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ABSTRACT   Imputation systems integrate corporate and shareholder personal income taxes to alleviate double taxation of dividend income. In this study, we empirically examine whether a corporate tax rate reduction under an imputation tax system benefits shareholders. Using Taiwan as a setting, our analyses indicate that decreasing the corporate tax rate is associated with an increase in dividend payout ratio and foreign investment. Moreover, the increase in dividend payout ratio is even greater for firms that have a higher increase in foreign ownership. Additionally, the market reacts positively to an announcement of a tax rate reduction; specifically, positive stock price reactions are stronger for firms that experienced a greater increase in foreign ownership in response to the tax rate reduction, for firms with greater liquidity constraints and more growth opportunities before the tax rate reduction, and for firms with a bigger decrease in effective tax rates after the tax rate reduction. Overall, we provide evidence that a tax rate reduction is associated with economic impacts and that foreign shareholders appear to be the main beneficiaries of a tax rate reduction under an imputation tax system.

1. Introduction

The two major tax systems for handling corporate and shareholder income taxes are classical and imputation systems. In classical tax systems, corporations and shareholders are viewed as separate entities and thus taxed separately.[1] In imputation tax systems, corporate earnings and shareholder dividends are viewed as being derived from the same source of income and are thus integrated to alleviate double taxation. Jurisdictions that adopt an imputation tax system usually grant shareholders an imputation credit for paid corporate income tax. This credit offsets shareholders' personal income taxes.[2] The total corporate and individual taxes that a shareholder pays on dividend income is determined by the shareholder's personal tax rate, not the corporate tax rate. Thus, in an imputation system, a shareholder's after-tax dividend

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[1]An example of a classical system is the US income tax system, which taxes corporations and shareholders separately.
[2]According to the Organisation for Economic Co-operation and Development tax databases, countries that currently use full or partial imputation tax systems for dividends include Australia, Canada, Chile, Korea, Mexico, New Zealand, and the UK (http://www.oecd.org/tax/tax-policy/tax-database.htm#C_CorporateCaptial).

income remains the same even after reducing the corporate tax rate. The benefits of a corporate tax rate cut for shareholders under this system are thus unclear.

In recent years, many countries have implemented or proposed to reduce corporate tax rates to attract investment and global capital. However, existing studies provide little evidence about whether a reduction in corporate tax rates under an imputation tax system can attract investment. We intend to fill this void. In this study, we use the 2010 implementation of the corporate tax rate reduction in Taiwan[3] as a setting to examine whether a tax rate reduction under an imputation tax system benefits shareholders and provides investors with sufficient tax incentives to invest. Specifically, we investigate the economic consequences of and the stock market reaction to the corporate tax rate reduction under an imputation tax system.

We employ a sample of listed firms in Taiwan from 2008 to 2011 to conduct our empirical tests. The first set of analyses examines the economic consequences of a corporate tax rate reduction. Our results show that a decrease in the corporate tax rate is associated with an increase in the corporate dividend payout ratio. The magnitude of the increase in dividend payouts is economically significant. Specifically, it increases by 5.153%, at the mean value of change in foreign ownership, after the implementation of the tax rate reduction, which means an increase of about 12% of the average dividend payout ratio in the year before the corporate tax reduction.

Next, our analysis indicates that a reduced corporate tax rates is associated with increased foreign investment by about 0.512%, at the average of change in effective tax rate (ETR), after the implementation of the tax cut. The magnitude of the increase in foreign ownership is economically significant, as this translates into a 7% increase of average foreign ownership in the year before the corporate tax rate reduction. We further find that the increase in foreign investment is greater for firms with a bigger decrease in their ETR after the tax rate reduction. These findings are consistent with the idea that the tax rate reduction helps attract foreign investment. Additionally, the increase in corporate dividend payouts after the tax rate reduction is greater in firms with increased foreign ownership. This finding is consistent with the view that the tax rate reduction attracts foreign investors who seek for higher after-tax dividends and that foreign investors' demand for higher dividends pushes firms to increase dividend payouts. Overall, our findings show that a tax rate reduction is associated with economic effects under imputation systems, including increased corporate dividend payouts and foreign investment.

Our second set of tests investigates market reactions to the announcement of a corporate tax rate reduction. We find a positive stock price reaction to the announcement of a tax rate reduction. Positive market reactions are stronger for firms with a greater increase in foreign ownership, suggesting that foreign investors respond to tax incentives provided by the tax rate reduction by increasing their investment, which bid up stock prices. Additionally, stock price reactions are stronger for firms with greater liquidity constraints and more growth opportunities before the announcement of a tax rate reduction, suggesting that these firms benefit more from the reduced corporate tax rate. Market reactions are found to be stronger for firms with a bigger decrease in ETRs after the tax rate reduction. These findings are consistent with the view that a corporate tax rate reduction benefits foreign shareholders more than domestic shareholders

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[3]Taiwan implemented an imputation system in 1998. From 1998 to 2010, Taiwan's corporate income tax rate was 25% for firms with income equal to or above NT $100,000. To improve the economy and compete with countries such as Hong Kong, Ireland, and Singapore, Taiwan revised its tax policy and lowered the corporate income tax rate from 25% to 17% in 2010. A 2008 press release from Taiwan's Council for Economic Planning and Development noted that

tax reduction is a global trend and that Taiwan's tax rate of 25% was obviously uncompetitive with Hong Kong's 17.5%, Ireland's 12.5%, and Singapore's 18%. To rectify this problem the Executive Yuan will propose a third tax reform to drastically cut business income tax rate . . . by the end of 2009.

under an imputation system, and that foreign investors drive up stock prices to maximize tax benefits.

Our study makes three contributions. First, it contributes to the existing tax literature on imputation tax systems that examine the impact of imputation tax systems on corporate capital structure (Pattenden, 2006; Schulman, Thomas, Sellers, & Kennedy, 1996; Twite, 2001), dividend policies (Chen & Gupta, 2011; Pattenden & Twite, 2008), capital investment (Black, Legoria, & Sellers, 2000), and firm value (Prevost, Rao, & Wagster, 2002). However, little is known about whether a reduction in corporate tax rate under an imputation system benefits shareholders and how it affects foreign investment. Our study fills this gap in the literature.

Second, our empirical findings complement the literature on tax clientele theory, which has focused on how shareholders adjust their holdings in response to changes in tax costs that arise from changes in corporate dividend policies or tax systems (Allen, Bernardo, & Welch, 2000; Bajaj & Vijh, 1990; Denis, Denis, & Sarin, 1994; Dhaliwal, Erickson, & Trezevant, 1999; Elton & Gruber, 1970). Our study furthers understanding of tax clientele theory under an imputation tax system and shows that a corporate tax rate reduction favors foreign over domestic investors.

Third, our study provides relevant tax policymaking implications for countries with imputation tax systems. Use of tax cut as a regulatory tool has increased amid weak economic climates. Since 2009, countries including Canada, Denmark, Finland, Japan, Sweden, Taiwan, and the UK have implemented or proposed corporate tax rate reductions to increase tax competitiveness and stimulate investment. Our results suggest that a reduction in corporate tax rate can help attract foreign investors in countries with an imputation tax system.

The remainder of this paper proceeds as follows: Section 2 discusses the institutional background and develops our hypotheses. Section 3 describes the data and research design. Section 4 reports our empirical findings, and Section 5 concludes.

2. Institutional Background and Hypothesis Development

2.1. Institutional Background

Taiwan adopted an imputation tax system in 1998 to eliminate double taxation of dividend income. This imputation system is similar to the Australian and Canadian systems, with two distinguishing features. First, the Taiwanese imputation system requires firms to keep only one retained earnings account for accumulations of both franked and unfranked earnings. Imputation credits granted to shareholders are computed based on the average ETR on corporate earnings, which is income tax paid at the corporate level divided by corporate after-tax earnings.[4] Second, foreign shareholders are not entitled to receive imputation credits, and their dividend income is subject to a withholding tax rate of 20%.[5] Unlike foreign shareholders, domestic shareholders are taxed on a progressive basis (e.g. the top tax rate during our sample period in Taiwan was 40%), on dividend income. Domestic shareholders nevertheless can offset their personal income tax with imputation credits from corporate tax paid on dividend income.

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[4]The Australian imputation system requires corporations to keep two-tiered retained earnings accounts: one is a franked account that accumulates earnings taxed at the corporate level that are eligible for imputation credits to shareholders when dividends are distributed from it, and the other is an unfranked account that accumulates earnings that have not been taxed at the corporate level and does not give imputation credits to shareholders if dividends are distributed from it (Chen & Gupta, 2011).

[5]Taiwan-sourced income earned by nonresident taxpayers is subject to a flat withholding tax rate when the income is paid by the company. The withholding tax rate is 20% and has not changed since its inception.

The Legislative Yuan, or Parliament of Taiwan, must approve all new laws, including tax laws. The Executive Yuan proposes a bill and then sends it to the Legislative Yuan, which conducts three readings to complete the legislative process. Tax law amendments are usually sent first to the Finance Committee for deliberations and approval, then the general meeting of the Legislative Yuan for a second and third reading. The second reading provides the most thorough discussions and revisions. After the bill passes the second reading, the third reading addresses any necessary rephrasing, though content revisions are prohibited. The second and third readings are usually completed on the same day.

To improve the economy and attract investment, Taiwan launched a two-phase tax reform to reduce the corporate income tax rate.[6] The first phase started in July 2008, when Taiwanese President Ma was inaugurated and formed the Tax Reform Commission. The Tax Reform Commission formally proposed to reduce the statutory corporate tax rate from 25% to 20% on 28 July 2008. The second phase started in April 2010, when the Industrial Innovation Act was proposed to replace the Statute for Upgrading Industries, which provided substantial tax incentives to stimulate corporate investments.[7] The Industrial Innovation Act eliminated almost all tax incentives. Many members of the Legislative Yuan opposed the Industrial Innovation Act and demanded further reduction of the corporate tax rate to mitigate the adverse impacts of repealing tax incentives. The Executive Yuan finally agreed to reduce the corporate tax rate from 20% to 17%. The amendment to the Income Tax Law to reduce the corporate tax rate to 17% was then proposed by the caucus of the ruling party, Kuomintang, to complete the legislative procedures. The bill was approved on 28 May 2010, retroactive to January 1, 2010.

2.2. Hypothesis Development

We develop hypotheses with regards to economic consequences of a tax rate reduction, as well as market pricing implications of a corporate tax rate reduction under an imputation system.

2.2.1. Economic consequences of corporate tax rate reduction

We hypothesize that a tax rate reduction under imputation systems affects corporate dividend payout for several reasons. A corporate tax reduction reduces cash outflows for income tax expenses and thus increases corporate cash holdings, so firms may face greater agency cost of free cash flow (Jensen, 1986). To mitigate this agency conflict, these firms may need to pay cash dividends. Additionally, a dividend payout is a function of corporate profits after taxes and cash flows (e.g. Higgins, 1972; Lintner, 1956). A reduced corporate tax rate increases after-tax profits, which in turn increases the firm's financial flexibility to pay dividends. Taken together, a corporate tax rate reduction increases firms' incentive and ability to raise the dividend payout ratio.[8] Hence, we hypothesize H1:

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[6]Many of Taiwan's competitor countries lowered their corporate income tax rates during 2008–2011. For example, China, Singapore, Korea, Hong Kong, and Ireland reduced their corporate tax rates to 25%, 17%, 22%, 16.5%, and 12.5%, respectively.

[7]The Statute for Upgrading Industries was intended to promote and upgrade Taiwanese companies in high-tech industries by providing extensive tax incentives, including an investment tax credit, an R&D tax credit, and a five-year tax holiday, to allow Taiwanese companies to invest in designated industries. The abundant tax incentives of the statute caused enormous tax revenue losses. Executive Yuan, Cabinet of the Taiwanese government, proposed to replace the Statute for Upgrading Industries with the Industrial Innovation Act, which essentially eliminates all tax incentives except an R&D tax credit.

[8]It is possible that domestic shareholders do not support an increase in dividend payout ratio because of limited tax benefits. An increase in dividend income may also increase their marginal income tax rates, and the increased tax expenses from non-dividend income can offset a large portion of after-tax dividend income.

H1: A corporate tax rate reduction is associated with an increase in dividend payout ratio.

An increase in dividend payouts increases shareholders' dividend income. However, marginal after-tax dividend income for each dollar is not equal for domestic and foreign shareholders under an imputation tax system. The imputation system integrates corporate and personal income taxes, but only domestic shareholders are entitled to receive an imputation credit. Domestic shareholders who receive a dividend from the firm are entitled to an imputation credit based on the income tax paid at the corporate level. The imputation credit can be used to offset domestic shareholders' personal income tax or it can be refunded if a shareholder's income tax payable is less than the amount of the imputation credit. The amount of total taxes (both corporate and individual) a shareholder pays on dividend income is determined by the shareholder's personal tax rate, not the corporate tax rate. Thus, in an imputation system, domestic shareholders' after-tax dividend income remains the same even after reducing the corporate tax rate. Foreign shareholders, however, are not entitled to an imputation credit and are subject to a constant withholding tax on dividends received from the firm.

Exhibit A presents numerical examples to illustrate how these changes affect Taiwan's tax rate on shareholders' after-tax personal income. Until 2010, the Taiwanese corporate tax rate was a flat rate of 25%, and the highest personal tax rate was 40%. Assume that a firm earns pre-tax income of $100 and that the dividend payout ratio is 100%. Panel A of Exhibit A shows that domestic shareholders' after-tax dividend income is $60 under the imputation system, regardless of whether the corporate tax rate is 25% or 17%. As previously mentioned, the imputation tax system alleviates double taxation, so taxes on dividend income are pegged at the domestic shareholder's personal income tax rate and the corporate tax rate becomes irrelevant. Therefore, under the imputation system, domestic shareholders' after-tax dividend income remains the same, despite the corporate tax rate reduction from 25% to 17%.

Because foreign shareholders are not eligible for an imputation credit, their dividend income is taxed in the same way as it is taxed in classical systems (i.e. at the corporate and personal levels). As shown in Panel B of Exhibit A, a reduced corporate tax rate benefits foreign shareholders. Given that the corporate tax rate is reduced from 25% to 17% and the withholding tax remains 20%,[9] the after-tax personal income of foreign shareholders increases to $66.4 from $60.

Collectively, the numerical examples in Exhibit A indicate that a reduction in the corporate tax rate has a greater positive effect on the after-tax dividend income of foreign shareholders, compared to domestic shareholders. Therefore, we hypothesize that the tax benefit incentive provided by the corporate tax rate reduction will increase foreign investment:

H2: A corporate tax rate reduction is associated with an increase in foreign investment.

Exhibit A. The effect of a corporate tax rate reduction on shareholders' after-tax dividend income under the imputation system in Taiwan.

[9]Prior to 2010, there were two different rates for foreign withholding tax. For foreign investment approved (not approved) by the Taiwanese investment authority, foreign withholding tax rate was 20% (30%). Since 2010, the Taiwanese government has set foreign withholding tax at a standard rate of 20% regardless of whether the foreign investment receives regulatory approval. We use 20% as a foreign withholding tax rate before 2010 for two reasons. First, in practice, the majority of foreign investment received approval from the authority prior to 2010. Second, this implicit assumption is necessary to ensure that the economic consequences and market pricing discussed in this study result from a corporate tax rate reduction rather than a foreign withholding tax rate reduction.

Panel A: Domestic shareholders

	With a corporate tax rate of 25%	*With a corporate tax rate of 17%*
1. Corporate pre-tax income	$100.00	$100.00
Less: Corporate income tax (25%, 17%)	(25.00)	(17.00)
Corporate after-tax earnings	$75.00	$83.00
2. Distribution to Shareholders		
Net dividend income	$75.00	$83.00
Add: Imputation credit	25.00	17.00
Grossed-up taxable dividend income	$100.00	$100.00
Less: Personal income tax (40%)	(40.00)	(40.00)
Add: Imputation credit	25.00	17.00
Personal after-tax dividend income	$60.00[a]	$60.00[b]

Panel B: Foreign shareholders

	With a corporate tax rate of 25%	*With a corporate tax rate of 17%*
Corporate pre-tax income	$100.00	$100.00
Less: Corporate income tax (25%, 17%)	(25.00)	(17.00)
Corporate after-tax earnings	$75.00	$83.00
Distribution to Shareholders		
Net dividend income	$75.00	$83.00
Add: Imputation credit	0	0
Taxable dividend income	$75.00	$83.00
Less: Withholding tax (20%)	(15.00)	(16.60)
Add: Imputation credit	0	0
Personal after-tax dividend income	$60.00[c]	$66.40[d]

Following H2, a corporate tax reduction provides a direct tax benefit for foreign shareholders. Because foreign investors receive greater after-tax dividend income when the corporate tax rate is lower, they have incentive to push firms to raise dividends. Additionally, prior research indicates that firms can pay dividends to reduce agency cost arising from shareholder monitoring (Easterbrook, 1984; Rozeff, 1982). Taken together, incentives from the increased foreign ownership to push firms to raise dividends are even higher. We thus predict H3 as follows:

H3: The increase in dividend payout ratio after a tax rate reduction is higher for firms with increased foreign ownership.

2.2.2. Market reactions to corporate tax rate reduction announcements

We also investigate how investors react to the announcement of a change in the corporate tax rate. A corporate tax rate reduction is associated with firm value in several ways. First, valuation theory suggests that firm value is the present value of a stream of future payoffs (e.g. dividend or cash flow) of a firm. A reduced corporate tax rates increases future payoffs of a firm and thus firm value, all else being equal. Second, pecking order theory suggests that firms prioritize sources of financing based on the cost of financing (Myers & Majluf, 1984). Of the three types of financing,

internal funds are cheapest, followed by debt financing and equity financing. Reducing the corporate tax rate increases internal funds, thus decreasing cost of capital, and increasing firm value. Last, a tax rate reduction increases dividend payouts, and investors react positively to firms that announce increased dividend payouts (Divecha & Morse, 1983). Hence, there is a positive market reaction, because dividend investors bid up the stock price. Given these positive effects of a tax rate reduction on firm value, we hypothesize that the market reacts positively to news about a corporate tax rate reduction:

H4: The market reacts positively to the announcement of a corporate tax rate reduction.

We further investigate what firm characteristics explain cross-sectional variations in stock returns surrounding the announcement of a corporate tax rate reduction, including foreign ownership, liquidity constraints, and growth opportunities. A lower corporate tax rate does not benefit all shareholders equally, because the marginal tax benefit is greater for foreign shareholders than for domestic shareholders in Taiwan. Foreign investors may react favorably to the announcement of a corporate tax rate reduction and bid up stock prices. Domestic shareholders' may sell their stock as the price increases. Unlike dividend income, capital gains on securities are non-taxable in Taiwan, so domestic shareholders benefit more from capital gain than they do from the tax reduction derived from dividend income (as discussed in footnote 8). We thus expect stock returns to be positively associated with an increase in foreign ownership after the announcement of a tax rate reduction:

H5: Stock returns surrounding the announcement of a corporate tax rate reduction are positively associated with an increase in foreign ownership.

Because a reduced corporate tax rate decreases income tax expenses and thus increases cash retained in the firm, firms with liquidity constraints and greater growth opportunities are likely to benefit more than other firms. Firms facing liquidity constraints are also more likely to default on their payments (Boissay & Gropp, 2013), which adversely affects their credit history. These firms may find it difficult to negotiate favorable terms with suppliers and customers and therefore must spend more to operate their businesses. Additionally, firms with greater liquidity constraints are more likely to violate debt covenants and thus have their credit rating downgraded (Dichev & Skinner, 2002; Standard & Poor's, 2008), which may lead to financial distress. Because a reduced corporate tax rate increases cash retained in firms and relieves firms' liquidity constraints, we expect investors to react positively to firms with greater liquidity constraints surrounding the announcement of a tax rate reduction:

H6: Stock returns surrounding the announcement of a corporate tax rate reduction are higher for firms with greater liquidity constraints.

Firms with greater growth opportunities are likely to benefit more from a corporate tax rate reduction than other firms, because these firms need funds to invest in capital and R&D (Deng, Lev, & Narin, 1999). A lower corporate tax rate increases funds and reduces reliance on external financing. The pecking order theory (Myers & Majluf, 1984) argues that internal funds tend to be less expensive than debt and equity financing. Firms are thus more likely to undertake more positive net positive value investment projects. Hence, we expect that market reactions to the announcement of a tax rate reduction are greater for firms with greater growth opportunities:

H7: Stock returns surrounding the announcement of a corporate tax rate reduction are higher for firms with greater growth opportunities.

Table 1.   Sample selection

Panel A: Selection procedures for tests that examine the economic consequences of the corporate tax rate reduction

	Number of firm-year observations
Total firm-year observations during 2008–2011	5204
Less: Firm-year observations in finance and insurance industries	(176)
Firm-year observations with missing data on selected financial statements variables	(344)
Final sample (1171 firms)	4684

Panel B: Selection procedures for market reactions to events leading to the implementation of the corporate tax rate reduction

Sample selection procedures

	Number of firms
Taiwanese listed and over-the-counter companies in 2008	1301
Less: Firms in finance and insurance industries	(46)
Non-financial firms	1255

	Number of firm-event observations
Total firm-event observations on 9 event dates (1255 × 9)	11,295
Less: Firm-event observations with earnings announcements around event day	(88)
Firm-event observations with missing data on selected financial statements variables and stock returns	(3623)
Final sample (1062 firms)	7584

3.   Data and Research Design

3.1. Data and Sample Selection

We collect corporate ownership structure, financial statement, and stock return data of Taiwanese listed firms for 2008–2011. Our sample firms consist of non-financial firms listed on the Taiwan Stock Exchange and over-the-counter markets. Table 1 describes our sample selection. Panel A of Table 1 outlines the sample procedures for our tests of economic consequences of the tax rate reduction. Panel B of Table 1 presents the selection procedures for market reaction tests. To prevent extreme values from exercising undue influence on our results, we winsorize all variables at the 1% level.

3.2. Selection of Event Dates

For market reaction tests, we select nine relevant event dates to measure the stock market's anticipation of tax benefits from a corporate tax rate reduction. We select events based on the government's relevant administrative and legislative procedures (see Section 2.1). As previously mentioned, the implementation of the tax rate reduction involved two phases. From the first phase, in which the statutory corporate tax rate was reduced from 25% to 20%, we select five events pertaining to the legislature's proposal and implementation of the tax reduction. From the second phase, in which the statutory corporate tax was further reduced from 20% to 17%, we select four related events. Exhibit B describes the events.

Exhibit B. Events leading to the implementation of the corporate tax rate reduction.

Phase I: Corporate income tax rate reduced from 25% to 20%

Date	Event
2008/7/28	The Tax Reform Commission of the Executive Yuan proposed reducing the corporate tax rate from 25% to 20%
2009/3/5	The Executive Yuan passed an amendment to the Income Tax Law to reduce the corporate income tax rate to 20%
2009/3/11	The amendment to the Income Tax Law was sent to the Legislative Yuan to complete the legislature procedures
2009/4/02	The Finance Committee of the Legislative Yuan passed the first reading of the amendment to the Income Tax Law
2009/5/4	The Legislative Yuan general meeting passed the second and third readings of the amendment to the Income Tax Law, reducing the corporate income tax rate to 20%

Phase II: Corporate income tax rate reduced from 20% to 17%

Date	Event
2010/4/9	In proposing the Industrial Innovation Act, the Executive Yuan agreed that the corporate income tax rate could be further reduced if most existing tax incentives were terminated
2010/4/12	Both major political parties (Kuomintang and Democratic Progressive Party) agreed to eliminate most tax incentives from the Industrial Innovation Act, with a proposal to further reduce the corporate income tax rate. The Kuomintang caucus proposed to reduce the tax rate to 17%, and the Democratic Progressive Party caucus to 17.5%
2010/4/23	The Finance Committee of the Legislative Yuan passed the first reading of the amendment to the Income Tax Law to reduce the corporate income tax rate to 17%
2010/5/28	The Legislative Yuan general meeting passed the second and third readings of the amendment to the Income Tax Law, reducing the corporate income tax rate to 17%

Note: Please refer to Section 2.1 for detailed descriptions of the events leading to the corporate tax rate reductions and Taiwan's legislative procedures.

3.3. Regression Design

Based on our hypotheses, we develop regression models to conduct tests relating to economic consequences and market reactions to a corporate tax rate reduction.

3.3.1. Economic consequences of a corporate tax rate reduction

We first construct an empirical regression model in Equation (1) to examine the effect of a corporate tax rate reduction on the corporate dividend payout ratio:

$$\text{DIV}_{it} = \alpha_0 + \alpha_1 \text{POST}_{it} + \alpha_2 \Delta \text{FOR}_{it} + \alpha_3 \text{POST}_{it} \times \Delta \text{FOR}_{it} + \alpha_4 \text{SIZE}_{it} + \alpha_5 \text{ROE}_{it}$$
$$+ \alpha_6 \text{DEBT}_{it} + \alpha_7 \text{GROWTH}_{it} + \alpha_8 \text{QUICK}_{it} + \alpha_9 \text{FCF}_{it} + \mu_{it}, \tag{1}$$

where

DIV	=dividend payout ratio, measured as dividend per share divided by earnings per share;
POST	=post-tax rate reduction period in which a dummy variable equals 1 if a firm-year observation occurs in the period from 2010 to 2011 and 0 otherwise;
ΔFOR	=change in a firm's foreign ownership between the current year and prior year;
SIZE	=firm size, measured as the natural log value of total assets;
ROE	=return on equity, measured as net income divided by average shareholder equity;
DEBT	=debt ratio, measured as total debt divided by total assets;
GROWTH	=growth opportunity, measured as the quarterly change of net sales, adjusted for industry growth;
QUICK	=quick ratio, measured as quick assets divided by current liabilities; and
FCF	=free cash flows, measured as cash flows from operations minus capital expenditures, divided by total assets at the beginning of year t.

The subscripts i and t denote firm and year, respectively. Our dependent variable is DIV, which is the dividend payout ratio. The variables of interest in this model are POST and ΔFOR. We also account for factors that determine corporate dividend policy, which include firm size (SIZE), return on equity (ROE), debt ratio (DEBT), growth opportunities (GROWTH), liquidity (QUICK), and free cash flows (FCF) (Agrawal & Jayaraman, 1994; Fama & French, 2001; Jensen, 1986; Rozeff, 1982).

Next, we examine whether a tax rate reduction is associated with an increase in foreign investment. To conduct our test, we construct the model in Equation (2) below:

$$\text{FOR}_{it} = \beta_0 + \beta_1 \text{POST}_{it} + \beta_2 \Delta \text{ETR}_{it} + \beta_3 \text{POST}_{it} \times \Delta \text{ETR}_{it} + \beta_4 \text{QUICK}_{it}$$
$$+ \beta_5 \text{GROWTH}_{it} + \beta_6 \text{SIZE}_{it} + \beta_7 \text{ROE}_{it} + \beta_8 \text{DEBT}_{it} + \varepsilon_{it} \qquad (2)$$

where

FOR	=foreign ownership, measured as shares owned by foreign shareholders divided by the number of shares outstanding; and
ΔETR	=changes in a firm's ETR between the current year and prior year.

Our dependent variable is FOR, which is the level of foreign ownership. Our variable of interest is POST. We also add the change in ETR (ΔETR) and a variable that interacts ΔETR with POST. Foreign investors' tax benefits are positively associated with the extent of tax benefits that a firm receives from a reduction of corporate tax rates. A firm with a bigger decrease in ETRs after a tax rate reduction receives greater tax benefits, which attracts foreign investment. This is reflected in β_3.

As prior studies show that foreign investors tend to invest in firms with certain characteristics (e.g. Dahlquist & Robertsson, 2001; Kang & Stulz, 1997), we include these firm characteristics in our regression: quick ratio (QUICK), growth opportunities (GROWTH), firm size (SIZE), return on equity (ROE), and debt ratio (DEBT). To mitigate the possibility that the effects of the tax rate reduction on foreign ownership and on dividend payout ratio are affected by unobservable firm characteristics, we use fixed-effects estimation with panel data that include firm fixed effects (Equations (1) and (2)).

3.3.2. Market reactions to corporate tax rate reduction announcements

To examine the relation between abnormal stock returns on the nine selected event dates, we develop our model in Equation (3) below:

$$
\begin{aligned}
\mathrm{CAR}_{id} = {} & \gamma_0 + \gamma_1 \Delta \mathrm{FOR\_SH}_{id} + \gamma_2 \mathrm{QUICK}_{iq-1} + \gamma_3 \mathrm{GROWTH}_{iq-1} + \gamma_4 \Delta \mathrm{ETR\_AVG}_{iy} \\
& + \gamma_5 \mathrm{DEBT}_{iq-1} + \gamma_6 \Delta \mathrm{DEBT}_{iq} + \gamma_7 \mathrm{SIZE}_{iq-1} + \gamma_8 \mathrm{LOSS}_{iq-1} + \gamma_9 \mathrm{NDTA}_{iq-1} \\
& + \gamma_{10} \mathrm{DIV}_{iy-1} + \mathrm{INDUSTRY} + \varepsilon_{id}
\end{aligned} \tag{3}
$$

where

CAR	= three-day cumulative abnormal returns (CAR), measured as the cumulative abnormal stock returns of the three trading days spanning from one day before through one day after the event date;
ΔFOR_SH	= change in the percentage of shares owned by foreign investors surrounding the event date;
ΔETR_AVG	= change in ETR, measured as the difference between the average ETR after the corporate tax rate deduction (2010 and 2011) and the average ETR before the corporate tax rate deduction (2008 and 2009);
ΔDEBT	= change in long-term debt ratio, measured as the quarterly change of long-term debt ratio;
LOSS	= loss firm, a dummy variable that equals 1 if a firm's net income is negative and 0, otherwise;
NDTA	= net deferred tax assets, measured as the difference between deferred tax assets and deferred tax liabilities, divided by total assets;
DIV	= dividend payout ratio in the preceding year, measured as dividend per share divided by earnings per share; and
INDUSTRY	= industry dummies.

The subscripts d, q, and y index the day, quarter, and year in which the event date occurs, respectively. For the calculation of CAR, we use the seemingly unrelated regression (SUR) model to compute abnormal stock returns for every firm on each event date to address potential concern about cross-sectional dependence of event clustering (Dyckman, Philbrick, & Stephan, 1984). The estimation period used in the study contains 150 trading days and covers the period from t-219 to t-20 trading days preceding the first event date (t) of the two phases of the corporate tax rate reduction.[10]

The three variables of interest in this regression include ΔFOR_SH, QUICK, and GROWTH. ΔFOR_SH measures the change in foreign ownership surrounding the announcement of a tax rate reduction. In H5, we hypothesize that foreign shareholders benefit more than domestic shareholders from a corporate tax rate reduction. In view of the direct tax benefit, foreign investors bid up stock prices. We therefore predict that $\gamma_1 > 0$ captures the companies' liquidity constraints. Higher QUICK indicates fewer liquidity constraints. H6 posits that firms with greater liquidity constraints benefit more from a corporate tax rate reduction than other firms and thus are more likely to receive greater *CAR*s. We thus predict $\gamma_2 < 0$. GROWTH measures the companies' growth opportunities. As stated in H7, firms with greater growth opportunities benefit more from a corporate tax rate reduction and the market thus tends to react positively to firms with greater growth opportunities. We predict $\gamma_3 > 0$.

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[10] We obtain abnormal stock returns on event dates by performing the SUR model as follows: $R_{it} = \alpha_{it} + \beta_i Rm_t + \Sigma_T \gamma_{it} D_t + \varepsilon_{it}$ where R_{it} is firm i's daily stock return at day t. The trading days used in the SUR model include the estimation period of 150 trading days and the event periods. Each event period $_T$ spans the day before through the day after the event. R_{mt} is the market return at day t. D is the dummy variable, which equals 1 if the day occurs in event period $_T$ and 0 otherwise. The coefficient γ is firm i's abnormal stock return on event date $_T$ when D equals 1. ε is the residual term.

The direction and extent of market reactions to the announcement of a tax rate reduction are also dependent on the associated tax benefits enjoyed by a firm. Firms whose ETRs drop after a tax rate reduction are more likely to enjoy tax benefits, and their stock prices tend to be bid up by foreign investors. Thus, we predict $\gamma_4 < 0$.

We include several control variables that could contaminate market reactions surrounding announcement periods, as well as industry dummies. The cost of a debt covenant (DEBT) is used to control for the effect of debt covenant constraints on stock returns on event dates. Change in long-term debt ratio (ΔDEBT) captures the change in tax shield when the level of debt changes. Size effect (SIZE) controls for differences in a firm's ability and resources to do tax planning (Lassila, Omer, Shelley, & Smith, 2010; Omer, Bedard, & Falsetta, 2006). Loss firm (LOSS) is included, as a loss firm has different tax treatments than a profit firm. We add net-deferred assets (NDTA), because market reactions may be contaminated by firms' deferred assets and liabilities (Givoly & Hayn, 1992). The inclusion of dividend policy (DIV) is because market reactions may be associated with corporate payouts.

4. Empirical Results

4.1. Economic Consequences of the Corporate Tax Rate Reduction

We start with the economic consequence of the tax rate reduction. Table 2 describes variables in the sample used in economic consequence tests. Panel A of Table 2 presents descriptive statistics. The mean of foreign ownership is only 7.522%, which is low and explains the government's tax reform initiative to attract foreign investors. The average dividend payout ratio is 40.665%.

Panel B of Table 2 reports the correlation matrix. Firms in the post-tax rate reduction period (POST) are positively associated with foreign ownership, change in foreign ownership, growth opportunities, return on equity, and dividend payout ratio, but negatively associated with change in the ETR and free cash flows. The correlations across other variables are generally in line with those found in prior studies and economic intuitions.

4.1.1. The impact of a corporate tax rate reduction on corporate dividends

We first test H1 to determine whether a reduced corporate tax rate is associated with an increase in dividend payout ratio. The empirical results are reported in Table 3. The partial effect of POST on DIV is captured by the sum of α_1 and $\alpha_3 \times \Delta$FOR (Jaccard & Turrisi, 2003; Wooldridge, 2003). We find that the coefficients on α_1 and α_3 are 5.243 and 0.442 and statistically significant, respectively.[11] The mean of ΔFOR is -0.204. Hence, at the mean value of ΔFOR, the partial effect of POST on DIV is 5.153. In terms of the economic significance, this means that the payout rate increased by 5.153% after implementing the tax rate cut, which is an increase of about 12% relative to the average dividend payout ratio of 42.9% in 2009. When we plug in the value of the bottom 10th percentile of ΔFOR (-3.780) to estimate the partial effect of POST on DIV, we find that the sum of α_1 and $\alpha_3 \times \Delta$FOR is 3.572. This result shows that the partial effect of POST on DIV remains positive and significant (p-value $< .0001$) even for firms at the bottom 10th percentile of ΔFOR and suggests a large extent of the effect of POST on DIV across our sample firms. Overall, the results are consistent with our H1 that firms increase dividend payout

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[11]The Hausman χ^2 statistic for testing the consistency of random-effects estimation is 383 (p-value $< .01$), which suggests that the random-effects model may be inconsistent. Accordingly, we report only the fixed-effects estimation results.

Table 2.   Economic consequences of the corporate tax rate reduction

Panel A: Descriptive statistics

Variables	Mean	SD	Med.	Min.	Max.
FOR (%)	7.522	12.045	2.490	0.000	59.970
POST	0.500	0.500	0.500	0.000	1.000
ΔETR (%)	0.015	0.397	0.000	−0.941	0.957
ΔFOR (%)	−0.204	4.059	0.000	−16.080	15.360
QUICK	1.810	2.096	1.199	0.039	14.263
GROWTH (%)	4.801	40.247	−0.215	−71.290	241.190
SIZE	15.121	1.325	14.957	12.451	19.249
ROE (%)	4.056	18.334	6.627	−84.266	38.836
DEBT (%)	35.563	17.078	34.248	4.667	82.626
DIV (%)	40.665	36.510	42.919	0.000	100.000
FCF (%)	−1.760	12.116	−0.455	−49.758	29.726

FOR = foreign ownership, measured as shares owned by foreign shareholders divided by the number of shares outstanding;
POST = the post-tax rate reduction period, a dummy variable that equals 1 if a firm-year observation falls in the period from 2010 to 2011; and 0 otherwise;
ΔETR = change in a firm's ETR, measured as the difference in its ETR between the current and prior year;
ΔFOR = change in a firm's foreign ownership, measured as the difference of foreign ownership between current year and prior year;
QUICK = quick ratio, measured as quick assets divided by current liabilities;
GROWTH = growth opportunity, measured as change of net sales in year t, adjusted for industry growth;
SIZE = firm size, measured as the natural log value of total assets;
ROE = return on equity, measured as net income divided by average shareholder equity;
DEBT = debt ratio, measured as total debt divided by total assets;
DIV = dividend payout ratio, measured as dividend per share divided by earnings per share;
FCF = free cash flows, measured as cash flows from operations minus capital expenditure, divided by total assets at the beginning of year t.

Note: The sample consists of 4684 firm-year observations.

Panel B: Correlation matrix

	FOR	POST	ΔETR	ΔFOR	QUICK	GROWTH	SIZE	ROE	DEBT	DIV	FCF
FOR	1	0.03	−0.02	0.13	−0.04	0.04	0.47	0.16	−0.02	0.14	0.02
		(0.04)	(0.09)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.13)	(0.00)	(0.15)
POST	0.02	1	−0.05	0.17	0.01	0.23	0.02	0.09	−0.01	0.07	−0.17
	(0.09)		(0.00)	(0.00)	(0.31	(0.00)	(0.14)	(0.00)	(0.66)	(0.00)	(0.00)
ΔETR	−0.02	−0.06	1	−0.02	0.01	−0.09	−0.01	−0.15	−0.02	−0.09	−0.02
	(0.16)	(0.00)		(0.18)	(0.31)	(0.00)	(0.40)	(0.00)	(0.14)	(0.00)	(0.26)
ΔFOR	0.15	0.14	−0.02	1	0.00	0.09	−0.02	0.06	−0.01	0.01	0.01
	(0.00)	(0.00)	(0.26)		(0.81)	(0.00)	(0.19)	(0.00)	(0.67)	(0.50)	(0.52)
QUICK	−0.02	0.01	0.04	0.00	1	−0.05	−0.21	0.06	−0.54	0.09	0.10
	(0.15)	(0.62)	(0.01)	(0.87)		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GROWTH	0.07	0.31	−0.07	0.10	−0.02	1	0.00	0.28	0.08	0.03	−0.12
	(0.00)	(0.00)	(0.00)	(0.00)	(0.20)		(0.99)	(0.00)	(0.00)	(0.07)	(0.00)
SIZE	0.58	0.02	−0.01	0.10	−0.24	0.06	1	0.18	0.14	0.17	0.03
	(0.00)	(0.12)	(0.34)	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)	(0.04)
ROE	0.23	0.10	−0.16	0.10	0.13	0.39	0.18	1	−0.25	0.45	0.09
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
DEBT	−0.02	0.00	−0.03	0.00	−0.67	0.07	0.16	−0.09	1	−0.24	−0.13
	(0.20)	(0.77)	(0.05)	(0.85)	(0.00)	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)
DIV	0.19	0.07	−0.07	0.05	0.24	0.11	0.18	0.50	−0.22	1	0.11
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)		(0.00)
FCF	0.00	−0.19	−0.02	0.02	0.15	−0.10	0.00	0.09	−0.13	0.09	1
	(0.86)	(0.00)	(0.19)	(0.23)	(0.00)	(0.00)	(0.95)	(0.00)	(0.00)	(0.00)	

Note: *p*-Value is reported in parentheses. The upper (lower) triangle reports the Pearson (Spearman) correlation.

Table 3. The impact of the corporate tax rate reduction on corporate dividend payouts

$$\text{DIV}_{it} = \alpha_0 + \alpha_1 \text{POST}_{it} + \alpha_2 \Delta\text{FOR}_{it} + \alpha_3 \text{POST}_{it} \times \Delta\text{FOR}_{it} + \alpha_4 \text{SIZE}_{it}$$
$$+ \alpha_5 \text{ROE}_{it} + \alpha_6 \text{DEBT}_{it} + \alpha_7 \text{GROWTH}_{it} + \alpha_8 \text{QUICK}_{it} + \alpha_9 \text{FCF}_{it} + \mu_{it}$$

Variables	Predicted Sign	Coefficient	t-Statistic	p-Value
Intercept	?	N/A		
POST	+	5.243***	7.10	.000
ΔFOR	?	−0.184	−1.48	.139
POST × ΔFOR	+	0.442**	2.26	.024
SIZE	+	2.880	1.44	.151
ROE	+	0.144***	4.93	.000
DEBT	−	−0.312***	−5.17	.000
GROWTH	−	−0.020*	−1.86	.064
QUICK	+	−0.338	−0.77	.439
FCF	+	0.084**	2.30	.021
R^2			.71	
F statistic			4.91***	

Notes: The sample consists of 4684 firm-year observations. Firm fixed effects are included. Please refer to Table 2 for variable definitions.
*Statistical significance (two-tailed) at the 10% level.
**Statistical significance (two-tailed) at the 5% level.
***Statistical significance (two-tailed) at the 1% level.

ratio after a tax rate reduction. For control variables, their signs are generally consistent with our predictions based on prior studies and economic intuitions.

H3 posits that a higher dividend payout ratio is associated with increased foreign ownership after the implementation of the tax rate reduction. We find that, consistent with H3, the coefficient on the interaction term, POST × ΔFOR, is 0.442 and statistically significant, which shows that an increase in foreign ownership is associated with a higher dividend payout ratio after the tax rate reduction. The evidence is in line with the idea that the tax rate reduction increases foreign shareholders' tax incentive for greater dividend payouts. Overall, our empirical findings in Table 3 show that the tax rate reduction is associated with a higher corporate dividend payout rate. Moreover, the increase in dividend payout ratio is even higher for firms that increase their foreign ownership after tax rates are reduced.

4.1.2. The impact of a corporate tax rate reduction on foreign ownership

In Table 4, we report the results of H2 with regards to the relation between the tax rate reduction and foreign ownership.[12] The effect of POST on FOR is determined by the sign of the sum of β_1 and $\beta_3 \times \Delta\text{ETR}$. The coefficient on POST is 0.524 and statistically significant at the 1% level. The coefficient on β_3 is −0.809 and significant at the 5% level, which indicates that the increase in foreign investment is greater for firms with a bigger decrease in the ETR after the tax rate reduction. The mean value of ΔETR is 0.015. Thus, the partial effect of POST on FOR is 0.512 at the mean value of ΔETR. This partial effect is also economically significant. Compared with the average foreign ownership of 7.3% in 2009, the

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[12]The Hausman χ^2 statistic for testing the consistency of random-effects estimation is 45.77 (p-value < .01), which suggests that the random-effects model may be inconsistent. Accordingly, we report only the fixed-effects estimation results.

Table 4. The impact of the corporate tax rate reduction on foreign ownership
$FOR_{it} = \beta_0 + \beta_1 POST_{it} + \beta_2 \Delta ETR_{it} + \beta_3 POST_{it} \times \Delta ETR_{it} + \beta_4 QUICK_{it} + \beta_5 GROWTH_{it} + \beta_6 SIZE_{it} + \beta_7 ROE_{it} + \beta_8 DEBT_{it} + \epsilon_{it}$

Variables	Predicted Sign	Coefficient	*t*-Statistic	*p*-Value
Intercept	?	N/A		
POST	+	0.524***	4.74	.000
ΔETR	?	0.023	0.10	.924
POST × ΔETR	−	−0.809**	−2.21	.027
QUICK	+	0.025	0.38	.704
GROWTH	+	0.003	1.58	.114
SIZE	+	1.741***	3.88	.000
ROE	+	0.014	1.33	.185
DEBT	−	0.005	0.36	.720
R^2		.93		
F statistic		30.85***		

Notes: The sample consists of 4684 firm-year observations. Firm fixed effects are included. Please refer to Table 2 for variable definitions.
*Statistical significance (two-tailed) at the 10% level.
**Statistical significance (two-tailed) at the 5% level.
***Statistical significance (two-tailed) at the 1% level.

increase of 0.512% in the foreign ownership in the post-tax reduction period accounts for about 7.0% of the average foreign ownership in 2009. When we insert the value of the top 10% of ΔETR (0.545) to estimate the value of β_1 and $\beta_3 \times$ ΔETR, the sum of β_1 and $\beta_3 \times$ ΔETR is 0.083. This shows that even for firms at the top 10th percentile of ΔETR, the partial effect of POST on FOR continues to stay positive and significant (*p*-value = .003), suggesting how substantial the positive partial relation is in our sample firms. These findings suggest that foreign investors anticipated an increase in after-tax income and thus increased their shares after implementing the tax rate reduction cut. Overall, our results are in line with H2 and are consistent with the tax clientele effect of corporate tax reductions, suggesting that tax incentive plays an important role in shaping foreigners' investment decision. For control variables, their signs are in line with our predictions.

4.2. Market Reactions to the Announcements of a Corporate Tax Rate Reduction

We first present three-day stock returns surrounding selected events that led to the implementation of the corporate tax reduction. Panel A of Table 5 reports the descriptive statistics of raw returns on selected events. In eight of the nine events, the mean of stock returns are positive and range from 0.57% to 3.01%, suggesting that the market favorably views news about corporate tax cuts. The minimum and maximum returns are around 7% across all event dates, because the daily change in a stock's price is capped at 7% by the Taiwan Stock Exchange to avoid excessive stock price volatility.[13]

We then calculate abnormal stock returns on these event dates to account for market-wide factors affecting the market reaction to the announcement of a corporate tax rate reduction.

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[13]We conduct three sensitivity tests to show that a 7% cap on stock price change does not affect our results. First, we find that the percentage of firms that reach the 7% cap is relatively small (less than 1% of the total sample). Second, after removing firms that reach the 7% cap from our sample and rerunning our tests, the results remain quantitatively similar. Lastly, we extend our return period to $t + 4$, and our results do not change.

Table 5. Selected event dates and stock returns

Panel A: Descriptive statistics of raw returns on the selected event dates

Event dates	Mean	SD	Med.	Min.	Max.
Corporate income tax rate reduced from 25% to 20%					
2008/07/28 (Mon.)	−1.97	2.55	−2.15	−7.00	6.99
2009/03/05 (Thur.)	1.38	2.56	1.01	−6.92	6.99
2009/03/11 (Wed.)	0.62	2.81	0.30	−7.00	7.00
2009/04/02 (Thur.)	1.61	2.59	1.14	−6.90	7.00
2009/05/04 (Mon.)	3.01	3.06	2.80	−6.97	7.00
Corporate income tax rate reduced from 20% to 17%					
2010/04/09 (Fri.)	0.57	2.08	0.29	−6.88	7.00
2010/04/12 (Mon.)	0.63	2.44	0.13	−6.89	6.99
2010/04/23 (Fri.)	0.58	2.03	0.18	−5.79	6.99
2010/05/28 (Fri.)	1.22	1.79	0.90	−4.54	7.00

Panel B: Three-day cumulative abnormal stock returns

Date	Event	Average of abnormal stock returns (%)
Phase I: Corporate income tax rate reduced from 25% to 20%		
2008/7/28	The Tax Reform Commission of the Executive Yuan proposed reducing the corporate tax rate from 25% to 20%	0.42 (3.06) ***
2009/3/5	The Executive Yuan passed an amendment to the Income Tax Law to reduce the corporate income tax rate to 20%	0.32 (2.16) **
2009/3/11	The amendment to the Income Tax Law was sent to the Legislative Yuan to complete the legislature procedures	1.43 (9.46) ***
2009/4/02	The Finance Committee of the Legislative Yuan passed the first reading of the amendment to the Income Tax Law	1.51 (8.55) ***
2009/5/4	The Legislative Yuan general meeting passed the second and third readings of the amendment to the Income Tax Law, reducing the corporate income tax rate to 20%	−2.59 (−13.23) ***

Phase II: Corporate income tax rate reduced from 20% to 17%

2010/4/9	In proposing the Industrial Innovation Act, the Executive Yuan agreed that the corporate income tax rate could be further reduced if most of the existing tax incentives were terminated	0.38 (2.62) ***
2010/4/12	Both major political parties (Kuomintang and Democratic Progressive Party) agreed to eliminate most tax incentives from the Industrial Innovation Act, with a proposal to further reduce the corporate income tax rate. The Kuomintang caucus proposed to reduce the tax rate to 17%, and the Democratic Progressive Party caucus to 17.5%	0.06 (0.45)
2010/4/23	The Finance Committee of the Legislative Yuan passed the first reading of the amendment to the Income Tax Law to reduce the corporate income tax rate to 17%	−0.89 (−6.62) ***
2010/5/28	The Legislative Yuan general meeting passed the second and third readings of the amendment to the Income Tax Law, reducing the corporate income tax rate to 17%	1.29 (11.90) ***

Note: *t*-Statistics are reported in parentheses.
*Statistical significance (two-tailed) at the 10% level.
**Statistical significance (two-tailed) at the 5% level.
***Statistical significance (two-tailed) at the 1% level.

Panel B of Table 5 shows that abnormal stock returns are positive in seven of the nine events. In particular, the events that generated positive market reactions are clustered around dates before the first reading of the amendment to the Income Tax Law and around the announcement dates of a further tax rate reduction from 20% to 17%. Taken together, the results are consistent with our H4 that investors view the tax rate reductions as benefits to shareholders.

4.3. Cross-sectional Variations in Returns Surrounding the Announcement of a Corporate Tax Rate Reduction

We conduct tests to examine the cross-sectional variations in stock returns surrounding the announcement of a corporate tax rate reduction. Table 6 presents the sample used in these tests. Panel A of Table 6 reports descriptive statistics of the sample. We find that the mean of CAR is 0.26%, which indicates a positive market reaction in response to the announcement of a reduction in the corporate tax rate. Also, the change in foreign ownership during the three-day announcement window is on average 0.025%, suggesting that the announcement of a corporate tax rate reduction has a positive effect on foreign investment and provides consistent evidence to complement our H2. The correlation matrix in Panel B of Table 6 indicates that abnormal stock returns are positively associated with a change in foreign ownership and growth opportunities and negatively associated with liquidity and decreased ETR.

We test H5 to H7 and report the empirical findings in Table 7. Our results indicate that the coefficient on *ΔFOR_SH* is positive and significant at the 1% level, suggesting that foreign investors bid up stock prices in anticipation of an increase in their after-tax dividend income in response to a tax rate reduction. This finding is consistent with H5. We also find that the coefficients of QUICK and GROWTH are statistically significant and exhibit negative and positive

Table 6. Market reactions to events leading to the implementation of the corporate tax rate reduction

Panel A: Descriptive statistics

Variables	Mean	SD	Med.	Min.	Max.
CAR (%)	0.258	4.46	−0.143	−10.814	14.952
ΔFOR_SH (%)	0.025	0.18	0	−0.675	0.928
QUICK	1.853	1.81	1.316	0.04	10.894
GROWTH (%)	1.504	23.38	0	−55.76	98.63
DEBT (%)	5.468	7.86	0.763	0	32.176
ΔDEBT (%)	0.11	2.56	0	−8.802	13.545
SIZE	15.285	1.29	15.114	13.041	19.466
LOSS	0.213	0.41	0	0	1
NDTA (%)	0.026	2.13	0.05	−7.964	6.549
DIV (%)	48.795	33.82	54.296	0	100
ΔETR_AVG (%)	−4.056	23.74	−2.238	−100	100

CAR (%)	=	three-day cumulative abnormal stock returns, measured as the sum of abnormal stock returns of three trading days spanning from the day before to the day after the event date;
ΔFOR_SH	=	change in foreign ownership surrounding the event date;
QUICK	=	quick ratio, measured as quick assets divided by current liabilities;
GROWTH	=	growth opportunity, measured as the change of net sales in quarter q-1, adjusted for industry growth;
DEBT	=	long-term debt ratio, measured as long-term debt divided by total assets;
ΔDEBT	=	change in long-term debt ratio, measured as the change of long-term debt ratio in quarter q-1;
SIZE	=	firm size, measured as the natural log value of total assets;
LOSS	=	loss firm, a dummy variable that equals 1 if a firm's net income is negative and 0 otherwise;
NDTA	=	net deferred tax assets, measured as the difference between deferred tax assets and deferred tax liabilities, divided by total assets;
DIV	=	dividend payout ratio in preceding year, measure as dividend per share divided by earnings per share; and
ΔETR_AVG	=	change in ETR, measured as the difference between the average ETR after the corporate tax rate deduction (2010 and 2011) and the average ETR before the corporate tax rate deduction (2008 and 2009).

Note: The sample comprises 7584 firm-event observations.

Panel B: Correlation matrix

	CAR	ΔFOR_SH	QUICK	GROWTH	DEBT	ΔDEBT	SIZE	LOSS	NDTA	DIV	ΔETR_AVG
CAR	1	0.09 (0.00)	−0.04 (0.00)	0.02 (0.05)	0.01 (0.43)	−0.01 (0.39)	−0.01 (0.33)	0.01 (0.20)	0.00 (0.94)	−0.03 (0.01)	−0.03 (0.00)
ΔFOR_SH	0.05 (0.00)	1	0.01 (0.61)	0.03 (0.02)	0.02 (0.08)	−0.03 (0.03)	0.10 (0.00)	0.00 (0.94)	0.00 (0.78)	0.00 (0.79)	0.03 (0.01)
QUICK	−0.03 (0.07)	0.02 (0.07)	1	−0.03 (0.00)	−0.21 (0.00)	−0.05 (0.00)	−0.25 (0.00)	−0.04 (0.00)	0.11 (0.00)	0.11 (0.00)	0.04 (0.00)
GROWTH	0.04 (0.00)	0.02 (0.11)	0.00 (0.93)	1	−0.03 (0.01)	0.00 (0.75)	0.00 (0.90)	−0.16 (0.00)	0.01 (0.59)	0.05 (0.00)	0.00 (0.77)
DEBT	−0.01 (0.61)	0.02 (0.05)	−0.36 (0.00)	−0.03 (0.03)	1	−0.13 (0.00)	0.27 (0.00)	0.15 (0.00)	0.06 (0.00)	−0.17 (0.00)	−0.02 (0.04)
ΔDEBT	−0.01 (0.42)	−0.03 (0.01)	0.03 (0.01)	0.02 (0.12)	−0.28 (0.00)	1	0.00 (0.82)	−0.01) (0.22	−0.01 (0.51)	0.02 (0.07)	0.01 (0.53)
SIZE	−0.01 (0.49)	0.10 (0.00)	−0.31 (0.00)	0.01 (0.44)	0.29 (0.00)	0.02 (0.04)	1	−0.03 (0.01)	−0.10 (0.00)	0.07 (0.00)	−0.02 (0.03)
LOSS	0.01 (0.61)	0.01 (0.64)	−0.11 (0.00)	−0.19 (0.00)	0.14 (0.00)	−0.03 (0.00)	−0.04 (0.00)	1	0.12 (0.00)	−0.30 (0.00)	−0.11 (0.00)
NDTA	0.00 (0.90)	0.00 (0.76)	0.09 (0.00)	−0.01 (0.23)	0.00 (0.92)	−0.02 (0.14)	−0.12 (0.00)	0.14 (0.00)	1	−0.11 (0.00)	−0.03 (0.00)
DIV	−0.01 (0.55)	0.00 (0.81)	0.21 (0.00)	0.07 (0.00)	−0.18 (0.00)	0.05 (0.00)	0.05 (0.00)	−0.29 (0.00)	−0.11 (0.00)	1	0.05 (0.00)
ΔETR_AVG	−0.04 (0.00)	0.04 (0.00)	0.03 (0.01)	−0.01 (0.52)	0.01 (0.37)	0.00 (0.96)	−0.02 (0.05)	−0.06 (0.00)	−0.01 (0.48)	−0.05 (0.00)	1

Note: p-Value is reported in parentheses. The upper (lower) triangle reports the Pearson (Spearman) correlation.

Table 7. Tests of market reactions to events leading to the implementation of the corporate tax rate reduction

$$\text{CAR}_{id} = \gamma_0 + \gamma_1 \Delta\text{FOR\_SH}_{id} + \gamma_2\text{QUICK}_{iq-1} + \gamma_3\text{GROWTH}_{iq-1} + \gamma_4\Delta\text{ETR\_AVG}_{iy} + \gamma_5\text{DEBT}_{iq-1}$$
$$+ \gamma_6\Delta\text{DEBT}_{iq} + \gamma_7\text{SIZE}_{iq-1} + \gamma_8\text{LOSS}_{iq-1} + \gamma_9\text{NDTA}_{iq-1} + \gamma_{10}\text{DIV}_{iy-1} + \text{INDUSTRY} + \varepsilon_{id}$$

Variables	Predicted Sign	Coefficient	*t*-Statistic	*p*-Value
Intercept	?	2.276***	3.41	.001
ΔFOR_SH	+	2.325***	8.30	.000
QUICK	−	−0.080***	−2.64	.008
GROWTH	+	0.004*	1.78	.076
ΔETR_AVG	?	−0.006***	−2.64	.008
DEBT	?	−0.001	−0.17	.861
ΔDEBT	?	−0.016	−0.82	.415
SIZE	?	−0.122***	−2.81	.005
LOSS	?	−0.013	−0.10	.924
NDTA	?	−0.014	−0.56	.577
DIV	?	−0.005***	−2.71	.007
INDUSTRY		Included		
Adjusted R^2		.015		
F statistic		7.85***		

Notes: The sample consists of 7584 firm-event observations. Please refer to Table 6 for variable definitions.
*Statistical significance (two-tailed) at the 10% level.
**Statistical significance (two-tailed) at the 5% level.
***Statistical significance (two-tailed) at the 1% level.

signs, respectively, which show that firms that experience greater liquidity constraints and growth opportunities before the tax rate reduction are more likely to benefit from a reduced corporate tax rate. These results are consistent with H6 and H7.

The sign of ΔETR_AVG is negative and significant at the 1% level. This is in line with our conjecture that stock prices of firms with a bigger decrease in ETRs after the decrease in the tax rate tend to be bid up by foreign investors because of greater tax benefits. The result is line with our test results for H5 that a tax rate reduction provides a tax incentive to foreign investors. For control variables, the coefficient on SIZE is negative, suggesting that small firms receive greater tax benefits from the tax rate cut than large firms, possibly because of small firms' financial constraints and limited tax planning resources. The coefficient on DIV is negative, suggesting there is more room for firms with a lower payout ratio to increase it in response to pressure from foreign shareholders. Collectively, the findings in Table 7 are consistent with H5–H7. Specifically, foreign investors bid up share prices in anticipation of tax benefits from the corporate tax rate reduction. Firms with greater liquidity constraints and growth opportunities tend to benefit more from the tax rate reduction and thus investors tend to bid up share prices of these firms.

5. Conclusions

Imputation tax systems integrate corporate and shareholder personal income taxes to alleviate double taxation on corporate dividend income. Few studies have addressed the tax policy implications of lowering corporate tax rates in an imputation system. A growing trend is for countries to reduce their corporate tax rate to improve their economies and attract foreign investment. Our study employs Taiwan's implementation of the tax rate reduction as a setting to investigate whether lowering a corporate tax rate benefits shareholders and is associated with economic impacts under an imputation tax system.

Our empirical findings show that the tax rate reduction under an imputation system is associated with two important economic impacts: the corporate dividend payout ratio and foreign investment increase. The increase in the dividend payout ratio is even higher for firms that increase their foreign ownership in the post-tax rate reduction period. We also find that stock prices increase in response to the announcement of a corporate tax rate reduction. The positive market reaction is more pronounced for firms with a greater increase in foreign ownership in response to the tax rate reduction, consistent with the view that the decrease in tax rate help attract foreign investors who bid up the stock prices. Additionally, the increase in stock prices is more pronounced for firms with greater liquidity constraints and more growth opportunities before the tax rate reduction, suggesting these firms benefit most from a reduced corporate tax rate. The market reaction is also stronger for firms with a bigger decrease in ETRs after the tax rate reduction, suggesting that foreign investors bid up stock prices for greater tax benefits. Overall, our results are in line with the notion that reducing a corporate tax rate can help attract foreign investors in countries with an imputation tax system because, unlike domestic shareholders, foreign shareholders pay lower taxes as a result of the tax cut. Our study complements the literature on imputation tax systems and tax clientele theory and provides an important implication about the benefits of corporate tax rate reductions in countries with an imputation tax system.

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