & + \beta_{10} DIVIDEND_{it-1} + \beta_{11} KZINDEX_{it-1} + \beta_{12} INVHHI_{it-1} + \beta_{13} RC_{it-1} + \beta_{14} INVLIFE_{it-1} \\ & + \beta_{15} FIRMAGE_{it-1} + \beta_{16} \Delta PERFORMANCE_{it} + \text{Firm FE} + \text{Year FE} + \varepsilon_{it,} \qquad (6)\end{aligned}$$

where, for firm *i* in year *t*, *ΔPERFORMANCE* represents one of the following performance metrics: sales growth (*ΔSALES)*, changes in market share (*ΔMSHARE)*, or changes in profitability (*ΔROA*).[30] We also include a lagged dependent variable to control for the time-series behavior of firm performance.

Column (1) of Table 5 presents the results for sales growth. The coefficient on *TREAT_PEER* × *POST* is positive and significant (0.023, $t = 2.31$), indicating that firms with affected peers experience higher sales growth than those without affected peers. For changes in

[30] We focus on sales growth and market share as measures of competitive positioning, which are not directly affected by tax expenses.

market share, as shown in column (2), the positive and significant coefficient on *TREAT_PEER* × *POST* (coefficient = 0.000, $t$ = 1.98) suggests that firms with affected peers gain market share following the tax rate increase. For changes in profitability, the coefficient on *TREAT_PEER* × *POST* in column (3) is positive and significant at the 1% level (0.007, $t$ = 2.61), indicating an improvement in profitability for firms with affected peers. To address concerns that reduced R&D spending might mechanically increase profitability, we adjust the profitability measure by adding back R&D expenses (*ΔROARD*). In column (4), the results remain consistent, suggesting that the increase in profitability is not merely a byproduct of reduced R&D investment. Overall, these findings indicate that the tax rate increase provides significant advantages for firms with affected peers, leading to notable improvements in sales growth, market share, and profitability. This highlights how heterogeneous tax policies can reshape competitive dynamics in product markets and reveals the broader performance implications of tax policy changes beyond investment responses.

## VII. ADDITIONAL ANALYSES AND ROBUSTNESS TESTS

### Estimating the Investment Responses of Affected Firms

While our analyses thus far have focused on the responses of unaffected firms in industries with affected peers, we now turn to the investment responses of firms directly affected by the 2018 tax rate increase. Prior studies using DID models typically compare affected firms to unaffected firms, assuming that the latter's investment strategies remain unchanged. However, as our earlier findings show, firms with affected peers tend to increase their capital investments in response to competitors' increased tax burdens. This strategic behavior complicates the interpretation of DID estimates, as using firms with affected peers as controls in a DID model could lead to an

overestimation of the true effect of tax policy changes on directly affected firms.

To examine this issue, we estimate Equation (5) using affected firms and three different control groups: (1) a combined group of firms with and without affected peers (Control #1), (2) firms with affected peers (Control #2), and (3) firms without affected peers (Control #3). We believe that comparisons to Control #3 provide a more accurate estimate of the investment responses of affected firms, while including firms with affected peers in the comparison group, as in Control #1 or Control #2, may introduce bias.

Panel A of Table 6 provides a univariate comparison of net investment (*NETINV*) and R&D investment (*RDINV*) across the three groups. Before the 2018 tax increase, the average net investments for affected firms (0.095) and firms with affected peers (0.069) were lower than those for firms without affected peers (0.106). After the tax increase, net investment for affected firms declines to 0.058, though this change is not statistically significant. In contrast, firms with affected peers show a significant increase in net investment, rising from 0.069 to 0.119 ($p$-value<0.01). Firms without affected peers show no significant changes in net investment between the pre- and post-periods. For R&D investment, affected firms exhibit no significant change between the pre- and post-tax reform periods. However, firms with affected peers reduce their R&D investment from 0.022 to 0.019 ($p$-value < 0.01), while firms without affected peers show no significant changes in R&D.

Panel B presents the regression results. In column (1), when Control #1 is used as the control group, the coefficient on *TREAT* × *POST* is negative and significant at the 1% level (−0.095, $t$ = −2.91), suggesting that net investment for affected firms decreases significantly, corresponding to a 9.5% reduction in gross PP&E. In column (3), where firms with affected peers (Control #2) are used as the control group, the investment reduction of affected firms is even

stronger, with the coefficient on *TREAT* × *POST* increasing to −0.115. However, in column (5), with Control #3 as the control group, the coefficient declines to −0.056 and becomes marginally insignificant ($t = -1.59$). As an alternative approach, we use the same sample as in column (1) but additionally include *TREAT_PEER* × *POST* to compare investment responses across three groups: affected firms, firms with affected peers, and firms without affected peers, with the latter serving as the benchmark. In column (7), the negative and significant coefficient on *TREAT* × *POST* (−0.068, $t = -2.00$) suggests that, compared to firms without affected peers, affected firms decrease fixed asset investment. Meanwhile, the positive and significant coefficient on *TREAT_PEER* × *POST* (0.044, $t = 2.55$) indicates increased investment by firms with affected peers.[31] More importantly, the magnitude of the estimated decrease in investment by affected firms (−0.068) in this specification is smaller than the estimate in column (1) (−0.095), even though the same sample (N = 9,227 firm-year observations) is used in both columns. These findings imply that using firms with affected peers as controls (as in Control #1 or #2) may overstate the investment response of affected firms, as the comparison includes the peers' strategic actions.

Regarding R&D investment, we find no significant change for affected firms across all models, as shown in columns (2), (4), (6), and (8). These findings suggest that the 2018 tax rate increase does not significantly affect R&D spending for affected firms. This lack of change in R&D investments may be due to the favorable tax treatment of R&D compared to capital

[31] While the DID estimates representing the difference in net investment between affected firms and firms without affected peers are of similar magnitude in columns (5) and (7), with coefficients of −0.056 and −0.068, respectively, only the coefficient in column (7) is statistically significant. This difference in significance may be explained by differences in sample composition and statistical power. The larger sample size in column (7) may improve statistical power by reducing standard errors.

investment.[32] In contrast, as shown in column (8), the negative and significant coefficient on *TREAT_PEER* × *POST* (−0.002, $t = -2.55$) suggests that firms with affected peers decrease their R&D investment, consistent with the results previously reported in Table 3.

In summary, our results highlight the importance of selecting appropriate control groups in DID models when analyzing the effect of tax changes. Including firms indirectly affected by tax changes in the control group, as commonly done in prior literature, can distort estimates by inflating affected firms' investment reductions. Using a control group that excludes these peers would yield a more accurate assessment of how affected firms adjust their investment strategies in response to tax policy changes.

**Testing the Parallel Trend Assumption**

To validate our main results reported in Table 3 based on the DID model, we test the parallel trend assumption, which requires that both the treatment and control groups exhibit similar investment trends before the 2018 tax rate increase. We examine this assumption by interacting year-specific indicators (*YEAR2015, YEAR2016*, *YEAR2018*, *YEAR2019*, and *YEAR2020*) with the treatment variable (*TREAT_PEER*). The indicator for 2017 is omitted, as it serves as the benchmark year in this analysis. In Table 7, we report the results with and without the control variables. The coefficients on *TREAT_PEER* × *YEAR2015* and *TREAT_PEER* × *YEAR2016* are statistically insignificant across all columns, indicating no significant differences in investment trends between treated and control firms before the tax rate increase. This supports the parallel trend assumption during the pre-treatment period.

[32] In the Online Appendix, we provide cross-sectional analyses (Table A2) and explore the economic consequences of the tax rate increase (Table A3) after including affected firms in the sample. Additionally, we re-estimate Equation (5) using both total investment (*TOTALINV*) and replacement investment (*REPLACEINV*) to assess the robustness of our findings (Table A4). See Online Appendix for further discussion.

The coefficients representing post-treatment differences are generally significant. For example, as shown in column (2) with net investment (*NETINV*) as the dependent variable, the coefficients on *TREAT_PEER* × *YEAR2018* and *TREAT_PEER* × *YEAR2019* are positive and significant, suggesting that firms with affected peers increase their capital investments following the tax rate increase. Column (4) shows that the coefficients on *TREAT_PEER* × *YEAR2019* and *TREAT_PEER* × *YEAR2020* are negative and significant for R&D investment (*RDINV*), implying that firms with affected peers reduce their R&D expenditures after the 2018 tax rate increase. Overall, the results in Table 7 corroborate our main inferences.

**Entropy Balanced Sample Analysis**

A potential concern with our main findings is that the treated and control groups in our main DID model may fundamentally differ in firm characteristics, even though our firm-fixed effects specifications focus on within-firm variation. To address this issue, we employ entropy balancing (Hainmueller 2012), which adjusts the weights of the control group (firms without affected peers) to ensure a more accurate comparison.

The results of this analysis are presented in Table 8. As shown in Panel A, after applying entropy balancing, all covariates show a standardized difference of 0.000 and a variance ratio of approximately 1.000, indicating that the two groups are now statistically indistinguishable in terms of these characteristics.

The regression results using the entropy-balanced sample in Panel B are consistent with those reported in Table 3. The coefficient on *TREAT_PEER* × *POST* is positive and significant (0.048, $t = 2.37$) for net investment (*NETINV*) and negative and significant (−0.002, $t = -2.25$) for R&D investment (*RDINV*). Overall, our main inferences are robust to the use of entropy-balanced analysis.

## Robustness Tests

### *Falsification Test with a Pseudo-Event Year*

We perform a placebo test using 2014 as a pseudo-event year to address concerns that the observed results may reflect inherent differences between firms rather than the effects of the tax policy change. For this test, we reclassify firms based on their taxable income in 2013, identifying affected firms and dividing unaffected firms into those with affected peers and those without. The sample period for this test is adjusted to cover 2011 to 2016, capturing six years around the pseudo tax rate change year of 2014. To capture the post-pseudo-event period, we introduce the variable *POST2014*, covering the 2014–2016 period. In Panel A of Table 9, the regression results show that the coefficients on *TREAT_PEER* × *POST2014* are statistically insignificant across all specifications. This confirms that the investment changes observed in our main analysis are specific to the 2018 tax rate increase and are not driven by other confounding factors.

### *Alternative Investment Responses*

Beyond capital and R&D investments, we examine firms' responses through advertising expenditures and labor. Panel B of Table 9 presents these results. In column (1), the coefficients on *TREAT_PEER* × *POST* for advertising expenditures are insignificant, indicating that firms with affected peers did not significantly alter their advertising strategies. In column (2), there are no significant changes in employee wages (*WAGE*). These results suggest that fixed assets and R&D are key channels for investment responses.

### *Alternative Sample Period*

In Panel C of Table 9, we present results from tests using alternative sample periods: 1) a narrowed sample period of four years around the tax reform (i.e., 2016 to 2019) and 2) a sample that excludes 2017 and 2018. The latter adjustment accounts for the possibility that firms may have

adjusted their investment behavior in anticipation of the tax reform before its official implementation. Our results remain unchanged, showing similar patterns in capital and R&D investments.

## VIII. CONCLUSION

This study examines how firms respond to corporate tax rate increases imposed on their industry peers. Exploiting a unique tax policy change in Korea, where only a subset of firms faced higher tax burdens after 2018, we find that firms in industries with affected peers, though not directly impacted by the tax increase, increase their capital investments. Simultaneously, these firms reduce R&D expenditures, suggesting a reallocation of resources toward fixed assets. They experience subsequent improvements in sales growth, market share, and profitability. We also provide evidence indicating that failing to account for the strategic actions of peers can lead to biased estimates of the investment responses of directly affected firms.

Our study is subject to limitations. First, we identify product market peers based on the industry; however, firms within the same industry may not always be direct competitors in the same product space (Hoberg and Phillips 2016). Second, while we provide evidence that firms with affected peers increase capital investment and achieve short-term gains in market share, their reduction in R&D may adversely affect their long-term performance. This reduced effort in innovation contrasts with the response of affected firms, whose R&D investments remain unchanged. We encourage future research to explore these strategic interactions over the long term.

Despite these limitations, this study provides valuable insights for policymakers and researchers. As many governments consider raising corporate taxes, understanding the broader implications of such policies is necessary. Our findings show that targeted tax policies can trigger

unintended spillovers, reshaping competitive dynamics and redistributing market power among firms. Policymakers must, therefore, carefully evaluate these externalities to avoid creating unintended competitive consequences.

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## APPENDIX Variable Definition

| Variable | | Definition |
|---|---|---|
| *TOTALINV* | = | Total investment, calculated as follows (Livdan and Nezlobin 2021): $TOTALINV_{it} = (PPENT_{it} - PPENT_{it-1} + WDP_{it} + DPC_{it})/PPEGT_{it-1}$ *PPENT* represents the net book value of PP&E; *WDP* is the write-down of PP&E; and *DPC* is the depreciation expense reported on the statement of cash flows. The variable is scaled by the gross PP&E (*PPEGT*) at the beginning of the year. |
| *NETINV* | = | Net investment, calculated as the change in gross PP&E from the previous year to the current year as follows (Livdan and Nezlobin 2021): $NETINV_{it} = (PPEGT_{it} - PPEGT_{it-1})/PPEGT_{it-1}$ |
| *REPLACEINV* | = | Replacement investment, computed as the difference between total investment (*TOTALINV*) and net investment (*NETINV*) (Livdan and Nezlobin 2021): |
| *RDINV* | = | Research and development (R&D) expenses scaled by lagged total assets. |
| *TREAT_PEER* | = | Indicator variable equal to 1 if the firm operates in an industry with at least one affected firm (*TREAT*) in 2017, and 0 otherwise. |
| *POST* | = | Indicator variable equal to 1 for the years 2018, 2019, and 2020, and 0 for the years 2015, 2016, and 2017. |
| *SIZE* | = | The natural logarithm of total assets. |
| *LEV* | = | Leverage, calculated as the sum of debt in current liabilities and long-term debt, divided by total assets. |
| *MTB* | = | Market-to-book ratio, computed as the market value of equity divided by the book value of equity. |
| *CASH* | = | Cash and cash equivalents, divided by total assets. |
| *ROA* | = | Return on assets, measured as operating income scaled by lagged total assets. |
| *CFO* | = | Operating cash flows from the statement of cash flows, divided by lagged total assets. |
| *LOSS* | = | Indicator variable equal to 1 if a firm reports negative operating income, and 0 otherwise. |
| *SALESGROWTH* | = | The change in sales from the previous year, divided by the previous year's sales. |
| *DIVIDEND* | = | Indicator variable equal to 1 if the firm pays dividends during year *t*, and 0 otherwise. |
| *KZINDEX* | = | Kaplan and Zingales' (1997) financial constraint index calculated as below at the beginning of year *t*. $KZINDEX_{it} = (-1)\times((OIADP_{it} + DP_{it})/PPENT_{it-1}) + (0.28)\times(Q_{it}) + (3.13)\times(Total\ Debt_{it}/(Total\ Debt_{it} + Common\ Equity_{it}) - (39.36)\times(DIVPAY_{it}/PPENT_{it-1}) - 1.31\times\times(CHE_{it}/PPENT_{it-1})$ *OIADP* represents operating income after depreciation, and *DP* is the depreciation expense. Q is Tobins' *q* ratio, which measures the firm's market value relative to the book value of its assets. *Total Debt* includes both current and long-term debt obligations, while *Common Equity* represents shareholders' equity. *DIVPAY* refers to dividend payments, and *CHE* refers to cash and cash equivalents. A higher value of *KZINDEX* signals greater financial constraints, indicating that firms with higher scores are more likely to face challenges in securing external financing for operations and investments. |
| *INVHHI* | = | Inverse Herfindahl-Hirschman Index (HHI), calculated as the sum of squared market shares (based on sales) for each firm within a two-digit SIC industry. The index is multiplied by −1 so that higher values indicate more competitive |

| | | |
|---|---|---|
| | | markets. |
| *RC* | = | The ratio of net PP&E to gross PP&E in year *t*. |
| *INVLIFE* | = | The inverse of useful life, where useful life is estimated as the ratio of the average beginning and ending balances of gross PP&E to the depreciation expense. |
| *AGE* | = | The natural logarithm of the number of years since the firm's IPO, plus one. |
| *ΔSALE* | = | The change in sales, divided by lagged total assets, from year *t*−1 to year *t*. |
| *ΔMSHARE* | = | The change in market share from the previous year, where market share is based on sales within two-digit SIC industries. |
| *ΔROA* | = | The change in operating income, divided by lagged total assets, from year *t*−1 to year *t*. |
| *ΔROARD* | = | The change in operating income plus R&D expenses, scaled by lagged total assets, from year *t*−1 to year *t*. |
| *TREAT* | = | Indicator variable equal to 1 for firms with estimated taxable income greater than KRW 300 billion in 2017, and 0 otherwise. |
| *TREAT2014* | = | Indicator variable equal to 1 for firms with estimated taxable income greater than KRW 300 billion in 2013, and 0 otherwise. |
| *TREAT_PEER2014* | = | Indicator variable equal to 1 if the firm operates in an industry with at least one affected firm (*TREAT*) in 2013, and 0 otherwise. |
| *POST2014* | = | Indicator variable equal to 1 for the years 2014, 2015, and 2016, and 0 for the years 2011, 2012, and 2013. |
| *ADV* | = | Advertising expenses, scaled by lagged total assets. |
| *WAGE* | = | Total wages paid to employees, scaled by lagged total assets. |

## TABLE 1 Descriptive Statistics

| **Variables** | N | MEAN | STD | P10 | Q1 | MED | Q3 | P90 |
|---|---|---|---|---|---|---|---|---|
| *TOTALINV* | 9,080 | 0.148 | 0.411 | −0.010 | 0.016 | 0.051 | 0.135 | 0.348 |
| *NETINV* | 9,080 | 0.099 | 0.422 | −0.104 | −0.003 | 0.028 | 0.099 | 0.298 |
| *REPLACEINV* | 9,080 | 0.050 | 0.157 | 0.000 | 0.003 | 0.013 | 0.048 | 0.156 |
| *RDINV* | 9,080 | 0.022 | 0.033 | 0.000 | 0.000 | 0.009 | 0.030 | 0.062 |
| *TREAT_PEER* | 9,080 | 0.596 | 0.491 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| *POST* | 9,080 | 0.511 | 0.500 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| *SIZE* | 9,080 | 18.906 | 1.177 | 17.582 | 18.084 | 18.731 | 19.554 | 20.476 |
| *LEV* | 9,080 | 0.087 | 0.108 | 0.000 | 0.000 | 0.042 | 0.140 | 0.248 |
| *MTB* | 9,080 | 1.844 | 1.835 | 0.536 | 0.767 | 1.233 | 2.192 | 3.774 |
| *CASH* | 9,080 | 0.147 | 0.148 | 0.012 | 0.037 | 0.096 | 0.209 | 0.360 |
| *ROA* | 9,080 | 0.033 | 0.081 | −0.053 | 0.002 | 0.030 | 0.068 | 0.121 |
| *CFO* | 9,080 | 0.042 | 0.092 | −0.061 | −0.002 | 0.041 | 0.089 | 0.149 |
| *LOSS* | 9,080 | 0.231 | 0.421 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| *SALESGROWTH* | 9,080 | 0.063 | 0.341 | −0.227 | −0.086 | 0.022 | 0.138 | 0.338 |
| *DIVIDEND* | 9,080 | 0.540 | 0.498 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| *KZINDEX* | 9,080 | −20.716 | 115.935 | −20.522 | −3.882 | −0.816 | 0.329 | 1.140 |
| *INVHHI* | 9,080 | −0.148 | 0.106 | −0.328 | −0.199 | −0.119 | −0.064 | −0.032 |
| *RC* | 9,080 | 0.609 | 0.219 | 0.317 | 0.466 | 0.618 | 0.760 | 0.902 |
| *INVLIFE* | 9,080 | 0.073 | 0.073 | 0.040 | 0.040 | 0.048 | 0.073 | 0.125 |
| *AGE* | 9,080 | 2.631 | 0.732 | 1.609 | 2.197 | 2.773 | 3.135 | 3.497 |
| *ΔSALE* | 9,080 | −0.039 | 0.242 | −0.282 | −0.117 | −0.017 | 0.056 | 0.177 |
| *ΔMSHARE* | 9,080 | −0.000 | 0.005 | −0.002 | −0.000 | −0.000 | 0.000 | 0.002 |
| *ΔROA* | 9,080 | −0.005 | 0.066 | −0.071 | −0.028 | −0.003 | 0.019 | 0.059 |
| *ΔROARD* | 9,080 | −0.006 | 0.068 | −0.075 | −0.029 | −0.003 | 0.019 | 0.059 |
| *TREAT* | 9,227 | 0.016 | 0.125 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *TREAT_PEER2014* | 7,854 | 0.616 | 0.486 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| *POST2014* | 7,854 | 0.508 | 0.499 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| *ADV* | 9,080 | 0.006 | 0.017 | 0.000 | 0.000 | 0.000 | 0.003 | 0.018 |
| *EMP* | 9,066 | 5.358 | 1.194 | 3.951 | 4.585 | 5.301 | 6.026 | 6.805 |
| *WAGE* | 9,037 | 0.079 | 0.063 | 0.021 | 0.039 | 0.065 | 0.101 | 0.144 |

*Notes:* This table presents the descriptive statistics for the variables used in the analyses, including the number of observations (N), mean, standard deviation (STD), and percentiles (P10, Q1, MED, Q3, P90). Definitions of all variables are provided in the Appendix.

## TABLE 2 Correlation Matrix

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) *TOTALINV* | | **0.87** | **0.21** | **0.06** | 0.00 | **0.06** | **0.06** | **−0.09** | **−0.04** | **0.11** | **0.13** | **0.05** | −0.01 | 0.00 | **0.08** | **−0.05** | **−0.20** | **0.03** | **−0.05** | **0.33** | **−0.08** |
| (2) *NETINV* | **0.81** | | **−0.22** | **0.07** | −0.01 | **0.04** | **0.03** | **−0.07** | **−0.03** | **0.09** | **0.11** | **0.08** | 0.02 | **−0.03** | **0.08** | **−0.03** | **−0.08** | **0.04** | **0.03** | **0.16** | **−0.09** |
| (3) *REPLACEINV* | **0.05** | **−0.37** | | **−0.04** | **0.06** | **0.05** | **0.07** | **−0.04** | −0.02 | **0.03** | **0.05** | **−0.07** | **−0.06** | **0.06** | 0.00 | **−0.04** | **−0.23** | **−0.04** | **−0.17** | **0.43** | **0.02** |
| (4) *RDINV* | **0.10** | **0.13** | **−0.10** | | **−0.07** | **−0.03** | **−0.07** | **−0.24** | **−0.02** | **0.30** | **0.23** | **−0.04** | **−0.02** | **0.09** | **0.05** | **−0.09** | **0.06** | **0.03** | −0.01 | **0.02** | **−0.25** |
| (5) *TREAT_PEER* | **−0.03** | **−0.06** | **0.07** | **−0.11** | | 0.00 | **0.54** | **0.04** | **−0.03** | **−0.12** | −0.01 | **−0.03** | 0.00 | **−0.02** | **−0.04** | 0.02 | **−0.07** | **−0.35** | **−0.13** | **0.08** | **0.08** |
| (6) *POST* | **0.05** | 0.00 | **0.10** | **−0.03** | **0.00** | | **0.65** | **0.06** | 0.01 | **−0.02** | −0.02 | **−0.06** | **−0.06** | **0.05** | −0.01 | 0.02 | **−0.05** | 0.01 | **−0.05** | **0.06** | **0.13** |
| (7) *TREAT_PEER×POST* | **0.03** | **−0.02** | **0.10** | **−0.09** | **0.54** | **0.65** | | **0.05** | −0.01 | **−0.09** | −0.02 | **−0.05** | **−0.04** | 0.01 | **−0.03** | **0.02** | **−0.07** | **−0.21** | **−0.11** | **0.09** | **0.12** |
| (8) *SIZE* | **−0.03** | **−0.03** | **0.05** | **−0.25** | **0.03** | **0.07** | **0.05** | | **0.20** | **−0.26** | **−0.29** | **0.15** | **0.14** | **−0.22** | −0.02 | **0.34** | **−0.06** | 0.01 | **0.05** | **−0.06** | **0.32** |
| (9) *LEV* | **−0.05** | **−0.03** | 0.00 | −0.01 | **−0.03** | **0.04** | 0.01 | **0.19** | | **0.09** | **−0.25** | **−0.15** | **−0.10** | **0.10** | −0.01 | **−0.15** | **0.07** | 0.02 | **0.07** | **−0.02** | 0.00 |
| (10) *MTB* | **0.18** | **0.15** | 0.02 | **0.30** | **−0.12** | **−0.05** | **−0.10** | **−0.36** | 0.00 | | **0.19** | **−0.06** | **−0.08** | **0.17** | **0.12** | **−0.25** | **0.04** | **0.15** | −0.01 | **0.07** | **−0.17** |
| (11) *CASH* | **0.12** | **0.08** | 0.01 | **0.20** | **−0.04** | −0.01 | **−0.03** | **−0.30** | **−0.35** | **0.21** | | **0.13** | **0.17** | 0.00 | **0.04** | −0.01 | **−0.04** | **−0.03** | **−0.09** | **0.10** | **−0.25** |
| (12) *ROA* | **0.21** | **0.21** | **−0.07** | **0.04** | **−0.04** | **−0.08** | **−0.07** | **0.17** | **−0.14** | **0.07** | **0.16** | | **0.64** | **−0.66** | **0.29** | **0.29** | **−0.05** | **0.05** | **0.10** | −0.01 | **−0.10** |
| (13) *CFO* | **0.12** | **0.12** | **−0.03** | **0.05** | 0.00 | **−0.08** | **−0.05** | **0.15** | **−0.11** | 0.00 | **0.19** | **0.60** | | **−0.42** | **0.11** | **0.26** | −0.01 | **−0.03** | 0.01 | 0.01 | **−0.05** |
| (14) *LOSS* | **−0.11** | **−0.12** | **0.05** | **0.07** | **−0.02** | **0.05** | 0.01 | **−0.24** | **0.08** | **0.12** | −0.01 | **−0.73** | **−0.44** | | **−0.19** | **−0.33** | **0.05** | −0.02 | **−0.06** | **0.02** | **−0.04** |
| (15) *SALESGROWTH* | **0.18** | **0.17** | **−0.05** | **0.06** | **−0.07** | 0.02 | −0.02 | **0.02** | −0.01 | **0.16** | **0.03** | **0.38** | **0.16** | **−0.28** | | **−0.06** | **−0.06** | **0.05** | **0.03** | **0.05** | **−0.08** |
| (16) *DIVIDEND* | 0.02 | **0.03** | −0.01 | **−0.08** | 0.02 | 0.02 | **0.02** | **0.37** | **−0.14** | **−0.27** | 0.00 | **0.33** | **0.28** | **−0.33** | 0.00 | | **−0.09** | −0.01 | **0.04** | **−0.04** | **0.13** |
| (17) *KZINDEX* | **−0.22** | **−0.11** | **−0.13** | **0.08** | **−0.13** | **−0.03** | **−0.10** | **−0.03** | **0.49** | **0.04** | **−0.42** | **−0.39** | **−0.24** | **0.32** | **−0.10** | **−0.43** | | −0.01 | **0.17** | **−0.33** | −0.02 |
| (18) *INVHHI* | **0.05** | **0.10** | **−0.12** | **0.16** | **−0.40** | 0.00 | **−0.25** | **−0.03** | **0.04** | **0.18** | **0.02** | **0.07** | **−0.02** | −0.01 | **0.08** | **−0.03** | **0.07** | | **0.10** | **−0.05** | 0.01 |
| (19) *RC* | **−0.04** | 0.02 | **−0.08** | 0.01 | **−0.13** | **−0.05** | **−0.11** | **0.04** | **0.10** | 0.00 | **−0.08** | **0.07** | −0.02 | **−0.05** | **0.04** | **0.02** | **0.17** | **0.12** | | **−0.08** | **−0.07** |
| (20) *INVLIFE* | **0.33** | **0.12** | **0.31** | **0.06** | **0.10** | 0.00 | **0.05** | **−0.06** | **−0.02** | **0.17** | **0.12** | **0.04** | **0.09** | **0.02** | **0.04** | **−0.05** | **−0.25** | **−0.10** | **−0.22** | | **−0.07** |
| (21) *FIRMAGE* | **−0.11** | **−0.11** | **0.06** | **−0.27** | **0.08** | **0.12** | **0.12** | **0.33** | **0.03** | **−0.24** | **−0.24** | **−0.08** | **−0.05** | **−0.05** | **−0.06** | **0.12** | **0.05** | **−0.03** | **−0.08** | −0.21 | |

*Notes:* This table presents the correlation matrix for the variables used in our main analysis. The upper triangle contains Pearson correlation coefficients, while the lower triangle reports Spearman correlation coefficients. Bolded values indicate significance at the 5% level (p-value < 0.05). Definitions of all variables are provided in the Appendix.

## TABLE 3 Corporate Tax Rate Increase and Peers' Responses

| Dep. Variable = | Total Investment (*TOTALINV*) | Net Investment (*NETINV*) | Replacement Investment (*REPLACEINV*) | R&D Investment (*RDINV*) |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| ***TREAT_PEER×POST*** | **0.034**** | **0.042**** | **−0.001** | **−0.002**** |
| | **(2.08)** | **(2.44)** | **(−0.13)** | **(−2.53)** |
| *SIZE* | −0.086** | −0.148*** | 0.050*** | −0.011*** |
| | (−2.19) | (−3.63) | (4.30) | (−7.80) |
| *LEV* | −0.064 | −0.090 | 0.016 | −0.001 |
| | (−0.75) | (−0.95) | (0.58) | (−0.41) |
| *MTB* | −0.001 | −0.002 | −0.001 | 0.001*** |
| | (−0.16) | (−0.26) | (−0.39) | (2.68) |
| *CASH* | 0.326*** | 0.418*** | −0.016 | 0.000 |
| | (3.86) | (4.89) | (−0.57) | (0.08) |
| *ROA* | 0.414*** | 0.535*** | −0.075 | 0.009 |
| | (3.01) | (3.60) | (−1.34) | (1.60) |
| *CFO* | −0.143 | −0.195** | 0.001 | −0.001 |
| | (−1.62) | (−2.07) | (0.04) | (−0.23) |
| *LOSS* | −0.017 | −0.018 | −0.000 | −0.000 |
| | (−1.01) | (−1.00) | (−0.05) | (−0.44) |
| *SALESGROWTH* | 0.011 | 0.015 | −0.005 | −0.001 |
| | (0.54) | (0.69) | (−0.70) | (−0.74) |
| *DIVIDEND* | 0.028* | 0.037** | −0.008 | 0.002** |
| | (1.83) | (2.27) | (−1.54) | (2.53) |
| *KZINDEX* | −0.933** | −0.484 | −0.315*** | −0.004 |
| | (−2.44) | (−1.33) | (−2.65) | (−0.61) |
| *INVHHI* | 0.279 | 0.131 | 0.106 | −0.003 |
| | (1.29) | (0.55) | (1.31) | (−0.37) |
| *RC* | −0.477*** | 0.055 | −0.407*** | 0.004* |
| | (−5.71) | (0.55) | (−14.33) | (1.96) |
| *INVLIFE* | 1.110*** | 0.706*** | 0.484*** | 0.002 |
| | (6.38) | (4.36) | (7.96) | (0.33) |
| *FIRMAGE* | −0.029 | −0.027 | 0.015 | −0.002 |
| | (−0.68) | (−0.60) | (1.14) | (−0.94) |
| Fixed effects | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 9,080 | 9,080 | 9,080 | 9,080 |
| Adjusted $R^2$ | 0.180 | 0.061 | 0.298 | 0.830 |

*Notes:* This table presents the results of estimating the impact of the 2018 tax rate increase on the investment behavior of firms with affected peers, based on Eq. (4). The dependent variables are Total Investment (*TOTALINV*) in column (1), Net Investment (*NETINV*) in column (2), Replacement Investment (*REPLACEINV*) in column (3), and R&D Investment (*RDINV*) in column (4). All models include firm- and year-fixed effects. The variable of interest, *TREAT_PEER×POST*, represents the interaction between firms with affected peers and the post-tax reform period. Standard errors are clustered at the firm level to account for potential within-firm correlations (Petersen 2009). *t*-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). For detailed definitions of all variables, refer to the Appendix.

## TABLE 4 Cross-Sectional Tests

| Dep. Variable = | Net Investment (*NETINV*) | R&D Investment (*RDINV*) | Net Investment (*NETINV*) | R&D Investment (*RDINV*) |
|---|---|---|---|---|
| *CSVAR* = | Financial Constraints (*KZINDEX*) | | Industry Competition (*INVHHI*) | |
| | (1) | (2) | (3) | (4) |
| ***TREAT_PEER×POST*** | **0.082*** ** | **−0.002*** | **0.023** | **−0.001** |
| | **(3.65)** | **(−1.91)** | **(1.22)** | **(−1.46)** |
| ***TREAT_PEER×POST×HIGHCSVAR*** | **−0.082*** ** | **−0.000** | **0.051*** | **−0.002*** |
| | **(−3.45)** | **(−0.45)** | **(1.95)** | **(−1.94)** |
| *HIGHCSVAR* | −0.075*** | 0.001* | −0.061 | 0.003 |
| | (−3.82) | (1.71) | (−0.72) | (1.64) |
| *SIZE* | −0.162*** | −0.011*** | −0.150*** | −0.011*** |
| | (−3.95) | (−7.79) | (−3.65) | (−7.76) |
| *LEV* | −0.050 | −0.002 | −0.091 | −0.001 |
| | (−0.53) | (−0.60) | (−0.97) | (−0.40) |
| *MTB* | 0.000 | 0.001*** | −0.001 | 0.001*** |
| | (0.06) | (2.61) | (−0.21) | (2.63) |
| *CASH* | 0.361*** | 0.001 | 0.415*** | 0.000 |
| | (4.21) | (0.34) | (4.86) | (0.12) |
| *ROA* | 0.460*** | 0.011* | 0.545*** | 0.009 |
| | (3.12) | (1.78) | (3.67) | (1.53) |
| *CFO* | −0.198** | −0.001 | −0.194** | −0.001 |
| | (−2.08) | (−0.25) | (−2.07) | (−0.24) |
| *LOSS* | −0.015 | −0.000 | −0.018 | −0.000 |
| | (−0.83) | (−0.50) | (−0.96) | (−0.50) |
| *SALESGROWTH* | 0.017 | −0.001 | 0.014 | −0.001 |
| | (0.80) | (−0.71) | (0.68) | (−0.74) |
| *DIVIDEND* | 0.010 | 0.002*** | 0.036** | 0.002** |
| | (0.55) | (2.91) | (2.23) | (2.57) |
| *KZINDEX* | N/A | N/A | −0.485 | −0.003 |
| | | | (−1.34) | (−0.60) |
| *INVHHI* | 0.173 | −0.003 | N/A | N/A |
| | (0.73) | (−0.34) | | |
| *RC* | 0.059 | 0.004* | 0.056 | 0.004* |
| | (0.60) | (1.88) | (0.57) | (1.90) |
| *INVLIFE* | 0.740*** | 0.003 | 0.707*** | 0.002 |
| | (4.70) | (0.58) | (4.36) | (0.33) |
| *FIRMAGE* | −0.034 | −0.002 | −0.026 | −0.002 |
| | (−0.80) | (−0.98) | (−0.59) | (−0.94) |
| Test of *TREAT_PEER×POST* + *TREAT_PEER×POST×HIGHCSVAR* = 0 | | | | |
| F-statistics | 0.00 | 6.93*** | 8.62*** | 9.11*** |
| (p-value) | (0.997) | (0.009) | (0.003) | (0.003) |
| Fixed effects | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 9,080 | 9,080 | 9,080 | 9,080 |
| Adjusted $R^2$ | 0.064 | 0.830 | 0.061 | 0.831 |

*Notes:* This table reports the results of cross-sectional tests examining the effects of the 2018 tax rate increase on the investment behavior of firms with affected peers, using net investment (*NETINV*) and R&D investment (*RDINV*) as dependent variables. Columns (1) and (2) focus on financial constraints, where the interaction term *TREAT_PEER×POST×HIGHCSVAR* captures the differential impact on financially constrained firms, as measured by the *KZINDEX*. Columns (3) and (4) examine the role of industry competition, with *INVHHI* indicating the degree

of competition within each industry. Firm- and year-fixed effects are included in all models, and standard errors are clustered at the firm level. The F-statistics test the joint significance of *TREAT_PEER×POST* and *TREAT_PEER×POST×HIGHCSVAR*, with p-values reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). For detailed definitions of all variables, refer to the Appendix.

## TABLE 5 Economic Consequences of the Corporate Tax Rate Increase

| Dep. Variable = | Changes in Sale ($\Delta SALE_{t+1}$) | Changes in Market Share ($\Delta MSHARE_{t+1}$) | Changes in Profitability ($\Delta ROA_{t+1}$) | Changes in Profitability adjusted for R&D expense ($\Delta ROARD_{t+1}$) |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| ***TREAT_PEER×POST*** | **0.023**** | **0.000**** | **0.007***** | **0.005*** |
| | **(2.31)** | **(1.98)** | **(2.61)** | **(1.69)** |
| *SIZE* | 0.003 | −0.002*** | −0.022*** | −0.018*** |
| | (0.15) | (−6.96) | (−4.77) | (−3.89) |
| *LEV* | 0.106** | 0.000 | −0.000 | −0.003 |
| | (2.38) | (0.29) | (−0.03) | (−0.21) |
| *MTB* | −0.015*** | −0.000*** | 0.001 | 0.001 |
| | (−4.60) | (−2.62) | (0.67) | (0.53) |
| *CASH* | −0.051 | −0.001 | 0.006 | −0.002 |
| | (−1.03) | (−0.98) | (0.41) | (−0.14) |
| *ROA* | −1.144*** | −0.004*** | −0.819*** | −0.797*** |
| | (−13.23) | (−2.69) | (−28.88) | (−28.80) |
| *CFO* | 0.090* | 0.001 | 0.005 | 0.013 |
| | (1.76) | (1.40) | (0.39) | (0.95) |
| *LOSS* | −0.021** | −0.000 | 0.007*** | 0.004 |
| | (−2.16) | (−0.27) | (3.07) | (1.60) |
| *SALESGROWTH* | −0.074*** | −0.001*** | 0.006** | 0.002 |
| | (−7.15) | (−2.77) | (2.09) | (0.67) |
| *DIVIDEND* | −0.041*** | −0.000 | −0.004* | −0.006** |
| | (−4.14) | (−0.43) | (−1.83) | (−2.35) |
| *KZINDEX* | −0.016 | −0.001 | 0.011 | 0.000 |
| | (−0.25) | (−1.01) | (0.82) | (0.49) |
| *HHI* | −0.205* | 0.020** | −0.052* | −0.055* |
| | (−1.66) | (2.43) | (−1.88) | (−1.78) |
| *RC* | 0.026 | 0.000 | 0.014** | 0.007 |
| | (0.83) | (0.35) | (1.98) | (0.96) |
| *INVLIFE* | −0.050 | −0.001 | 0.013 | 0.017 |
| | (−0.73) | (−1.37) | (0.62) | (0.81) |
| *AGE* | 0.041* | −0.000 | 0.012* | 0.012* |
| | (1.78) | (−0.42) | (1.74) | (1.70) |
| $\Delta PERFORMANCE_t$ | −0.377*** | −0.804*** | −0.724*** | −0.693*** |
| | (−22.24) | (−3.91) | (−33.84) | (−35.49) |
| Fixed effects | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 9,080 | 9,080 | 9,080 | 9,080 |
| Adjusted $R^2$ | 0.129 | 0.082 | 0.305 | 0.288 |

*Notes*: This table presents the results of estimating the effect of the 2018 tax rate increase on the performance of firms with affected peers, using Eq. (6). The dependent variables are changes in sales ($\Delta SALE_{t+1}$) in column (1), changes in market share ($\Delta MSHARE_{t+1}$) in column (2), changes in profitability ($\Delta ROA_{t+1}$) in column (3), and changes in profitability adjusted for R&D expenses ($\Delta ROARD_{t+1}$) in column (4). The key explanatory variable, *TREAT_PEER×POST*, captures the effect of the tax reform on the performance of firms with affected peers after the tax increase. Firm- and year-fixed effects are included in all models, and standard errors are clustered at the firm level. *t*-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). Definitions of all variables are provided in the Appendix.

## TABLE 6 The Investment Responses of Affected Firms

### Panel A. Univariate Comparison

| | Net Investment (*NETINV*) | | | R&D Investment (*RDINV*) | | |
|---|---|---|---|---|---|---|
| | Pre-period | Post-period | Diff. (p-value) | Pre-period | Post-period | Diff. (p-value) |
| (1) Affected firms (*TREAT* =1) | 0.095 | 0.058 | −0.037 (0.156) | 0.022 | 0.024 | 0.002 (0.752) |
| (2) Firms with affected peers (*TREAT_PEER* =1) | 0.069 | 0.119 | 0.050*** (<0.01) | 0.022 | 0.019 | −0.003*** (<0.01) |
| (3) Firms without affected peers | 0.106 | 0.105 | −0.001 (0.892) | 0.026 | 0.025 | −0.001 (0.417) |
| Diff. (1) − (2) (p-value) | 0.026 (0.249) | −0.062*** (<0.01) | −0.088 (0.239) | 0.000 (0.938) | 0.005 (0.240) | 0.005 (0.423) |
| Diff. (1) − (3) (p-value) | −0.011 (0.612) | −0.047*** (<0.01) | 0.036 (0.578) | −0.004 (0.336) | −0.001 (0.803) | −0.003 (0.658) |
| Diff. (2) − (3) (p-value) | −0.037*** (<0.01) | 0.014 (0.271) | −0.051*** (<0.01) | −0.004*** (<0.01) | −0.006*** (<0.01) | 0.002 (0.215) |

### Panel B. Regression Analysis

| Sample = | Affected firms and Control #1 | | Affected firms and Control #2 | | Affected firms and Control #3 | | Affected firms and Control #1 | |
|---|---|---|---|---|---|---|---|---|
| Dep. Variable = | Net Investment (*NETINV*) | R&D Investment (*RDINV*) | Net Investment (*NETINV*) | R&D Investment (*RDINV*) | Net Investment (*NETINV*) | R&D Investment (*RDINV*) | Net Investment (*NETINV*) | R&D Investment (*RDINV*) |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ***TREAT×POST*** | **−0.095*** ** | **0.001** | **−0.115*** ** | **0.001** | **−0.056** | **0.000** | **−0.068** ** | **−0.000** |
| | **(−2.91)** | **(0.42)** | **(−3.37)** | **(0.59)** | **(−1.59)** | **(0.10)** | **(−2.00)** | **(−0.24)** |
| ***TREAT_PEER×POST*** | | | | | | | **0.044** ** | **−0.002** ** |
| | | | | | | | **(2.55)** | **(−2.55)** |
| *SIZE* | −0.141*** | −0.011*** | −0.200*** | −0.010*** | −0.038 | −0.012*** | −0.139*** | −0.011*** |
| | (−3.52) | (−7.82) | (−3.76) | (−6.09) | (−0.67) | (−5.21) | (−3.47) | (−7.91) |
| *LEV* | −0.105 | −0.002 | −0.217* | 0.002 | 0.013 | −0.005 | −0.107 | −0.001 |
| | (−1.12) | (−0.47) | (−1.87) | (0.38) | (0.09) | (−1.01) | (−1.14) | (−0.44) |
| *MTB* | −0.001 | 0.001*** | 0.002 | 0.000 | −0.003 | 0.001** | −0.001 | 0.001*** |
| | (−0.17) | (2.73) | (0.18) | (1.36) | (−0.35) | (2.53) | (−0.13) | (2.69) |
| *CASH* | 0.414*** | −0.005 | 0.290** | −0.011* | 0.594*** | 0.005 | 0.419*** | −0.006 |
| | (3.87) | (−1.13) | (1.96) | (−1.67) | (4.02) | (0.82) | (3.91) | (−1.18) |
| *ROA* | 0.552*** | 0.009 | 0.442** | 0.009 | 0.682*** | 0.010 | 0.550*** | 0.009 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (3.74) | (1.55) | (2.06) | (1.15) | (3.93) | (1.12) | (3.75) | (1.56) |
| *CFO* | −0.179* | 0.000 | −0.154 | 0.005 | −0.226* | −0.007 | −0.176* | 0.000 |
| | (−1.95) | (0.13) | (−1.26) | (1.23) | (−1.80) | (−1.39) | (−1.92) | (0.09) |
| *LOSS* | −0.016 | −0.000 | −0.046* | −0.001 | 0.021 | 0.000 | −0.016 | −0.000 |
| | (−0.86) | (−0.42) | (−1.84) | (−0.73) | (0.83) | (0.34) | (−0.85) | (−0.43) |
| *SALESGROWTH* | 0.011 | −0.001 | 0.003 | 0.000 | 0.023 | −0.002 | 0.011 | −0.001 |
| | (0.53) | (−0.77) | (0.12) | (0.15) | (0.70) | (−1.29) | (0.53) | (−0.77) |
| *DIVIDEND* | 0.037** | 0.002** | 0.041* | 0.002** | 0.026 | 0.001 | 0.036** | 0.002** |
| | (2.23) | (2.52) | (1.81) | (2.50) | (1.22) | (0.72) | (2.23) | (2.54) |
| *KZINDEX* | −0.473 | −0.004 | −0.752* | −0.000 | 0.445 | −0.017 | −0.465 | −0.005 |
| | (−1.33) | (−0.75) | (−1.81) | (−0.04) | (0.96) | (−0.98) | (−1.31) | (−0.81) |
| *HHI* | 0.002 | 0.003 | −0.201 | 0.010 | 0.352 | −0.008 | 0.117 | −0.002 |
| | (0.01) | (0.32) | (−0.42) | (0.76) | (1.56) | (−0.79) | (0.50) | (−0.29) |
| *RC* | 0.044 | 0.004* | 0.183 | 0.004 | −0.204 | 0.004 | 0.048 | 0.004* |
| | (0.45) | (1.87) | (1.49) | (1.58) | (−1.33) | (1.00) | (0.49) | (1.79) |
| *INVLIFE* | 0.717*** | 0.001 | 0.733*** | −0.000 | 0.737** | 0.006 | 0.713*** | 0.001 |
| | (4.38) | (0.21) | (3.75) | (−0.05) | (2.55) | (0.64) | (4.36) | (0.25) |
| *AGE* | −0.045 | −0.003 | −0.011 | −0.007** | −0.083 | 0.003 | −0.040 | −0.003 |
| | (−1.01) | (−1.10) | (−0.18) | (−2.42) | (−1.35) | (0.71) | (−0.91) | (−1.19) |
| Fixed effects | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 9,227 | 9,227 | 5,561 | 5,561 | 3,813 | 3,813 | 9,227 | 9,227 |
| Adjusted $R^2$ | 0.057 | 0.830 | 0.053 | 0.833 | 0.084 | 0.824 | 0.058 | 0.830 |

*Notes:* This table presents a univariate comparison and regression analysis that examines the investment responses of affected firms and their industry peers following the 2018 tax rate increase. In Panel A, we provide a univariate comparison of net investment (*NETINV*) and R&D investment (*RDINV*) across three groups: affected firms (*TREAT* = 1), firms with affected peers (*TREAT_PEER* = 1), and firms without affected peers. Differences between the pre- and post-tax reform periods are reported, along with p-values to indicate statistical significance. The differences between these groups are also tested, with corresponding p-values reported in parentheses. Panel B presents the results of the regression analysis, where the dependent variables are *NETINV* and *RDINV* across four samples: (1) affected firms compared with Control #1 (firms in industries with and without affected peers), (2) affected firms compared with Control #2 (firms in industries with affected peers only), (3) affected firms compared with Control #3 (firms without affected peers only), and (4) all firms. Firm- and year-fixed effects are included in all models, and standard errors are clustered at the firm level. *t*-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). Definitions of all variables are provided in the Appendix.

## TABLE 7 Dynamic Analysis

| Dep. Variable = | Net Investment (*NETINV*) | Net Investment (*NETINV*) | R&D Investment (*RDINV*) | R&D Investment (*RDINV*) |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *TREAT_PEER×YEAR2015* | 0.005 | 0.011 | 0.000 | 0.001 |
| | (0.18) | (0.43) | (0.20) | (0.79) |
| *TREAT_PEER×YEAR2016* | 0.034 | 0.035 | 0.000 | 0.000 |
| | (1.31) | (1.37) | (0.17) | (0.47) |
| ***TREAT_PEER×YEAR2018*** | **0.050*** | **0.054**** | **−0.000** | **−0.000** |
| | **(1.82)** | **(2.03)** | **(−0.30)** | **(−0.47)** |
| ***TREAT_PEER×YEAR2019*** | **0.087**** | **0.080**** | **−0.001** | **−0.002*** |
| | **(2.32)** | **(2.18)** | **(−1.27)** | **(−1.69)** |
| ***TREAT_PEER×YEAR2020*** | **0.059**** | **0.038** | **−0.003**** | **−0.003***** |
| | **(2.07)** | **(1.39)** | **(−2.21)** | **(−2.59)** |
| *SIZE* | | −0.148*** | | −0.011*** |
| | | (−3.62) | | (−7.83) |
| *LEV* | | −0.089 | | −0.001 |
| | | (−0.95) | | (−0.41) |
| *MTB* | | −0.002 | | 0.001*** |
| | | (−0.24) | | (2.69) |
| *CASH* | | 0.417*** | | 0.000 |
| | | (4.90) | | (0.08) |
| *ROA* | | 0.536*** | | 0.010 |
| | | (3.60) | | (1.63) |
| *CFO* | | −0.195** | | −0.001 |
| | | (−2.08) | | (−0.23) |
| *LOSS* | | −0.018 | | −0.000 |
| | | (−1.00) | | (−0.43) |
| *SALESGROWTH* | | 0.015 | | −0.001 |
| | | (0.69) | | (−0.72) |
| *DIVIDEND* | | 0.037** | | 0.002** |
| | | (2.27) | | (2.54) |
| *KZINDEX* | | −0.482 | | −0.004 |
| | | (−1.33) | | (−0.62) |
| *HHI* | | 0.142 | | −0.002 |
| | | (0.60) | | (−0.26) |
| *RC* | | 0.053 | | 0.004* |
| | | (0.54) | | (1.93) |
| *INVLIFE* | | 0.712*** | | 0.002 |
| | | (4.41) | | (0.39) |
| *AGE* | | −0.028 | | −0.002 |
| | | (−0.63) | | (−0.97) |
| Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 9,080 | 9,080 | 9,080 | 9,080 |
| Adjusted $R^2$ | 0.029 | 0.060 | 0.824 | 0.830 |

*Notes:* This table presents the dynamic analysis of investment behavior among firms with affected peers over different years surrounding the 2018 tax rate increase. The dependent variables are net investment (*NETINV*) in columns (1) and (2), and R&D investment (*RDINV*) in columns (3) and (4). The key independent variables are interaction terms between *TREAT_PEER* and year indicators (i.e., *YEAR2015*, *YEAR2016*, *YEAR2018*, *YEAR2019*, and *YEAR2020*), capturing year-specific changes in investment behavior for firms with affected peers. Firm- and year-fixed effects are

included in all models, and standard errors are clustered at the firm level. The variable *TREAT_PEER×YEAR2018* and subsequent year interactions capture investment responses following the tax reform, indicating whether firms adjusted their strategies in specific post-reform years. *t*-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). Definitions of all variables are provided in the Appendix.

## TABLE 8 Entropy Balanced Sample Analysis

### Panel A. Covariate Balance Statistics before and after Entropy Balancing

| | Before Balancing | | | | | | After Balancing | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Firms with affected peers | | Firms without affected peers | | Balance Stats | | Firms without affected peers | | Balance Stats | |
| | Mean | Variance | Mean | Variance | Std. Diff. | Var Ratio | Mean | Variance | Std. Diff. | Var Ratio |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| *SIZE* | 19.000 | 1.414 | 18.865 | 1.368 | 0.113 | 1.034 | 18.999 | 1.414 | 0.000 | 1.000 |
| *LEV* | 0.084 | 0.011 | 0.088 | 0.012 | −0.031 | 0.867 | 0.084 | 0.011 | 0.000 | 1.000 |
| *MTB* | 1.603 | 2.368 | 1.950 | 3.766 | −0.225 | 0.629 | 1.603 | 2.370 | 0.000 | 0.999 |
| *CASH* | 0.143 | 0.022 | 0.148 | 0.022 | −0.034 | 1.019 | 0.143 | 0.022 | 0.000 | 1.000 |
| *ROA* | 0.026 | 0.005 | 0.036 | 0.007 | −0.130 | 0.742 | 0.026 | 0.005 | 0.000 | 1.000 |
| *CFO* | 0.037 | 0.007 | 0.045 | 0.009 | −0.096 | 0.823 | 0.037 | 0.007 | 0.000 | 1.000 |
| *LOSS* | 0.240 | 0.182 | 0.227 | 0.175 | 0.031 | 1.040 | 0.240 | 0.182 | 0.000 | 1.000 |
| *SALESGROWTH* | 0.049 | 0.095 | 0.069 | 0.126 | −0.066 | 0.758 | 0.049 | 0.095 | 0.000 | 1.000 |
| *DIVIDEND* | 0.556 | 0.247 | 0.533 | 0.249 | 0.048 | 0.992 | 0.556 | 0.247 | 0.000 | 1.000 |
| *KZINDEX* | 0.977 | 0.009 | 0.988 | 0.002 | −0.115 | 3.566 | 0.977 | 0.009 | 0.000 | 1.000 |
| *HHI* | −0.180 | 0.011 | −0.133 | 0.011 | −0.449 | 1.047 | −0.180 | 0.011 | 0.000 | 1.000 |
| *RC* | 0.572 | 0.053 | 0.626 | 0.045 | −0.235 | 1.190 | 0.572 | 0.053 | 0.000 | 1.000 |
| *INVLIFE* | 0.082 | 0.009 | 0.069 | 0.004 | 0.140 | 2.656 | 0.082 | 0.009 | 0.000 | 1.000 |
| *AGE* | 2.768 | 0.441 | 2.571 | 0.566 | 0.297 | 0.779 | 2.768 | 0.441 | 0.000 | 1.000 |

### Panel B. Regression Analysis

| Dep. Variable = | Net Investment (*NETINV*) | R&D Investment (*RDINV*) |
|---|---|---|
| | (1) | (2) |
| ***TREAT_PEER×POST*** | **0.048**** | **−0.002**** |
| | **(2.37)** | **(−2.25)** |
| Other Controls | Included | Included |
| Fixed effects | Firm, Year | Firm Year |
| Observations | 9,080 | 9,080 |
| Adjusted $R^2$ | 0.088 | 0.837 |

*Notes:* This table presents the results of the entropy−balanced sample analysis. Panel A provides covariate balance statistics before and after entropy balancing for firms with affected peers (treated group) and firms without affected peers (control group). Columns (5) and (6) show standardized differences (Std. Diff.) and variance ratios (Var Ratio) before balancing, assessing the alignment of the covariates across the two groups. Columns (9) and (10) show these statistics after

balancing. Standardized differences evaluate the alignment of means (first moment), while variance ratios assess the alignment of variances (second moment). Following Rubin (2001), covariates are considered balanced if standardized differences are within ±0.1 and variance ratios are between 4/5 and 5/4. Panel B presents the regression results examining the impact of the corporate tax rate increase on firms with affected peers' net investment (*NETINV*) and R&D investment (*RDINV*). The coefficient on *TREAT_PEER×POST* captures the differential effect of the post−tax reform period on firms with affected peers relative to those without affected peers. Both models include firm- and year-fixed effects, and other control variables but are omitted from the table for brevity. Standard errors are clustered at the firm level, with *t*-statistics reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). Definitions of all variables are provided in the Appendix.

## TABLE 9 Robustness Tests

### Panel A. Falsification Test using Pseudo Event Year

| Dep. Variable = | Net Investment (*NETINV*) | Net Investment (*NETINV*) | R&D Investment (*RDINV*) | R&D Investment (*RDINV*) |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| ***TREAT_PEER×POST2014*** | **0.023** | **0.014** | **0.001** | **0.000** |
| | **(1.45)** | **(0.95)** | **(0.86)** | **(0.36)** |
| Other Controls | Not included | Included | Not included | Included |
| Fixed effects | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 7,854 | 7,854 | 7,854 | 7,854 |
| Adjusted $R^2$ | 0.004 | 0.090 | 0.825 | 0.829 |

### Panel B. Alternative Responses

| Dep. Variable = | Advertising (*ADV*) | Employee Wage (*WAGE*) |
|---|---|---|
| | (1) | (2) |
| ***TREAT_PEER×POST*** | **0.000** | **−0.002** |
| | **(0.26)** | **(−1.21)** |
| Other Controls | Included | Included |
| Fixed effects | Firm, Year | Firm, Year |
| Observations | 9,080 | 9,037 |
| Adjusted $R^2$ | 0.825 | 0.885 |

### Panel C. Alternative Sample Period

| Sample = | [−2, +2] Sample | | Exclude Years 2017 and 2018 | |
|---|---|---|---|---|
| Dep. Variable = | Net Investment (*NETINV*) | R&D Investment (*RDINV*) | Net Investment (*NETINV*) | R&D Investment (*RDINV*) |
| | (1) | (2) | (3) | (4) |
| ***TREAT_PEER×POST*** | **0.060*** ** | **−0.001*** | **0.039*** | **−0.003*** ** |
| | **(2.72)** | **(−1.74)** | **(1.78)** | **(−2.61)** |
| Other Controls | Included | Included | Included | Included |
| Fixed effects | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 6,169 | 6,169 | 5,939 | 5,939 |
| Adjusted $R^2$ | 0.071 | 0.864 | 0.068 | 0.805 |

*Notes:* This table presents the results of robustness tests. Panel A reports the results of a falsification test using a pseudo−event year (2014) to determine whether the estimated effects of the corporate tax rate increase are influenced by random timing or unobserved factors. Columns (1) and (3) present results without control variables, while columns (2) and (4) include all control variables. Panel B explores alternative firm responses, using advertising expenses (*ADV*) and employee wages (*WAGE*) as dependent variables. Panel C assesses the robustness of the main findings by employing alternative sample periods. Columns (1) and (2) restrict the sample to two years before and after the tax reform, while columns (3) and (4) exclude the years 2017 and 2018 to reduce potential confounding effects. All models include firm- and year-fixed effects. Standard errors are clustered at the firm level, with *t*-statistics reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). Definitions of all variables are provided in the Appendix.

Online Appendix to

# Tax-Induced Changes in Competitive Dynamics: Firms' Strategic Responses to Peers' Tax Rate Increases

This document supplements "*Tax-Induced Changes in Competitive Dynamics: Firms' Strategic Responses to Peers' Tax Rate Increases* (2024)" and is not intended for publication.

## OA 1. Cross-Sectional Tests using Total Investment and Replacement Investment as the Dependent Variables

Table A1 presents the results of re-estimating the cross-sectional analyses reported in Table 4 of the manuscript using total investment (*TOTALINV*) and replacement investment (*REPLACEINV*) as the dependent variables. In column (1), the coefficient on *TREAT_PEER* × *POST* is positive and significant, while the coefficient on *TREAT_PEER* × *POST* × *HIGHCSVAR* is negative and significant. The sum of these two coefficients is not statistically different from zero, as indicated at the bottom of the table. These findings suggest that while financially unconstrained firms increase their total investment, financially constrained firms do not significantly change their total investment. However, when replacement investment is used as the dependent variable in column (2), the coefficients on both *TREAT_PEER* × *POST* and *TREAT_PEER* × *POST* × *HIGHCSVAR* are not significant.

In column (3), while the coefficient on *TREAT_PEER* × *POST* is positive but insignificant, the coefficient on *TREAT_PEER* × *POST* × *HIGHCSVAR* (0.047, $t$ = 1.94) is positive and significant. The sum of these two coefficients is statistically significant, as shown at the bottom of the table. These findings indicate that firms operating in more competitive industries increase their total investment, whereas those in less competitive industries do not exhibit significant changes in total investment. In column (4), when the dependent variable is replacement investment, these coefficients are insignificant, suggesting that competitive pressures do not influence this component of investment. Overall, the results based on total investment are consistent with those based on net investment presented in Table 4 of the manuscript.

## TABLE A1. Cross-Sectional Tests using Total Investment and Replacement Investment

| Dep. Variable = | Total Investment (*TOTALINV*) | Replacement Investment (*REPLACEINV*) | Total Investment (*TOTALINV*) | Replacement Investment (*REPLACEINV*) |
|---|---|---|---|---|
| *CSVAR* = | Financial Constraints (*KZINDEX*) | | Industry Competition (*INVHHI*) | |
| | (1) | (2) | (3) | (4) |
| ***TREAT_PEER×POST*** | **0.080*** ** | **0.006** | **0.013** | **−0.003** |
| | **(3.81)** | **(0.75)** | **(0.74)** | **(−0.39)** |
| ***TREAT_PEER×POST×HIGHCSVAR*** | **−0.094*** ** | **0.007** | **0.047*** | **0.000** |
| | **(−4.36)** | **(1.08)** | **(1.94)** | **(0.01)** |
| *HIGHCSVAR* | −0.065*** | −0.013 | 0.031 | 0.061** |
| | (−3.58) | (−1.49) | (0.35) | (2.35) |
| *SIZE* | −0.101*** | 0.048*** | −0.086** | 0.051*** |
| | (−2.59) | (4.05) | (−2.20) | (4.37) |
| *LEV* | −0.031 | 0.012 | −0.066 | 0.015 |
| | (−0.37) | (0.41) | (−0.78) | (0.56) |
| *MTB* | 0.001 | −0.001 | −0.001 | −0.001 |
| | (0.15) | (−0.46) | (−0.10) | (−0.37) |
| *CASH* | 0.281*** | −0.009 | 0.328*** | −0.014 |
| | (3.33) | (−0.32) | (3.87) | (−0.48) |
| *ROA* | 0.352** | −0.067 | 0.423*** | −0.075 |
| | (2.57) | (−1.21) | (3.08) | (−1.34) |
| *CFO* | −0.148* | −0.001 | −0.143 | 0.000 |
| | (−1.65) | (−0.03) | (−1.63) | (0.00) |
| *LOSS* | −0.015 | −0.001 | −0.016 | −0.000 |
| | (−0.90) | (−0.18) | (−0.97) | (−0.06) |
| *SALESGROWTH* | 0.016 | −0.003 | 0.010 | −0.005 |
| | (0.76) | (−0.42) | (0.49) | (−0.77) |
| *DIVIDEND* | 0.007 | −0.004 | 0.026* | −0.009 |
| | (0.40) | (−0.78) | (1.73) | (−1.63) |
| *KZINDEX* | 0.331 | 0.114 | −0.931** | −0.313*** |
| | (1.50) | (1.44) | (−2.44) | (−2.65) |
| *INVHHI* | −0.476*** | −0.410*** | −0.480*** | −0.411*** |
| | (−5.80) | (−14.30) | (−5.72) | (−14.42) |
| *RC* | 1.223*** | 0.538*** | 1.115*** | 0.487*** |
| | (7.56) | (9.07) | (6.44) | (8.09) |
| *INVLIFE* | −0.042 | 0.011 | −0.026 | 0.017 |
| | (−1.01) | (0.84) | (−0.61) | (1.28) |
| *FIRMAGE* | −0.101*** | 0.048*** | −0.086** | 0.051*** |
| | (−2.59) | (4.05) | (−2.20) | (4.37) |
| Test of *TREAT_PEER×POST* + *TREAT_PEER×POST×HIGHCSVAR* = 0 | | | | |
| F-statistics | 0.63 | 0.95 | 6.61** | 0.08 |
| (p-value) | (0.429) | (0.329) | (0.010) | (0.772) |
| Fixed effects | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 9,080 | 9,080 | 9,080 | 9,080 |
| Adjusted $R^2$ | 0.178 | 0.292 | 0.181 | 0.299 |

*Notes:* This table presents the results of re-estimating the cross-sectional analyses reported in Table 4 of the manuscript using total investment (*TOTALINV*) and replacement investment (*REPLACEINV*) as the dependent variables. In columns (1) and (2), the interaction term *TREAT_PEER* × *POST* × *HIGHCSVAR* measures the differential impact on investment behavior for firms with high financial constraints (where *HIGHCSVAR* = *KZINDEX*) compared to less

constrained firms. Columns (3) and (4) analyze the moderating role of industry competition, with *HIGHCSVAR* = *INVHHI*. The F-statistics are reported for the joint test of *TREAT_PEER* × *POST* + *TREAT_PEER* × *POST* × *HIGHCSVAR* = 0. All models include firm- and year-fixed effects to control for unobserved heterogeneity across firms and time. Standard errors are clustered at the firm level, and *t*-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). Definitions of all variables are provided in the Appendix.

**OA 2. Cross-Sectional Tests after Including Affected Firms**

Table A2 presents the results of cross-sectional analyses for the sample of affected firms (*TREAT*), indirectly affected firms (*TREAT_PEER*), and unaffected firms to examine how financial constraints (*KZINDEX*) and industry competition (*INVHHI*) affect the investment responses of affected firms and their industry peers. Net investment (*NETINV*) and R&D investment (*RDINV*) are used as the dependent variables.

For net investment in column (1), the coefficient on *TREAT* × *POST* is negative and significant, while the coefficient on *TREAT* × *POST* × *HIGHCSVAR* is positive but insignificant. This result suggests that financial constraints do not significantly influence the investment behavior of directly affected firms following the 2018 tax increase. In other words, both financially constrained and unconstrained firms reduce their net investment. In contrast, the coefficient on *TREAT_PEER* × *POST* is positive and significant, while the coefficient on *TREAT_PEER* × *POST* × *HIGHCSVAR* is significantly negative. These results indicate that while financially unconstrained peers significantly increase their net investment, peers facing financial constraints do not, likely due to limited financial flexibility.

In column (2), with R&D investment as the dependent variable, the coefficients on *TREAT* × *POST* and *TREAT* × *POST* × *HIGHCSVAR* are both insignificant, indicating that directly affected firms, regardless of their financial constraints, do not significantly alter their R&D expenditures following the 2018 tax increase. The results for firms indirectly affected are consistent with those reported in column (2) of Table 4 in the manuscript.

In column (3), the coefficient on *TREAT* × *POST* is negative and significant for net investment, while the coefficient on *TREAT* × *POST* × *HIGHCSVAR* is positive but statistically insignificant. This indicates that directly affected firms reduce their net investment regardless of

product market competition levels. However, peers of affected firms increase their net investment only when operating in more competitive industries, as indicated by the insignificant coefficient on *TREAT_PEER* × *POST* and the positive coefficient on *TREAT_PEER* × *POST* × *HIGHCSVAR*. For R&D investment, as shown in column (4), the coefficients on both *TREAT* × *POST* and *TREAT* × *POST* × *HIGHCSVAR* are insignificant, suggesting that industry competition does not influence the R&D investment of directly affected firms. Similar to the results reported in Table 4 of the manuscript, the negative coefficient on *TREAT_PEER* × *POST* × *HIGHCSVAR* suggests that peers in competitive industries reduce their R&D spending.

**TABLE A2. Cross-Sectional Tests after Including Affected Firms**

| Dep. Variable = | Net Investment (*NETINV*) | R&D Investment (*RDINV*) | Net Investment (*NETINV*) | R&D Investment (*RDINV*) |
|---|---|---|---|---|
| *CSVAR* = | Financial Constraints (*KZINDEX*) | | Industry Competition (*INVHHI*) | |
| | (1) | (2) | (3) | (4) |
| ***TREAT_POST*** | **−0.088**** | **0.000** | **−0.101**** | **−0.002** |
| | **(−2.02)** | **(0.20)** | **(−2.01)** | **(−0.53)** |
| ***TREAT_POST×HIGHCSVAR*** | **0.048** | **−0.003** | **0.074** | **0.003** |
| | **(1.05)** | **(−1.33)** | **(1.38)** | **(1.09)** |
| ***TREAT_PEER×POST*** | **0.082***** | **−0.002*** | **0.024** | **−0.001** |
| | **(3.67)** | **(−1.87)** | **(1.24)** | **(−1.44)** |
| ***TREAT_PEER×POST×HIGHCSVAR*** | **−0.082***** | **−0.000** | **0.051*** | **−0.002*** |
| | **(−3.46)** | **(−0.49)** | **(1.94)** | **(−1.95)** |
| *HIGHCSVAR* | −0.074*** | 0.001* | −0.060 | 0.003* |
| | (−3.82) | (1.78) | (−0.71) | (1.66) |
| *SIZE* | −0.158*** | −0.011*** | −0.146*** | −0.011*** |
| | (−3.91) | (−7.82) | (−3.62) | (−7.80) |
| *LEV* | −0.053 | −0.002 | −0.092 | −0.001 |
| | (−0.57) | (−0.59) | (−0.99) | (−0.37) |
| *MTB* | 0.000 | 0.001** | −0.001 | 0.001*** |
| | (0.06) | (2.57) | (−0.21) | (2.59) |
| *CASH* | 0.358*** | 0.001 | 0.413*** | 0.000 |
| | (4.21) | (0.25) | (4.87) | (0.02) |
| *ROA* | 0.456*** | 0.010* | 0.540*** | 0.009 |
| | (3.12) | (1.76) | (3.68) | (1.50) |
| *CFO* | −0.196** | −0.001 | −0.194** | −0.001 |
| | (−2.07) | (−0.28) | (−2.07) | (−0.27) |
| *LOSS* | −0.015 | −0.000 | −0.018 | −0.000 |
| | (−0.83) | (−0.51) | (−0.97) | (−0.50) |
| *SALESGROWTH* | 0.017 | −0.001 | 0.015 | −0.001 |
| | (0.80) | (−0.70) | (0.69) | (−0.73) |
| *DIVIDEND* | 0.011 | 0.002*** | 0.037** | 0.002** |

| | | | | |
|---|---|---|---|---|
| | (0.58) | (2.93) | (2.26) | (2.56) |
| *KZINDEX* | | | −0.468 | −0.004 |
| | | | (−1.32) | (−0.73) |
| *INVHHI* | 0.151 | −0.002 | | |
| | (0.64) | (−0.29) | | |
| *RC* | 0.060 | 0.004* | 0.057 | 0.004* |
| | (0.61) | (1.83) | (0.58) | (1.87) |
| *INVLIFE* | 0.740*** | 0.002 | 0.707*** | 0.001 |
| | (4.70) | (0.58) | (4.36) | (0.29) |
| *FIRMAGE* | −0.035 | −0.003 | −0.026 | −0.002 |
| | (−0.82) | (−1.09) | (−0.60) | (−1.04) |
| Test of *TREAT*×*POST* + *TREAT*×*POST*×*HIGHCSVAR* = 0 | | | | |
| F-statistics | 2.01 | 1.78 | 1.05 | 2.57 |
| (p-value) | (0.156) | (0.183) | (0.307) | (0.109) |
| Test of *TREAT_PEER*×*POST* + *TREAT_PEER*×*POST*×*HIGHCSVAR* = 0 | | | | |
| F-statistics | 0.00 | 6.86*** | 8.69*** | 9.04*** |
| (p-value) | (0.990) | (0.009) | (0.003) | (0.003) |
| Fixed effects | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 9,227 | 9,227 | 9,227 | 9,227 |
| Adjusted $R^2$ | 0.063 | 0.830 | 0.060 | 0.830 |

*Notes:* This table presents the results of cross-sectional analyses for the sample of affected firms (*TREAT*), indirectly affected firms (*TREAT_PEER*), and unaffected firms to examine how financial constraints (*KZINDEX*) and industry competition (*INVHHI*) affect the investment responses of affected firms and their industry peers. Net investment (*NETINV*) and R&D investment (*RDINV*) are used as the dependent variables. Columns (1) and (2) focus on financial constraints using the Kaplan-Zingales index (*KZINDEX*) as the cross-sectional variable, while columns (3) and (4) investigate the moderating role of industry competition, proxied by the inverse Herfindahl−Hirschman Index (*INVHHI*). The F-statistics are reported for the joint test of *TREAT*×*POST*+*TREAT_PEER*× *POST*×*HIGHCSVAR*=0 or *TREAT_PEER*×*POST*+*TREAT_PEER*×*POST*×*HIGHCSVAR*= 0. All models include firm- and year-fixed effects to control for unobserved heterogeneity across firms and time. Standard errors are clustered at the firm level, and *t*-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). Definitions of all variables are provided in the Appendix.

**OA 3. Economic Consequences of Tax Rate Increases After Including Affected Firms**

Table A3 presents regression results analyzing the impact of the corporate tax rate increase on firms' operating performance across four dimensions: changes in sales (*ΔSALE*), changes in market share (*ΔMSHARE*), changes in profitability (*ΔROA*), and changes in profitability adjusted for R&D expenses (*ΔROARD*). The table examines the differential effects of the tax increase on directly affected firms (*TREAT*) and their industry peers (*TREAT_PEER*).

***Sales Growth and Market Share***

In column (1), the coefficient on *TREAT* × *POST* is negative but statistically insignificant (−0.021, $t = -0.95$), suggesting that directly affected firms do not experience a substantial decline in sales growth following the tax increase. In contrast, the coefficient on *TREAT_PEER* × *POST* (0.022, $t = 2.29$) is positive and significant, indicating that industry peers benefit from the weakened positions of taxed competitors. In column (2), the negative coefficient on *TREAT* × *POST* (−0.004, $t = -1.79$) indicates that directly affected firms see a marginal but significant reduction in market share. The positive and significant coefficient on *TREAT_PEER* × *POST* (0.001, $t = 1.96$) suggests that their peers gain market share, consistent with the results reported in column (2) of Table 5 in the manuscript.

***Profitability***

In column (3), the coefficient on *TREAT* × *POST* is negative and statistically significant (−0.020, $t = -2.60$), suggesting that directly affected firms experience a decline in profitability following the tax increase. This decline is observed even after adjusting for R&D expenses, as shown in column (4) (−0.015, $t = -2.03$). On the other hand, the coefficients on *TREAT_PEER* × *POST* in both columns (3) and (4) are positive and significant (0.007, $t = 2.62$, and 0.005, $t = 1.69$,

respectively), implying that industry peers improve their profitability, consistent with findings reported in columns (3) and (4) of Table 5 in the manuscript.

**TABLE A3 Economic Consequences of Tax Rate Increase after Including Affected Firms**

| Dep. Variable = | Changes in Sale ($\Delta SALE_{t+1}$) | Changes in Market Share ($\Delta MSHARE_{t+1}$) | Changes in Profitability ($\Delta ROA_{t+1}$) | Changes in Profitability adjusted for R&D expense ($\Delta ROARD_{t+1}$) |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| ***TREAT×POST*** | **−0.021** | **−0.004*** | **−0.020***** | **−0.015**** |
| | **(−0.95)** | **(−1.79)** | **(−2.60)** | **(−2.03)** |
| ***TREAT_PEER×POST*** | **0.022**** | **0.001*** | **0.007***** | **0.005*** |
| | **(2.29)** | **(1.96)** | **(2.62)** | **(1.69)** |
| *SIZE* | 0.002 | −0.002*** | −0.021*** | −0.017*** |
| | (0.13) | (−6.95) | (−4.83) | (−3.91) |
| *LEV* | 0.110** | 0.001 | −0.000 | −0.003 |
| | (2.48) | (0.67) | (−0.04) | (−0.24) |
| *MTB* | −0.015*** | −0.000*** | 0.001 | 0.000 |
| | (−4.68) | (−2.65) | (0.58) | (0.45) |
| *CASH* | −0.052 | −0.001 | 0.006 | −0.002 |
| | (−1.07) | (−0.81) | (0.42) | (−0.12) |
| *ROA* | −1.140*** | −0.005*** | −0.819*** | −0.800*** |
| | (−13.32) | (−2.84) | (−29.03) | (−29.07) |
| *CFO* | 0.097* | 0.001 | 0.004 | 0.012 |
| | (1.90) | (1.34) | (0.35) | (0.92) |
| *LOSS* | −0.021** | −0.000 | 0.007*** | 0.004 |
| | (−2.13) | (−0.57) | (2.93) | (1.48) |
| *SALESGROWTH* | −0.075*** | −0.001*** | 0.006** | 0.002 |
| | (−7.25) | (−2.95) | (2.10) | (0.68) |
| *DIVIDEND* | −0.041*** | −0.000 | −0.004* | −0.005** |
| | (−4.19) | (−0.53) | (−1.68) | (−2.26) |
| *KZINDEX* | −0.018 | −0.001 | 0.010 | 0.000 |
| | (−0.29) | (−1.01) | (0.74) | (0.36) |
| *HHI* | −0.194 | 0.018** | −0.052* | −0.057* |
| | (−1.59) | (2.21) | (−1.91) | (−1.89) |
| *RC* | 0.023 | 0.000 | 0.014* | 0.006 |
| | (0.77) | (0.33) | (1.92) | (0.89) |
| *INVLIFE* | −0.051 | −0.001 | 0.012 | 0.017 |
| | (−0.74) | (−1.43) | (0.59) | (0.79) |
| *AGE* | 0.039* | −0.000 | 0.012* | 0.012* |
| | (1.71) | (−0.27) | (1.76) | (1.71) |
| $\Delta PERFORMANCE_t$ | −0.377*** | −0.635*** | −0.721*** | −0.693*** |
| | (−22.31) | (−3.74) | (−33.75) | (−35.82) |
| Fixed effects | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 9,227 | 9,227 | 9,227 | 9,227 |
| Adjusted $R^2$ | 0.129 | 0.073 | 0.304 | 0.288 |

*Notes:* This table presents the results of regressions examining the effect of the corporate tax rate increase on various measures of operating performance: changes in sales (*ΔSALE*), changes in market share (*ΔMSHARE*), changes in profitability (*ΔROA*), and changes in profitability adjusted for R&D expense (*ΔROARD*). The table provides insights

into the differential impact on directly affected firms and their industry peers following the tax reform. All models include firm- and year-fixed effects to control for unobserved heterogeneity across firms and time. Standard errors are clustered at the firm level, and *t*-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). Definitions of all variables are provided in the Appendix.

**OA 4. Replication of TABLE 6 using Total Investment and Replacement Investment as the Dependent Variables**

This section provides additional analyses replicating Table 6, using total investment (*TOTALINV*) and replacement investment (*REPLACEINV*) as the dependent variables. Panel A of Table A4 compares changes in total and replacement investments across three groups: affected firms (*TREAT*), firms with affected peers (*TREAT_PEER*), and firms without affected peers. For affected firms, total investment decreases from 0.123 in the pre-period to 0.099 in the post-period; however, this reduction is not statistically significant (p = 0.317). Similarly, replacement investment shows a slight increase from 0.032 to 0.042, which is also insignificant (p = 0.457). Firms with affected peers exhibit a distinct pattern, with total investment increasing significantly from 0.113 to 0.183 (p < 0.01) and replacement investment rising from 0.049 to 0.067 (p < 0.01). In contrast, firms without affected peers show a modest but statistically insignificant increase in total investment (0.136 to 0.154, p = 0.146), while their replacement investment increases significantly (p < 0.01) from 0.031 to 0.046.[33]

Panel B reports the regression results analyzing the impact of the corporate tax rate increase across various subsamples. The results for total investment are consistent with those for net investment, as presented in Panel B of Table 6 in the manuscript. In column (1), which includes all firms, the coefficient on *TREAT* × *POST* is −0.082 ($t = -2.91$), indicating a significant reduction in total investment among affected firms. However, in column (5), which excludes firms with affected peers, the coefficient decreases to −0.050 ($t = -1.57$) and becomes statistically

[33] Although replacement investment increases for both firms with and without affected peers, the difference-in-differences test shows no statistically significant difference. Specifically, the post-period difference yields a coefficient of −0.003 (p = 0.776), indicating that their replacement investment strategies are not significantly different.

insignificant. For replacement investment, the coefficients on *TREAT* × *POST* remain insignificant across all columns, confirming that the observed reduction in total investment is not driven by changes in replacement investment.

The coefficient on *TREAT_PEER* × *POST* in column (7) for total investment is positive and significant (0.036, $t = 2.22$), consistent with the results for net investment reported in column (7) of Panel B, Table 6 in the manuscript. The lack of a significant effect on replacement investment in column (8) suggests that these firms focus on expanding their operations beyond required capital maintenance.

## TABLE A4 Replication of TABLE 6 using Total Investment and Replacement Investment as the Dependent Variables

### Panel A. Univariate Comparison

| | Total Investment (*TOTALTINV*) | | | Replacement Investment (*REPLACEINV*) | | |
|---|---|---|---|---|---|---|
| | Pre-period | Post-period | Diff (p-value) | Post-period | Pre-period | Diff (p-value) |
| (1) Affected firms (*TREAT*) | 0.123 | 0.099 | −0.024 (0.317) | 0.032 | 0.042 | 0.010 (0.457) |
| (2) Firms with affected peers (*TREAT_PEER*) | 0.113 | 0.183 | 0.070*** (<0.01) | 0.049 | 0.067 | 0.018*** (<0.01) |
| (3) Firms without affected peers | 0.136 | 0.154 | 0.018 (0.146) | 0.031 | 0.046 | 0.015*** (<0.01) |
| Diff. (1)−(2) (p-value) | 0.010 | −0.084*** | **0.094** | −0.017 | −0.025*** | **0.008** |
| | (0.619) | (<0.01) | **(0.186)** | (0.127) | (<0.01) | **(0.776)** |
| Diff. (1)−(3) (p-value) | −0.013 | 0.055*** | **0.042** | 0.001 | −0.004 | **0.005** |
| | (0.577) | (<0.01) | **(0.513)** | (0.969) | (0.702) | **(0.856)** |
| Diff. (2)−(3) (p-value) | −0.023** | 0.029** | **0.052*** ** | 0.018*** | 0.021*** | **−0.003** |
| | (0.026) | (0.034) | **(<0.01)** | (<0.01) | (<0.01) | **(0.529)** |

### Panel B. Regression Analysis

| Sample = | Affected firms and Control #1 | | Affected firms and Control #2 | | Affected firms and Control #3 | | Affected firms and Control #1 | |
|---|---|---|---|---|---|---|---|---|
| Dep. Variable = | Total Investment (*TOTALINV*) | Replacement Investment (*REPLACEINV*) | Total Investment (*TOTALINV*) | Replacement Investment (*REPLACEINV*) | Total Investment (*TOTALINV*) | Replacement Investment (*REPLACEINV*) | Total Investment (*TOTALINV*) | Replacement Investment (*REPLACEINV*) |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| ***TREAT×POST*** | **−0.082*** ** | **0.010** | **−0.097*** ** | **0.014** | **−0.050** | **0.006** | **−0.060** ** | **0.010** |
| | **(−2.91)** | **(1.10)** | **(−3.38)** | **(1.29)** | **(−1.57)** | **(0.58)** | **(−2.04)** | **(1.02)** |
| ***TREAT_PEER×POST*** | | | | | | | **0.036** ** | **−0.001** |
| | | | | | | | **(2.22)** | **(−0.10)** |
| *SIZE* | −0.078** | 0.049*** | −0.139*** | 0.057*** | 0.021 | 0.033** | −0.076** | 0.049*** |
| | (−2.05) | (4.28) | (−2.70) | (3.50) | (0.41) | (2.38) | (−2.01) | (4.27) |
| *LEV* | −0.073 | 0.018 | −0.180* | 0.022 | 0.046 | 0.019 | −0.075 | 0.018 |
| | (−0.86) | (0.66) | (−1.67) | (0.63) | (0.36) | (0.44) | (−0.89) | (0.67) |
| *MTB* | −0.001 | −0.001 | −0.002 | −0.003 | 0.001 | 0.001 | −0.000 | −0.001 |
| | (−0.11) | (−0.51) | (−0.18) | (−1.05) | (0.18) | (0.73) | (−0.08) | (−0.51) |
| *CASH* | 0.373*** | 0.039 | 0.260* | 0.068 | 0.530*** | −0.012 | 0.376*** | 0.039 |
| | (3.69) | (1.12) | (1.94) | (1.35) | (3.40) | (−0.33) | (3.72) | (1.11) |
| *ROA* | 0.423*** | −0.073 | 0.374** | −0.036 | 0.485*** | −0.113* | 0.423*** | −0.073 |
| | (3.10) | (−1.32) | (1.99) | (−0.43) | (2.62) | (−1.81) | (3.11) | (−1.32) |
| *CFO* | −0.138 | −0.010 | −0.116 | −0.011 | −0.159 | 0.003 | −0.136 | −0.010 |
| | (−1.61) | (−0.36) | (−1.01) | (−0.27) | (−1.34) | (0.07) | (−1.58) | (−0.37) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *LOSS* | −0.015 | −0.000 | −0.034 | 0.008 | 0.008 | −0.011 | −0.015 | −0.000 |
| | (−0.91) | (−0.06) | (−1.51) | (0.93) | (0.32) | (−1.41) | (−0.90) | (−0.06) |
| *SALESGROWTH* | 0.009 | −0.004 | 0.010 | −0.004 | 0.005 | −0.006 | 0.009 | −0.004 |
| | (0.45) | (−0.63) | (0.37) | (−0.44) | (0.16) | (−0.62) | (0.45) | (−0.63) |
| *DIVIDEND* | 0.027* | −0.008 | 0.026 | −0.013* | 0.027 | 0.001 | 0.027* | −0.008 |
| | (1.83) | (−1.52) | (1.22) | (−1.67) | (1.54) | (0.15) | (1.83) | (−1.52) |
| *KZINDEX* | −0.919** | −0.308*** | −1.095** | −0.222 | −0.349 | −0.597*** | −0.914** | −0.308*** |
| | (−2.44) | (−2.64) | (−2.57) | (−1.53) | (−0.50) | (−6.08) | (−2.43) | (−2.64) |
| *HHI* | 0.168 | 0.107 | −0.291 | −0.096 | 0.646*** | 0.237*** | 0.261 | 0.106 |
| | (0.79) | (1.34) | (−0.72) | (−0.59) | (2.91) | (2.91) | (1.23) | (1.33) |
| *RC* | −0.478*** | −0.403*** | −0.348*** | −0.415*** | −0.724*** | −0.389*** | −0.475*** | −0.403*** |
| | (−5.83) | (−14.33) | (−3.29) | (−12.87) | (−6.47) | (−7.51) | (−5.79) | (−14.33) |
| *INVLIFE* | 1.115*** | 0.485*** | 1.115*** | 0.505*** | 1.162*** | 0.413*** | 1.112*** | 0.485*** |
| | (6.43) | (7.98) | (5.72) | (7.41) | (3.18) | (3.06) | (6.41) | (7.98) |
| *AGE* | −0.038 | 0.020 | 0.029 | 0.046** | −0.124** | −0.015 | −0.034 | 0.020 |
| | (−0.91) | (1.54) | (0.51) | (2.44) | (−2.01) | (−0.88) | (−0.82) | (1.53) |
| Fixed effects | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 9,227 | 9,227 | 5,561 | 5,561 | 3,813 | 3,813 | 9,227 | 9,227 |
| Adjusted $R^2$ | 0.179 | 0.299 | 0.179 | 0.292 | 0.193 | 0.322 | 0.179 | 0.299 |

*Notes:* This table presents the univariate comparison and regression analysis to examine the responses of affected firms and their industry peers following the corporate tax rate increase, using total investment (*TOTALINV*) and replacement investment (*REPLACEINV*) as dependent variables. In Panel A, we provide a univariate comparison of *TOTALINV* and *REPLACEINV* across three groups: affected firms (*TREAT*), firms with affected peers (*TREAT_PEER*), and firms without affected peers (*CONTROL*). For each group, the pre- and post-tax reform investments are compared, and *p*-values are reported to indicate statistical significance. Differences between these groups are also tested with p-values provided in parentheses. Panel B presents regression analyses with *TOTALINV* and *REPLACEINV* as the dependent variables across four samples: (1) Affected firms compared with Control #1 (firms in industries with and without affected peers); (2) Affected firms compared with Control #2 (firms with affected peers only); (3) Affected firms compared with Control #3 (firms without affected peers); (4) Affected firms with the inclusion of *TREAT_PEER* × *POST* interaction. Firm- and year-fixed effects are included in all models, and standard errors are clustered at the firm level. *t*-statistics are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed). Definitions of all variables are provided in the Appendix.