

Local Individual Income Tax Revenue and Corporate R&D Expenditures* : Evidence from China's Unified Tax System Context

Yu Liu** · Seongho Bae*** · Chenguang Fan****

〈Abstract〉

Prior studies have predominantly focused on the effects of corporate income tax on firms' investment and innovation decisions, while the role of personal income tax has received limited scholarly attention. In China, firms are responsible for withholding and remitting personal income taxes on behalf of their employees, and regional disparities in personal income tax revenue arise mainly from income level variations rather than tax rate differences. Utilizing a panel of Chinese A-share listed firms from 2012 to 2021, this study examines the impact of local personal income tax revenue on corporate R&D investment.

Baseline results indicate that higher local personal income tax revenue significantly reduces firms' R&D expenditures, with this effect primarily driven by labor income tax. A difference-in-differences analysis exploiting the 2018 increase in the personal income tax threshold provides causal evidence supporting the baseline findings. Further heterogeneity analyses reveal that the adverse effect is more pronounced among financially constrained firms and firms exhibiting lower operating profitability. This study underscores the importance of fiscal revenue structure in shaping corporate innovation behavior.

〈Key words〉 Personal income tax, Corporate R&D investment, Local public finance

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** Ph.D., School of Business Administration, Kyungpook National University, liuyu722@knu.ac.kr, First Author

*** Professor, School of Business Administration, Kyungpook National University, shobae@knu.ac.kr, Corresponding Author

**** Ph.D., School of Business Administration, Kyungpook National University, fcg@knu.ac.kr, Co-author

I. Introduction

The tax system constitutes a critical institutional environment influencing corporate investment and innovation decisions. Existing research has predominantly focused on corporate income tax, systematically analyzing how changes in corporate tax burdens affect investment scale, capital structure, and research and development(R&D) activities. Given that corporate income tax directly targets firms as taxpayers, its impact pathways on corporate behavior are relatively straightforward, leading to its widespread recognition as the tax most closely linked to business decision-making. In contrast, personal income tax primarily targets individuals as taxpayers. Traditional perspectives often suggest its effects are more pronounced at the individual level—such as labor supply, income distribution, and household consumption—while its influence on corporate decision-making remains relatively limited.

However, international experience indicates that the importance of personal income tax within modern tax systems has increased significantly. Enache(2021) notes that, on average, personal income tax revenues in OECD countries accounted for over 20% of total tax revenues in 2019, whereas corporate income tax contributed less than 10%. Comparisons of tax structures between 1990 and 2019 further reveal that personal income tax has long been one of the most central revenue sources in developed economies. These patterns suggest that understanding the impact of taxation on corporate behavior solely through the lens of corporate income tax may fail to fully capture the economic consequences of evolving tax structures.

In contrast to OECD countries, China's tax structure has long emphasized corporate taxes while placing comparatively less weight on personal taxes. A literature review by Feng et al.(2021) reveals that among China's major tax categories, corporate income tax and indirect taxes remain the dominant sources, whereas the share of personal income tax in fiscal revenue is notably low. Although this structure is closely associated with factors such as China's stage of economic development, income distribution structure, and tax administration systems, ongoing economic growth, rising household income levels, and the gradual refinement of tax collection mechanisms create a certain institutional inevitability for China's tax structure to converge toward that of OECD countries. Against this backdrop, the potential impact of personal income tax on corporate behavior merits increasing scholarly attention.

Within China's institutional framework, the influence of personal income tax on corporate decision-making has a clear institutional basis. On the one hand, although personal income tax nominally targets individuals as taxpayers, its collection is primarily implemented through withholding and

remittance by firms. This arrangement assigns firms practical responsibility for tax compliance and enforcement, creating channels through which personal income tax may impact corporate decision-making, including impacts on corporate cash flow, labor costs, and management burdens. On the other hand, China's personal income tax operates under a nationally unified rate system, with no regional variations in tax rates. Differences in local personal income tax revenues primarily reflect variations in income bases and levels of economic development. This institutional feature mitigates concerns regarding the endogeneity of local tax policies to some extent and provides a relatively clean institutional environment for identifying the impact of personal income tax on corporate behavior at the regional level.

Nevertheless, existing research on tax-firm interactions remains predominantly focused on corporate income tax. Empirical evidence on personal income tax-particularly concerning its indirect channels through local fiscal environments and firm capital constraints affecting long-term investment and innovation-remains limited. In China's context of uniform tax rates coupled with substantial regional income disparities, the impact of personal income tax on corporate R&D investment warrants systematic investigation.

Against this backdrop, this study examines the impact of local personal income tax revenue on corporate research and development(R&D) investment. Using China's A-share listed companies as the sample, the study constructs firm-region panel data to analyze how changes in regional personal income tax revenue affect corporate R&D investment decisions. Furthermore, leveraging the 2018 adjustment to the personal income tax threshold as a policy change, the study employs a difference-in-differences (DID) approach to mitigate potential reverse causality and instrumental variable concerns. It also examines the mechanism through which personal income tax influences corporate R&D investment from the perspective of capital constraints.

The study's contributions are threefold. First, it extends the literature by shifting attention from corporate income tax to personal income tax, thereby addressing the growing economic significance of personal income tax in evolving tax structures and enriching research on tax-firm behavior relationships. Second, by leveraging China's institutional setting of a nationally uniform personal income tax rate alongside significant regional income base disparities, the study provides empirical evidence on the relationship between personal income tax and corporate R&D investment. Third, through heterogeneity analysis, the study demonstrates that the impact of personal income tax on corporate R&D investment is more pronounced among firms facing tighter capital constraints, thereby offering new insights into how taxation influences corporate long-term investment and innovation decisions through financial channels.

II. Literature Review, Background, and Hypothesis

2.1 Literature Review

2.1.1 Company Tax and Business Conduct

A substantial body of classic research in tax and corporate finance systematically examines the impact of tax systems on corporate behavior(Atanassov & Liu, 2020 ; Chen et al., 2021 ; Langenmayr & Lester, 2018). Overall, tax burdens are widely regarded as significant exogenous constraints on corporate decisions related to investment, innovation, financing, and risk-taking. The core mechanism operates through their influence on firms' after-tax cash flows, capital costs, and risk-return tradeoffs.

With respect to investment decisions, higher corporate income taxes directly reduce firms' after-tax net cash flow, thereby diminishing their internally available funds and suppressing both capital accumulation and the willingness to invest in long-term projects(Auerbach et al., 1983). Given that R&D activities are typically characterized by high risk, long payback periods, and substantial information asymmetry, the dampening effect of increased tax burdens on R&D investment tends to be particularly pronounced. Cash flow constraints compel firms to prioritize short-term operational activities, resulting in reduced investment in innovation projects with high uncertainty(Hall & Van Reenen, 2000).

Regarding capital structure, the classic "tax shield effect" theory posits that, because interest expenses are tax-deductible, higher income tax rates enhance the appeal of debt financing relative to equity financing, prompting firms to increase leverage to reduce their overall tax burden(Alifani & Nugroho, 2013 ; Modigliani & Miller, 1963). However, higher leverage may also heighten a firm's financial risk, potentially constraining long-term investment and innovation activities(Aghion et al., 2004). Furthermore, tax systems influence the pace of adjustment in firms' capital stock, as well as their expansion and allocation strategies, by altering the marginal effective tax rate and the cost of capital.

In the field of innovation, extensive empirical research further reveals that tax incentive policies—such as additional deductions for R&D expenses and R&D tax credits—can significantly stimulate corporate R&D investment and innovation output, as reflected in increasing patent numbers, R&D intensity, and technological efficiency(Bloom et al., 2002 ; Dechezleprêtre et al., 2023). Collectively, these studies demonstrate that tax systems serve as crucial policy tools for shaping corporate innovation behavior. When tax burdens are high and incentives are insufficient, firms tend to reduce high-risk innovation investments. Conversely, in environments characterized

by clear tax incentives and adequate fiscal support, corporate innovation activities become more vigorous.

In summary, existing research has developed a relatively consistent understanding at the corporate tax level : tax policies systematically influence corporate investment and innovation decisions by influencing cash flows, financing structures, capital costs, and risk preferences. This line of research provides a crucial theoretical foundation for extending the analysis of corporate innovation behavior to a broader fiscal environment.

2.1.2 Local Finance and Corporate Decisions

Beyond corporate tax, the local fiscal environment has also been shown to constitute a critical institutional context influencing firms' operational decisions and long-term investment behavior. Extensive research indicates that the level of local government fiscal revenue constitutes the core foundation for regional economic development capacity and public service provision capabilities (Jin et al., 2005 ; Oates, 1972). Variations in fiscal capacity not only determine governments' ability to provide subsidies and public investments to firms but also indirectly influence corporate investment and innovation decisions through infrastructure development (Démurger, 2001 ; Munnell, 1992), public service quality, and improvements in the business environment(Oates, 1999 ; Zhang & Zou, 1998).

Local governments with stronger fiscal capacity typically possess greater resource mobilization capabilities, enabling them to offer comprehensive support for innovation. Such support includes innovation subsidies, research infrastructure, technology services, talent recruitment policies, and financing support, which can effectively mitigate the high costs and risks associated with firms' R&D activities(Hall & Lerner, 2010). Conversely, when local fiscal capacity is weak or fiscal pressures intensify, government expenditure on innovation subsidies, research investment, and talent support is often compressed. This constrains firms' access to external innovation incentives and subsequently weakens R&D activities(Howell, 2017).

Additionally, China's fiscal system and performance evaluation mechanisms assign local governments substantial responsibility for promoting economic growth(Blanchard & Shleifer, 2001). Against this backdrop, local governments' fiscal expenditure structures often exhibit a bias toward short-term economic growth and livelihood security(Zhou, 2007). Consequently, innovation investments—characterized by long-term horizons, uncertainty, and externalities—may be marginalized when fiscal resources are constrained. Simultaneously, fiscal pressures may prompt local governments to alter firms' cost environments through administrative interventions, tax and fee collection practices, or

resource allocation mechanisms, thereby further shaping corporate investment and innovation decisions.

Overall, local fiscal revenue levels, fiscal pressures, and the resulting fiscal expenditure preferences and policy incentive mechanisms collectively constitute a crucial institutional environment influencing corporate R&D investment and innovation behavior. This strand of literature provides key theoretical support for understanding corporate R&D decision-making from a local fiscal perspective.

2.2 Institutional Background

2.2.1 China's Individual Income Tax System and Its Regional Variations

China implements a unified national personal income tax system, under which local governments lack the authority to independently adjust the personal income tax rate structures. Consequently, regional variations in personal income tax revenue arise not from differing tax rates but primarily from disparities in residents' income levels, industrial structures, and stages of economic development. High-income regions, characterized by higher wage levels and broader tax bases, therefore generate significantly greater personal income tax revenue than low- and middle-income regions.

For local governments, personal income tax represents a stable and vital source of fiscal revenue, directly influencing local fiscal capacity and budgetary constraints. This institutional feature implies that local personal income tax revenue in China is more accurately viewed as an indicator of regional income levels and fiscal capacity differences, rather than a direct tax policy tool.

2.2.2 Local Fiscal Pressures and Corporate Innovation Support

Differences in fiscal capacity compel local governments to balance competing priorities, including social welfare expenditures, public service provision, and industrial development support. Although high-income regions generate substantial personal income tax revenues, they typically face greater demand for public services, such as education, healthcare, transportation, and social security expenditures. When fiscal resources are limited or expenditure pressures intensify, local governments tend to prioritize livelihood projects with rigid demand and short-term visible effects, while relatively underinvesting in innovation support initiatives that have longer return cycles and higher risks.

This fiscal orientation may weaken government support for corporate R&D activities through

a “fiscal crowding-out effect”, reducing the availability of innovation subsidies, scientific research services, and policy incentives for firms, thereby influencing their R&D investment decisions.

2.3 Research Gap and Hypothesis

Although the existing literature has extensively examined the relationship between tax systems and corporate innovation behavior from multiple perspectives—including corporate tax and local fiscal expenditures—several gaps warrant further investigation.

First, prior research has predominantly focused on the direct impact of corporate income tax and tax incentive policies on corporate innovation, while paying relatively limited attention to personal income tax—a crucial source of local fiscal revenue. Unlike corporate taxes, personal income tax does not directly affect corporate costs. However, it may exert significant indirect effects on corporate innovation by influencing local fiscal capacity, fiscal pressure, and government expenditure preferences.

Second, existing studies primarily investigate how local governments influence corporate decisions through subsidies and public investments on the expenditure side, with limited systematic analysis of how the revenue structure itself shapes government behavior and the corporate innovation environment. In China’s highly uniform tax rate system, regional variation in personal income tax revenue arises entirely from differences in income bases. This institutional feature provides a unique setting for identifying the causal chain linking “fiscal capacity disparities—government behavior—corporate innovation.”

Based on this institutional context and insights from the literature, this paper argues that higher local personal income tax revenue often reflects greater fiscal pressure on local governments to fund social welfare expenditures. Under budget constraints, governments may prioritize funding for public services with inelastic demand while relatively scaling back fiscal support for innovation activities. Reduced government innovation support increases the capital costs and uncertainty associated with corporate R&D activities, leading firms to adopt more conservative investment strategies and thereby lowering R&D expenditure. Accordingly, this study proposes the following research hypothesis :

H1 : Higher local personal income tax revenue is associated with lower corporate R&D expenditure levels.

III. Data and Model

3.1 Model

To examine the impact of local personal income tax revenue on corporate R&D investment, this study constructs the following baseline regression model :

$$RD_{i,t+1} = \beta_0 + \beta_1 Tax_{p,t} + \beta' X' + \alpha_i + \gamma_p + \lambda_i + \epsilon_{i,t} \quad (1)$$

where $RD_{i,t+1}$ denotes firm i 's R&D expenditure in year $t+1$ and serves as the dependent variable ; $Tax_{p,t}$ represents the personal income tax revenue of region p in year t , capturing variations in local fiscal capacity and functioning as the core independent variable in this analysis.

In the baseline regression, this study simultaneously controls for a comprehensive set of firm-level and provincial-level characteristics to mitigate potential bias arising from omitted variables. Firm-level control variables include firm size, debt-to-asset ratio, profitability, operating cash flow, growth potential, capital structure, and firm age. Provincial-level control variables account for factors that may influence corporate innovation activities, such as the level of economic development, industrial structure, and fiscal expenditure composition. Additionally, the model incorporates firm-level and province-level fixed effects to control for unobservable characteristics that remain constant over time. This study also includes annual fixed effects to account for standard shocks, such as macroeconomic cycles and nationwide policy changes. To address potential heteroskedasticity and serial correlation in the error terms, standard errors are clustered at the firm level, ensuring robust and reliable inferences. Table 1 presents the specific variables along with their measurement methods.

〈Table 1〉 Descriptions of dependent and explanatory variables

Variable Type	Variable Name	Variable Definition
Dependent Variable	RD	R&D Expenditure / Operating Revenues
Independent Variable	TAX	Provincial Individual Income Ta / Regional Gross Domestic Product
Micro-control Variables	SIZE	Natural logarithm of the year-end total assets
	LEV	Total liabilities / total assets from the previous year

〈Table 1〉 Descriptions of dependent and explanatory variables (continued)

Variable Type	Variable Name	Variable Definition
Micro-control Variables	MB	Market Capitalization / Total Assets
	GROW	(Current Period Revenue–Previous Period Revenue) / Previous Period Revenue
	PPE	Net Fixed Assets / Total Assets
	CASH_1	(Money Funds + Trading financial assets) / Total assets
	ROA	Net profit / Total assets from the previous year
	LOSS	1 when total profit is negative, 0 otherwise
	LOSSCARRY	1 when total profit is negative, 0 otherwise
	YRETWD	Annual Stock Returns Considering Cash Dividend Reinvestment
Macro-control Variables	RETAILOWN	1–Percentage of Institutional Investors
	PROGROW	Regional GDP growth rate
	INS	Value Added of Secondary and Tertiary Industries / GDP
	TECHEDU	ln(education expenditure + science and technology expenditure)
	PGDP	ln(per capita GDP)

3.2 Data

The data used in this study were primarily drawn from the following sources. First, macroeconomic data are obtained from CEInet, the EPS database, the China Taxation Yearbook, and the official website of the National Bureau of Statistics of China. These data encompass information on regional economic development, fiscal conditions, and tax structures, which form the basis for constructing regional-level explanatory and control variables. Second, financial data for listed companies and other micro-level firm-specific indicators are sourced from the CSMAR Database, which is widely used in academic research due to its comprehensiveness and accuracy.

The research sample consists of Chinese A-share listed firms on the Shanghai and Shenzhen stock exchanges from 2012 to 2021. After excluding financial enterprises, ST companies, and observations with missing values for key variables, the final sample comprises an unbalanced panel of 3,570 firms and 22,224 observations. The relatively long sample period allows for a comprehensive examination of the dynamic changes in R&D activities across industries and regions, thereby providing a reliable data foundation for empirical analysis. Table 2 presents summary statistics for the variables used in the main analysis.

〈Table 2〉 Summary statistics

VarName	Obs	Mean	SD	Min	Median	Max
RD	22224	4.824	4.852	0.030	3.670	28.110
TAX	22224	0.685	0.552	0.152	0.494	2.200
SIZE	22224	22.224	1.263	20.031	22.035	26.215
LEV	22224	0.412	0.199	0.057	0.403	0.902
MB	22224	2.122	1.346	0.859	1.691	8.545
GROW	22224	0.172	0.374	−0.504	0.114	2.258
PPE	22224	0.208	0.144	0.004	0.181	0.646
CASH_1	22224	0.197	0.134	0.021	0.161	0.653
ROA	22224	0.057	0.052	0.000	0.044	0.322
LOSS	22224	0.107	0.309	0.000	0.000	1.000
LOSSCARRY	22224	0.091	0.287	0.000	0.000	1.000
YRETWD	22224	0.156	0.522	−0.576	0.038	2.293
RETAILOWN	22224	0.573	0.252	0.084	0.560	0.998
PROGROW	22224	7.078	2.164	1.100	7.500	11.800
INS	22224	0.940	0.043	0.779	0.954	0.999
TECHEDU	22224	16.570	0.584	14.786	16.569	17.682
PGDE	22224	11.594	0.420	10.321	11.680	12.223

IV. Empirical Results

4.1 Baseline Regression

Table 3 presents the baseline regression results of personal income tax revenue (PTAXR) on the variation in firm R&D expenditure (f.RD). Column (1) includes the core explanatory variable TAX and firm-level control variables, along with firm-level and year fixed effects, but does not control for province-level fixed effects ; Column (2) extends this specification by further controlling for province-level fixed effects ; Column (3) further incorporates province-level macro control variables to test the robustness of the results.

<Table 3> Baseline regression

	(1) f.RD	(2) f.RD	(3) f.RD
TAX	−0.359 (0.261)	−0.715*** (0.249)	−0.702*** (0.261)
SIZE	0.459*** (0.105)	0.459*** (0.106)	0.453*** (0.106)
LEV	−2.251*** (0.393)	−2.229*** (0.393)	−2.237*** (0.392)
MB	−0.025 (0.033)	−0.024 (0.033)	−0.026 (0.033)
GROW	−0.718*** (0.071)	−0.720*** (0.071)	−0.719*** (0.071)
PPE	−0.351 (0.471)	−0.312 (0.473)	−0.305 (0.472)
CASH_1	0.510 (0.376)	0.533 (0.373)	0.529 (0.371)
ROA	−1.776** (0.706)	−1.747** (0.705)	−1.762** (0.705)
LOSS	−0.191* (0.099)	−0.180* (0.099)	−0.182* (0.099)
LOSSCARRY	0.033 (0.071)	0.040 (0.071)	0.039 (0.071)
YRETWD	−0.082* (0.048)	−0.088* (0.048)	−0.089* (0.048)
RETAILOWN	0.490 (0.367)	0.455 (0.372)	0.455 (0.372)
PROGROW			0.008 (0.027)
INS			3.587 (5.649)
TECHEDU			0.217 (0.408)
PGDP			0.100 (0.176)
Constants	5.256*** (0.171)	−4.012* (2.325)	−12.043 (7.971)
Firm FE	Y	Y	Y
Year FE	Y	Y	Y
Province FE	N	Y	Y
r2_within	0.031	0.032	0.032
N	17733	17733	17733

Standard errors in parentheses.

* p<0.1, ** p<0.05, and *** p<0.01.

First, the coefficients for TAX are negative across all three specifications. Specifically, the coefficient in Column (1) is -0.359 and insignificant, whereas the coefficients in Columns (2) and (3) are -0.715 and -0.702 , respectively, both significant at the 1% level. These results indicate that, after controlling for firm, year, and province fixed effects, higher local government personal income tax revenue is negatively associated with corporate R&D expenditure in the subsequent period. In other words, increased regional personal income tax revenue levels exhibit a significant negative relationship with corporate R&D investment.

Second, after incorporating firm-level control variables(Columns (2) and (3)), the sign and significance of the TAX coefficient remain stable, demonstrating the robustness of the results. Specifically, firm size(SIZE) exerts a significant positive effect on incremental R&D expenditure, indicating that larger firms are more likely to increase their R&D investment. Conversely, leverage ratio(LEV), growth rate(GROW), and profitability(ROA) exert significant inhibitory effects on R&D expenditure.

In summary, the baseline regression results suggest that higher levels of regional personal income tax revenue in China are associated with a greater tendency for firms to reduce subsequent R&D expenditures. This pattern may reflect changes in the local resource allocation environment, policy incentive structures, or government behavior as regional fiscal capacity increases, thereby exerting a dampening effect on corporate innovation activities. These results provide novel empirical evidence on the relationship between regional fiscal revenue structures and corporate innovation behavior in China.

4.2 Robustness Analysis

To further examine the impact of personal income tax revenue from different sources on corporate R&D investment, this study decomposes personal income tax revenue into labor income tax(EARNR) and capital income tax(INVSTR) and conducts separate regression analyses for each. Table 4 presents the results of these component-specific regressions.

First, regarding the regression results for labor income tax (EARNR), the coefficients in Column (1) and Column (2) are -0.754 and -0.824 , respectively, both significantly negative. Specifically, the coefficient in Column (1) is significant at the 5% level, while that in Column (2) is significant at the 1% level. These results indicate that, after controlling for firm, year, and province fixed effects, higher regional labor income tax revenue is associated with lower firm R&D expenditure in the subsequent period. That is, increases in labor-related tax burdens exhibit a significant negative relationship with corporate R&D investment.

〈Table 4〉 Alternate explanatory variable

	(1) f.rd	(2) f.rd	(3) f.rd	(4) f.rd
EARNR	−0.754** (0.302)	−0.824*** (0.307)		
INVESTR			−1.468* (0.852)	−1.457* (0.862)
Constants	5.221*** (0.160)	−11.723 (7.933)	5.032*** (0.123)	−14.046* (8.056)
Controls	N	Y	N	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Province FE	Y	Y	Y	Y
r2_within	0.001	0.032	0.000	0.032
N	17733	17733	17733	17733

Standard errors in parentheses.

* $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$

Second, regarding capital income tax (INVESTR), the coefficients in Column (3) and Column (4) are -1.468 and -1.457 , respectively, both significantly negative at the 10% level. Although the significance level is slightly lower than that for labor income tax, the signs are consistent, implying that increased capital income tax revenue significantly suppresses corporate R&D expenditure.

Overall, increases in both labor and capital income taxes significantly suppress corporate R&D investment in the subsequent period. This result implies that different sources within the regional personal income tax revenue structure may exert systemic inhibitory effects on corporate innovation activities by influencing business expectations, resource allocation environments, or local fiscal behavior. This result further reinforces the negative relationship between income tax revenue and corporate R&D expenditure observed in the baseline regression.

To further validate the reliability of the baseline regression results, this study conducts additional robustness tests by modifying the standard error treatment method and incorporating fixed effects at different levels. Table 5 presents the regression results.

〈Table 5〉 Replace fixed effects and standard errors

	(1)	(2)	(3)	(4)	(5)	(6)
	f.rd	f.rd	f.rd	f.rd	f.rd	f.rd
TAX	−0.637*** (0.178)	−0.702*** (0.173)	−0.637*** (0.171)	−0.713*** (0.167)	−0.598*** (0.177)	−0.612*** (0.180)
Constants	5.256*** (0.125)	−12.043** (5.814)	5.256*** (0.121)	−10.748* (5.868)	5.232*** (0.122)	−13.851** (5.903)
Controls	N	Y	N	Y	N	Y
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Province FE	Y	Y	Y	Y	Y	Y
Ind FE	N	N	Y	Y	Y	Y
Year×Ind FE	N	N	N	N	Y	Y
N	17733	17733	17733	17733	17715	17715

Standard errors in parentheses.

* $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$.

First, Columns (1) and (2) include firm, year, and region fixed effects estimated without and with the full set of control variables, respectively. The results show that the coefficients for the core explanatory variable TAX are -0.637 and -0.702 , respectively, both significantly negative at the 1% level, consistent with the baseline regression results.

Second, Columns (3) and (4) further incorporate industry fixed effects to control for potential structural differences across industries. Under this specification, the estimated coefficients for TAX remain significantly negative at -0.637 and -0.713 , respectively, indicating that industry variations do not alter the direction or significance of the impact of income tax revenue on corporate R&D investment.

Finally, Columns (5) and (6) incorporate an industry-by-year interaction term (Year×Ind FE) in addition to industry fixed effects, thereby more rigorously controlling for standard shocks across industries over time. The TAX coefficient remains significantly negative at -0.598 and -0.612 , respectively, and entirely consistent with the baseline results. Despite a slight reduction in sample size, the core conclusion remains unchanged.

In summary, across different fixed-effects specifications and standard error treatments, the significant negative impact of income tax revenue on corporate R&D expenditure remains consistent. These robustness tests confirm the stability and reliability of the baseline regression results.

4.3 Endogeneity Concerns : Event Study

Although baseline regression and a series of robustness tests indicate that local personal income tax revenue has a significant effect on corporate R&D investment, concerns regarding potential reverse causality remain. For instance, a reduction in corporate R&D expenditure could lead to fewer employment opportunities and lower wage levels for high-income individuals, thereby affecting regional personal income tax revenue and generating endogeneity. To further strengthen the reliability of causal inference, this study employs an event study approach to construct a quasi-natural experiment, using the 2018 revision of the Individual Income Tax Law as an exogenous shock for identification.

The 2018 personal income tax reform represents one of the most significant changes to China's tax system in recent years. This reform raised the threshold for comprehensive income tax from 3,500 yuan to 5,000 yuan, substantially reducing the tax burden on individuals earning wages, salaries, and labor remuneration. It took effect simultaneously across all regions nationwide. Given China's unified national personal income tax rate system, under which regions cannot independently adjust tax rates, this reform constitutes an exogenous institutional shock to regional personal income tax revenue. It is unaffected by the firms' own R&D investment levels, thereby possessing excellent quasi-natural experimental properties.

Table 6 presents the DID estimation results based on the 2018 personal income tax threshold reform.

〈Table 6〉 DID test

	(1) f.rd	(2) f.rd	(3) f.rd
TREAT*POST	0.282** (0.113)	0.291** (0.113)	0.278** (0.112)
Constants	-9.043 (6.971)	-13.107 (8.050)	-11.896 (7.915)
Controls	Y	Y	Y
Firm FE	Y	Y	Y
Year FE	Y	Y	Y
Province FE	N	Y	Y
Ind FE	N	N	Y
r2_within	0.033	0.032	0.031
N	17733	17733	17733

Standard errors in parentheses.

* $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$.

The core explanatory variable is $TREAT \times POST$, where $TREAT$ denotes regions with a higher proportion of labor income tax before the reform —making them more susceptible to tax burden reductions— and $POST$ is a dummy variable for the post-reform year.

Empirical results indicate that, across three distinct fixed-effects specifications, the $TREAT \times POST$ interaction coefficient is positive and statistically significant at the 5% level, with estimated values of 0.282, 0.291, and 0.278, respectively. These results demonstrate that the 2018 individual income tax reform significantly increased corporate R&D investment. This aligns with the baseline regression results, which show that higher local personal income tax revenue is associated with lower corporate R&D expenditure. Under China's personal income tax system, firms have a statutory obligation to withhold and remit personal income tax on behalf of their employees. Consequently, an increase in the personal income tax threshold not only directly reduces workers' tax liabilities but also decreases the scale of taxes withheld by firms, along with associated compliance costs and capital occupation pressures. From the firms' perspective, this institutional adjustment alleviates implicit burdens related to tax filing, cash flow management, and internal administration, thereby freeing up more resources for long-term investment activities. Given the high upfront costs and long payback periods characteristic of R&D, this marginal reduction in cost constraints may further incentivize increased corporate R&D expenditure.

The DID results based on the tax threshold adjustment provide further support for this firm-level mechanism. As an exogenous tax reform, raising the personal income tax threshold significantly reduces the costs borne by firms due to withholding obligations. This, in turn, improves the resource allocation environment for firms to some extent and promotes increased R&D investment. Given that this institutional shock is independent of the firms' own innovation decisions, the results effectively mitigate potential reverse causality issues and provide robust causal evidence in support of the study's baseline conclusions.

4.4 Heterogeneity

The double DID results based on the adjustment to the individual income tax threshold in the previous section indicate that reductions in personal income tax burdens significantly stimulate corporate R&D investment, thereby providing relatively reliable causal evidence in support of this study's baseline conclusion. Nevertheless, it remains necessary to further investigate the specific mechanisms through which personal income tax influences corporate investment decisions. Based on theoretical analysis, this study argues that personal income tax primarily affects corporate R&D investment decisions by influencing the availability of corporate funds and the degree of financing constraints.

To test this “funding constraint channel”, this study conducts a heterogeneity analysis.

To examine heterogeneity, this study characterizes firms’ funding conditions along two dimensions — financing constraints and operational profitability — and conducts grouped regression accordingly. First, financing constraints are measured using the SA index, which captures the degree of external financing constraints faced by firms. Firms with an SA index above the sample median are classified as facing strong financing constraints and are assigned a value of 1, and 0 otherwise. Second, regarding operating profitability, this study uses the operating profit margin as a proxy variable for a firm’s internal capital generation capacity. Firms with operating profit margins below the sample median — indicating relatively insufficient internal capital — are assigned a value of 1, and 0 otherwise.

Using this grouping approach, this study examines the differential impact of personal income tax on the investment behavior of firms with varying capital conditions. This approach aims to further validate whether tax shocks exert a more pronounced inhibitory effect on capital-constrained firms, thereby providing further insight into the operational mechanisms underlying this study’s core empirical findings.

〈Table 7〉 Heterogeneity analysis

	(1)	(2)	(3)	(4)
	f.rd	f.rd	f.rd	f.rd
TAX	−0.701*** (0.173)	−0.583*** (0.171)	−0.704*** (0.260)	−0.618** (0.265)
SA	−0.106* (0.056)	−0.109* (0.057)		
TAX*SA		−0.269*** (0.100)		
OM			−0.117* (0.069)	−0.117* (0.069)
TAX*OM				−0.217* (0.124)
Constants	−11.864** (5.841)	−14.006** (5.843)	−11.933 (7.962)	−11.863 (7.958)
Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Province FE	Y	Y	Y	Y
r2_within	0.033	0.033	0.032	0.033
N	17733	17733	17733	17733

Standard errors in parentheses.

* $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$.

Table 7 presents the results of heterogeneity tests based on firm-level financial conditions. Columns (1) and (2) classify firms according to financing constraints (SA index), whereas Columns (3) and (4) characterize internal financial conditions using operating margin (OM). First, Column (1) shows a significant negative association between the SA index and firm R&D expenditure, indicating that firms facing stronger financing constraints tend to have lower R&D investment levels. In Column (2), the inclusion of the interaction term between tax variables and financing constraints ($TAX \times SA$) yields a coefficient that is significantly negative at the 1% level. This result implies that firms with stronger financing constraints are more sensitive to changes in local personal income tax rates than those with weaker constraints, and the inhibitory effect of increased tax burdens on their R&D investment is more pronounced. This result is consistent with the theoretical expectation that taxes influence investment decisions by tightening financing constraints and crowding out internal funds.

Second, results reported in Columns (3) and (4) show a significant negative relationship between OM and corporate R&D expenditure, suggesting that firms with weaker profitability inherently face constraints in R&D investment. Notably, after introducing the interaction term $TAX \times OM$, its coefficient remains significantly negative. The results suggest that insufficient internal cash generation capacity amplifies the suppressive effect of personal income tax on R&D investment, indicating that tax shocks exert stronger constraints on firms with relatively tight internal cash flows.

Overall, the heterogeneity analysis reveals that the negative impact of local personal income tax on corporate R&D expenditure is more pronounced among capital-constrained firms. Whether driven by stronger external financing constraints or weaker internal profitability, the tax burden more readily crowds out funds available for long-term investment and innovation activities, thereby intensifying its inhibitory effect on R&D expenditure.

V. Conclusion

This study systematically examines the impact of the local personal income tax environment on corporate investment behavior using a sample of Chinese A-share listed firms. An exogenous institutional shock —the adjustment of the personal income tax threshold— is employed to achieve causal identification. The main findings can be summarized in three key aspects.

First, local personal income tax levels significantly suppress corporate investment activities. The

baseline regression results indicate that, after controlling for firm characteristics, regional characteristics, and multiple fixed effects, higher local personal income tax revenue exerts a significant negative impact on corporate investment levels. This result remains robust after adjusting the standard error specification, introducing fixed effects at different levels, and conducting various robustness tests, suggesting that the local personal income tax environment constitutes a significant institutional factor influencing corporate investment decisions.

Second, corporate investment is particularly sensitive to the labor income tax component of personal income tax. Further analysis reveals that, compared to other tax components, labor income tax imposes more direct constraints on corporate investment decisions by affecting labor costs, tax compliance burdens, and related capital allocation. This finding suggests that personal income tax does not merely indirectly influence corporate behavior through household income and demand channels; rather, its institutional design itself may substantially impact long-term corporate investment via cost structures and resource allocation mechanisms at the firm level.

Third, the investment-suppressing effect of personal income tax is more pronounced among capital-constrained firms. Heterogeneity analysis reveals that for firms facing stronger financing constraints, higher local personal income tax rates exert a significantly more substantial investment-suppressing effect. This result suggests that when firms possess limited financing capacity, they struggle to absorb constraints arising from increased tax-related costs, making them more likely to implement contractionary adjustments in long-term projects, such as investment and R&D activities.

To mitigate potential reverse causality concerns, this study further employs the exogenous policy shock of the 2018 personal income tax threshold increase and utilizes a DID approach for testing. The results demonstrate that the tax reform significantly stimulated corporate investment, supporting the causal interpretation that personal income tax influences investment decisions through corporate-side cost channels and reinforcing the credibility of this study's conclusions.

This study offers several policy implications. When assessing the economic effects of personal income tax systems, policymakers should move beyond a narrow focus on household income distribution and consider the indirect effects on corporate investment and innovation behavior. Optimizing the design of personal income tax systems and reducing the firm-level costs associated with withholding obligations may help improve the corporate investment environment, particularly for capital-constrained firms.

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지방 개인 소득세 수입과 기업 R&D 지출* : 중국 통합 세제 체계에서의 증거

리우위** · 배성호*** · 판천광****

〈요 약〉

기존 연구들은 주로 법인세와 기업의 투자 및 혁신 결정 간의 관계에 집중해 왔으며, 개인소득세의 역할은 학계의 관심을 상대적으로 덜 받아왔다. 중국에서는 기업이 직원들을 대신해 개인소득세를 원천징수하고 납부할 책임이 있으며, 개인소득세 수입의 지역적 차이는 주로 세율 차이보다는 소득 수준 차이에 기인한다. 본 연구는 2012년부터 2021년까지 중국 A주 상장기업 패널 데이터를 활용하여 지방 개인소득세 수입이 기업 연구개발(R&D) 투자에 미치는 영향을 분석한다. 기본 분석 결과, 지방 개인소득세 수입이 높을수록 기업의 R&D 지출이 유의미하게 감소하는 것으로 나타났으며, 이러한 효과는 주로 근로소득세에 의해 주도된다. 2018년 개인소득세 과세기준액 인상을 활용한 차이-차이 분석은 이러한 기본적 발견을 뒷받침하는 인과적 증거를 제공한다. 추가 이질성 분석에 따르면, 재정적 제약이 있는 기업과 영업이익률이 낮은 기업에서 부정적 효과가 더욱 두드러지게 나타난다. 본 연구는 기업 혁신 행태 형성에 있어 재정 수입 구조의 중요성을 강조한다.

〈주제어〉 개인 소득세, 기업 연구개발 투자, 지방 공공 재정

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** 경북대학교 일반대학원 경영학부 박사, liuyu722@knu.ac.kr, 주저자

*** 경북대학교 일반대학원 경영학부 교수, shobae@knu.ac.kr, 교신저자

**** 경북대학교 일반대학원 경영학부 박사, fcg@knu.ac.kr, 공동저자