When Governments Push Cash Out of Firms: Mandated Deployment of Internal Capital and the Breadth of Corporate Innovation

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1. Question

What changes inside a firm when the state requires it to deploy its income? A large literature studies taxes that change the price of investment at the margin. Less is known about instruments that designate approved uses for corporate income and tax the shortfall. This paper follows one such instrument from introduction to withdrawal. The tax was imposed in 2015, its list of approved uses was narrowed in 2018, and it was lifted for most firms in 2023. We examine which uses absorbed the requirement, whether the requirement reached real investment, and how innovation responded.

2. Relation to existing work

Three literatures meet here without answering the question. Work on taxation and innovation studies price instruments such as R&D credits and corporate rate changes (Hall and Van Reenen 2000; Mukherjee, Singh and Zaldokas 2017). Work on forced or windfall cash movements shows that money is fungible. Repatriated earnings under the 2004 American tax holiday flowed to payouts rather than investment (Dharmapala, Foley and Forbes 2011); mandated CSR spending in India reduced firm value (Manchiraju and Rajgopal 2017); and expiring public budgets produce low-quality year-end spending (Liebman and Mahoney 2017). Work on corporate cash holds that firms accumulate cash as a precautionary buffer for financing innovation (Bates, Kahle and Stulz 2009; Brown and Petersen 2011). In none of these settings does the state tax retained income directly while changing the approved uses over time. The Korean statute taxes retained income directly, narrowed its approved uses in 2018, and was lifted for most firms in 2023, so each margin of adjustment can be observed for the same firms.

3. Setting: three statutory regimes

Korea levied a penalty tax on large firms' undeployed income from fiscal 2015 through 2022, with a sharply narrowed scope thereafter. From 2015 to 2017, firms could satisfy the requirement through investment, wage increases, or dividends, at a 10 percent penalty rate, and could elect a formula that excluded investment entirely. In the first filing year, 69 percent of the 2,845 taxed corporations chose that formula, and the election was locked for three years. A 2018 reform removed dividends from the approved set and doubled the penalty rate to 20 percent. A 2023 reform removed all firms except those

affiliated with the largest business groups from the tax base. The three changes provide an onset, a tightening, and a release.

4. Data and research design

We assemble a panel of 1,818 listed firms from 2009 to 2024, combining separate financial statements, year-end market data, and the population of Korean patent applications and their forward citations from KIPRIS. Treatment is fixed at each firm's pre-announcement 2013 equity (at least KRW 50 billion) and 2013 statutory small-business status, which the law exempts regardless of equity. This yields 643 treated firms; 603 of them exit the tax base in 2023 and 40 group-affiliated firms remain taxed, which we use in the release analysis. Assignment therefore cannot respond to the policy. Estimation uses two-way fixed effects with standard errors clustered by firm, and event studies benchmarked to 2014, the last year before the tax applied to income. Pre-policy coefficients from 2009 to 2013 are flat for every outcome. Because patent counts are heavily skewed, we report equal-weighted log estimates, patenting-participation regressions, and count-weighted Poisson estimates side by side.

5. Findings

First, the financial responses. Relative to control firms, taxed firms' cash holdings fell 34 log points below the counterfactual path in the first regime and 61 log points in the second. Tangible capital expenditure fell by 14 percent in the first regime and 32 percent in the second, measured through 2020. Capitalized development costs, an accounting category that qualifies as investment under the statute, rose by 43 and 55 log points. Qualifying deployment rose through the accounting category while tangible investment fell.

Second, innovation. In the 2015 to 2017 regime, when dividends still qualified, innovation outcomes show no significant change. After the 2018 reform removed dividends and doubled the rate, the probability that a taxed firm files any patent falls by 4 to 5 percentage points, log patent applications fall by about 11 percent, and log forward citations fall by about 14 percent. Count-weighted Poisson estimates over the same firms and period are close to zero. Within the sample of firms that ever patent, the equal-weighted log estimate is minus 10.9 percent, the participation estimate is minus 5.5 percentage points, and the Poisson estimate is plus 1.0 percent. The top decile of patenting firms accounts for 60 percent of all patents and did not adjust, so the decline appears in how many firms patent while aggregate output shows no detectable change.

Third, the 2023 release. Firms removed from the tax base return to control-group patenting participation within two years. Their patent counts remain about 10 percent below control paths and their cash holdings about 69 log points below through 2024. Re-entry into patenting occurs quickly after the requirement is lifted; cash and output levels have yet to recover over the horizon we observe.

Two caveats on identification. Treated firms are larger than control firms; the flat pre-policy coefficients over the six years before assignment are the primary check, and comparisons near the statutory equity threshold are in progress. The 2018 reform combined the removal of dividends with the rate increase, so the second-regime estimates capture the joint effect of the narrower qualifying set and the higher rate.

Table 1. Regime-by-regime estimates, treatment fixed at 2013 exposure

Outcome	*2015–17: dividends qualify*	*2018–22: dividends removed, rate doubled*	*2023–24: released*
Patenting participation (LPM)	−0.012	−0.042***	+0.003
ln(1+patents), OLS	−0.047	−0.105***	−0.074*
ln(1+citations), OLS	−0.062*	−0.142***	—
Patents, PPML	+0.024	+0.010	+0.093
ln(cash holdings)	−0.338***	−0.609***	−0.624***
ln(tangible capex)	−0.139*	−0.322***	—
ln(capitalized development costs)	+0.429***	+0.552***	—

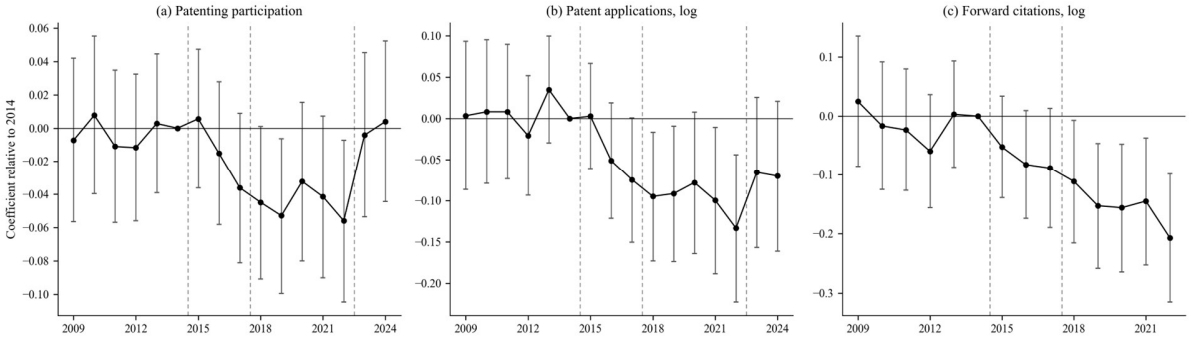
Notes: Two-way fixed effects, standard errors clustered by firm (1,665 clusters). Citations use a two-year window, valid through 2022. Capital expenditure and development costs are measured through 2020. The released column pools 603 released and 40 still-taxed firms for patents; released-only estimates are reported in the text. *** p<0.01, ** p<0.05, * p<0.10.

Table 2. The patent response under alternative estimators, 2018–22

Estimand	*Estimate*	*What it measures*
ln(1+patents), OLS	−0.109***	percentage change for the typical firm
Files any patent, LPM	−0.055***	whether the firm patents at all
ln(patents), conditional on patenting	−0.066	change among continuing patenters
Patents, PPML	+0.010	count-weighted aggregate output

Notes: All rows use the identical sample of 1,233 firms that patent at least once during 2009–2024 (19,464 firm-years). The top decile of patenting firms accounts for 60 percent of all patents. Fewer firms patent, while aggregate counts are sustained by the largest patenters.

Figure 1. Event studies around the three statutory changes, base year 2014



Notes: Coefficients on treated-by-year indicators relative to 2014, with 95 percent confidence intervals. Vertical dashed lines mark the statutory changes of 2015, 2018, and 2023. Estimates after 2022 pool released and still-taxed firms.

6. Interpretation

The number of firms that patent fell while total patent output did not. Smaller firms finance innovation largely from internal cash, and cash is the resource the tax reduced. After the release, firms resume patenting, but cash holdings and patent levels remain below their earlier paths through 2024. The evidence is consistent with internal cash serving as a financing buffer for smaller firms' innovation. The requirement weakened that buffer and did not raise tangible investment.

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