Dividend taxes and small firm's responses: evidence from Canada

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August 16, 2021

Abstract

This paper assesses the effects of dividend taxes on taxable income, dividends and investment by exploiting unique institutional settings in Canada, where corporate and personal taxes were fully or partially integrated (depending on the size of the firm). Using a bunching strategy, we estimate the effect of this reform on taxable income by estimating the elasticity of taxable income with respect to the integration rate. We show that an increase of 10 percentage points on the integration rate between corporate and personal taxes, increases the taxable income by 4.5 percent. In addition, we use a difference in difference strategy that compares the outcome of firms whose integration rates increased, due to an unanticipated reform in 2006, to the outcomes of unaffected firms. We estimate that an increase in the integration rate (or a reduction in the dividend tax rate) does not affect investment and increases dividends. However, for small enterprises those with less than 5 employees, an increase in the integration rate only increased dividends with negative effect on investment. These results suggest that a subset of firms are used as a tax shelter, and for other firms, standard theoretical predictions explain the relationship between investment, dividends and dividend taxes.

1 Introduction

Dividend taxes are a controversial tool to raise revenue. Supporters argue for higher dividend tax rates because of their progressive nature. Critics argue that an increase in dividend taxes is detrimental to economic growth and investment. The economic literature corroborates the first

group, showing that dividends accrue to the top of the income distribution, and thus a tax on dividends is a tax on the upper end of the distribution. However, there is no conclusive evidence that an increase of dividend taxes decreases investment and dampens economic growth. The Canadian dividend tax system is based on the concept of tax integration. That is, the corporate tax paid inside a firm may be used as a tax credit for the dividend tax that a shareholder has to pay when she receives dividends. Prior to 2006, shareholders of small firms that receive the small business deduction - a discounted tax rate granted to some Canadian Controlled Private Corporations - could fully deduct the corporate tax paid by these firms when they receive dividends, but shareholders from other firms could only partially deduct the corporate tax paid by the firm.[1] The 2006 tax reform increased the dividend tax credits received by shareholders of large corporations and some Canadian Controlled Private corporations achieving almost full integration. This translated into a reduction of the dividend tax paid by shareholders of large CCPC and other large corporations . Thus, this reform gives an opportunity to identify the effect of a reduction of dividend taxes on tax avoidance behaviour and firms' investment. The scheme for CCPCs before 2006 gives a lower corporate tax rate (the Small Business Deduction) to those firms that declare taxable income less or equal than a define federal threshold. For instance, for 2005, the federal threshold was $300.000 CAD. A CCPC that receive the small business deduction can generate income higher than the federal threshold, but the profits in excess of the federal threshold are taxed at a general corporate tax rate higher than the small business tax rate. Prior to 2006 all types of dividends (paid out from after tax income subject to the small business tax rate or the general rate) were eligible the same amount of corporate tax credit, an amount closer to the small business tax rate. This framework creates strong incentives for tax planning. Firms and shareholders face incentives to declare taxable income not exceeding the federal threshold because income declared in excess of the threshold is taxed at a higher rate and dividends paid out of this income are not fully credited for this higher

[1]The SBD reduces the corporate income tax that a corporation would otherwise have to pay in a taxation year throughout which it was a Canadian-controlled private corporation (CCPC). A corporation's SBD for a taxation year is generally calculated by multiplying its SBD rate by the lesser of its: 1) income for the year from an active business carried on in Canada, excluding certain income and exceeding certain losses; 2) taxable income for the year; and 3) business limit for the year. For example, in 2018 A CCPC's business limit for a taxation year is $500,000, prorated for the number of days in the year if there are less than 51 weeks in the year. The business limit must be allocated amongst corporations that are associated in a taxation year, and is reduced by any portion that the CCPC assigns to another corporation. The CCPC's remaining business limit is then further reduced on a straight-line basis if the combined taxable capital employed in Canada of the CCPC and any associated corporations is between $10 million and $15 million (the taxable capital business limit reduction).

corporate tax rate, leading to higher personal income taxes payable on these dividends. After the 2006 dividend tax reform, dividends that were subject to the general tax rate received a higher tax credit making tax planning less desirable. We use this reduction in the incentive for tax planning as our identification strategy to measure the tax avoidance effects generated by this lower tax credit. To do so, we use a Bunching empirical strategy (Saez, 2010; Chetty et al, 2011; Devereux et al. 2014; Kleven, 2016). We show that there are tax planning incentives both before and after the 2006 tax reform, but the pre-reform incentives are 5 times stronger.

Regarding the effects of dividend taxation on investment, the literature divides into two branches: papers that argue that the dividend tax affects investment behaviour (the well-known Old View) and papers that argue that there is no effect of dividend taxes on investment (the New View). The rationale for the Old View is the idea that marginal investment projects are financed by issuing new shares so that an increase in the dividend tax rate, reduces shareholders returns, discouraging investment. Advocates of the New View argue that the marginal source of financing is retained earnings, because there are tax advantages compared with other sources. In this context, dividends are a residual and an in increase in the dividend tax rate does not affect investment; it merely affects share prices.[2] In addition, some authors believe that the difference between the Old View and New View is simply a matter of heterogeneity between firms. New and small firms will use share issuance to finance investment and mature firms will use retained earnings, Sinn(1991), Korinek and Stiglitz (2008).

In addition, some authors believe that the difference between the Old View and New View is simply a matter of heterogeneity between firms. New and small firms will use share issuance to finance investment and mature firms will use retained earnings, Sinn(1991), Korinek and Stiglitz (2008). The recent empirical literature (Yagan, 2015; Adlastair et al., 2017; Smart, 2018; Boissel and Matray, 2019) also shows some contradictory results. Adlastair (2017) and Smart (2018) show that a decrease in dividend taxes increases investment, while, Yagan (2015) showed that a reduction in the dividend taxed in the United States did not have any effect on investment and Boissel and Matray (2019) show that an increase in dividend taxes did not change investment. None of these

[2]See Auerbach (2002) for a detailed literature review.

previous works focus purely on small firms . Thus, our work is unique in these respects.[3]

We show that the 2006 tax reform does not affect for those CCPCs that declared taxable profits higher than the threshold. This is consistent with the new view. However, for firms with a small numbers of employees -less than 5 employees, we find that the tax reform decreases investment and increases even more dividends. This is consistent with the existence of tax shelter firms. This rest of the paper is structured as follows: Section 2 present the institutional background, Section 3 outlines the tax avoidance effects of the 2006 tax reform, Section 4 discusses the effects of the 2006 tax reform on investment and dividends, and section 5 concludes.

2 Institutional background

2.1 Canadian corporate tax system

In Canada, firms pay corporate taxes depending on their structure, assets and location. Publicly traded and foreign-controlled firms pay the general business tax rate on all of their profits. In contrast, Canadian controlled private corporations (CCPCs) with working capital less than $CAD 15 million pay a substantially lower small business tax rate on profits up to the prescribed federal threshold -profits in excess of this threshold are taxed at the general rate.[4] This lower corporate tax rate is called the small business deduction. Thus, for small firms there is a Kink at the federal threshold taxable income level. Figure 1 shows the taxable scheme for the small businesses in Canada.

[3]Our paper differs from Smart (2018) in the sense that we only work with small firms that are mainly owned by Canadians whereas Smart works with large firms and non CCPC firms owned by Canadians and foreigners. Thus, our results extend and complement those of Smart 2018.

[4]A firm is a Canadian Controlled Private corporation if the following conditions met: i)it is a private corporation, ii) it is a corporation that was resident in Canada and was either incorporated in Canada or resident in Canada from June 18, 1971, to the end of the tax year, iii) it is not controlled directly or indirectly by one or more non-resident persons, iv) it is not controlled directly or indirectly by one or more public corporations (other than a prescribed venture capital corporation, as defined in Regulation 6700 of the Income Tax Regulations), v) it is not controlled by a Canadian resident corporation that lists its shares on a designated stock exchange outside of Canada vi) it is not controlled directly or indirectly by any combination of persons described in the three previous conditions, vii) if all of its shares that are owned by a non-resident person, by a public corporation (other than a prescribed venture capital corporation), or by a corporation with a class of shares listed on a designated stock exchange were owned by one person, that person would not own sufficient shares to control the corporation, viii) no class of its shares of capital stock is listed on a designated stock exchange.

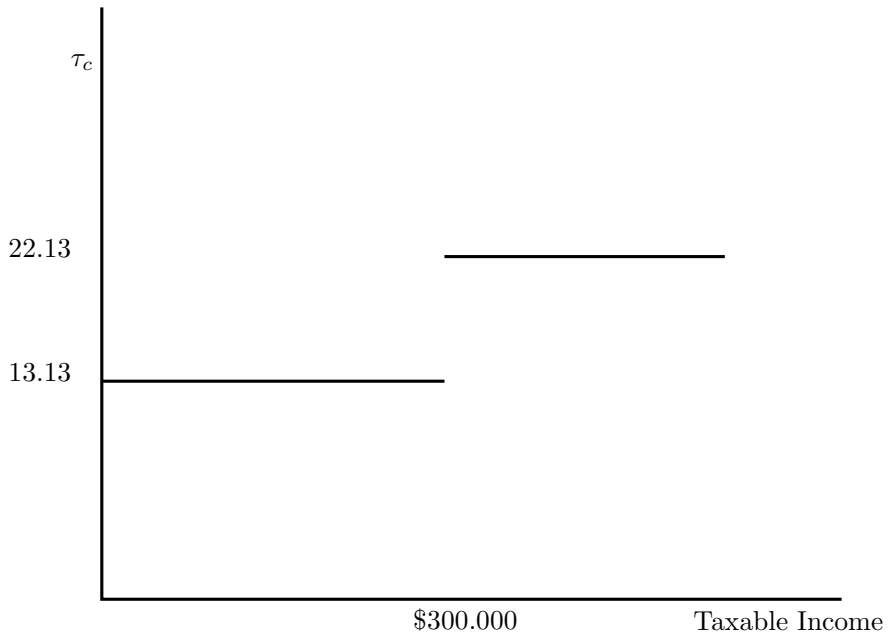


Figure 1: Corporate tax rate scheme for CCPCs that are entitled to the small business deduction for 2006.

For example, a CCPC that declares $200,000 in taxable income pays $26,260 in taxes because only the small business tax rate (the corporate tax rate after applying the small business deduction) is applied to its taxable income. In contrast, a CCPC entitled to the small business deduction that declares $400,000 in taxable income firm must pay $39,390 + $22,130 (i.e., $300.000X 13.13% and $100.000 X 22.13%). As shown in Figure 2, the federal income threshold for the SBD was increased several times since 2000.[5]

[5]There are provincial thresholds but since 2008, the provincial and federal thresholds were the same.

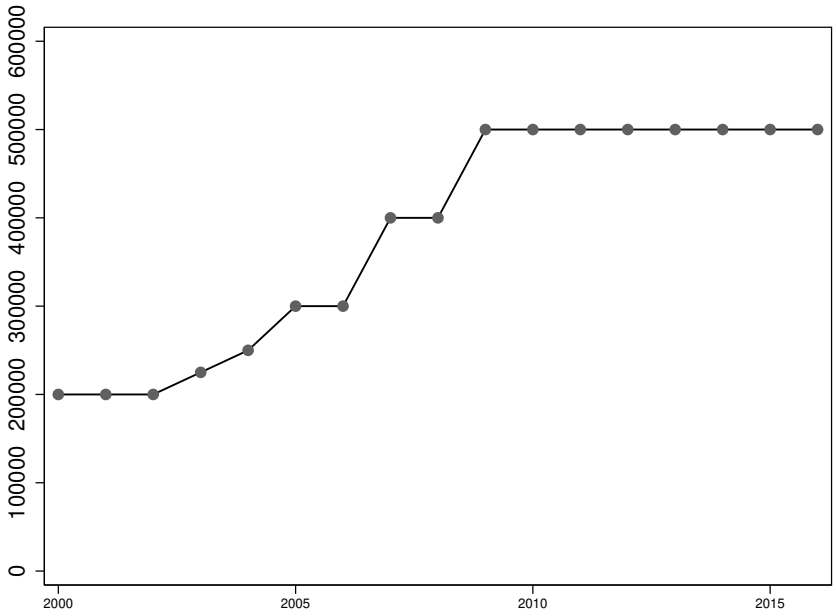


Figure 2: Federal corporate threshold for small business deduction.

Figure 2 shows that the federal threshold level experiences some changes between 2000 and 2016. Notice that between 2005 and 2006 the federal threshold remains constant and equal to $300.000 Canadian dollars.

2.2 Canadian dividend tax system.

A classical corporate income tax system is one where shareholders and corporations are taxed as separated units.[6] This approach may cause double taxation of dividends. Under a fully integrated tax system, dividends are taxed at a lower tax rate to make the combined corporate and dividend tax rate equal to the personal tax rate on other forms of income.[7]

Before 2006 the Canadian dividend tax system was integrated only for the small business deduction tax rate. However, for firms that paid the general corporate tax rate, integration was incomplete at just under 50% of the corporate tax rate.[8] After a major reform in 2006, the tax

[6]Or dividends paid to shareholders are not deductible from corporate tax income.

[7]Since 1949 the Canadian tax system is partially integrated, thus a dividend tax credit is given to shareholders when they received their post corporate tax dividends from the firm.

[8]This applies both to no- CCPCs and CCPCs that generate taxable income in excess of the federal threshold.

system became nearly fully integrated for both large and small firms.

As noted by Smart (2017) the rationales for integration in Canada were: i) Relief from double taxation to reduce the cost of equity finance, ii) investment neutrality between alternative finance instruments, iii) reducing incentives for tax avoidance and iv) promoting investments in Canadian corporations. Thus, integration could increase efficiency by affecting investment, tax avoidance and corporate finance. Since 1972, Canada integration has been achieved through a "gross-up-and-credit" system that aims to reduce double taxation while fully taxing the underlying corporate income at each shareholder's own personal marginal tax rate. Integration thus works in two steps: Step 1: From the after corporate tax dividend amount (div_t), a gross up rate (c) is applied to the dividend. Step 2: A dividend tax credit is applied to the grossed-up amount. The final amount is the Dividend tax credit, and the total tax paid is the personal tax rate multiplied by the grossed up level of dividends minus the DCT. To understand this better, we can have the following example for small and large corporations.[9]

	General	Small business
Federal corporate tax (-)	221	131
Dividend (net of corporate tax receive)	779	869
Gross up dividend (+)	896	1000
Personal tax paid (-)	260	290
DTC (+)	131	131
Dividend tax paid	129	159
Dividend received	650	710

Table 1: Dividend tax system prior to 2006 reform. Taxable income equal to 1000.

Assume a firm, owned by one shareholder, that generates taxable income equal to 1000. This firm faces the general corporate tax rate. First, the firm pay $221 as corporate tax (22.1% of corporate tax rate). Then, the shareholder receives $779 as dividends net of corporate tax rate. To those dividends a gross up rate is applied, transforming those dividends into $896. To this amount, the personal tax is charged (29% percent rate), which gives an amount of $260 ($896*0.29). Finally, a dividend tax credit equal to 13.1% of the taxable income from the firm is applied to the $260. Thus, the net dividend tax paid is equal to $129 ($260-$131), and the dividend net of taxes received

[9]This example is quite simple and ignores the provincial taxes.

by the shareholder is equal to $650 - dividends net of corporate tax ($779) - minus personal tax paid on dividends net of dividend tax credit ($129). However, there is some double taxation because the tax paid by the shareholder in the case of receive the taxable income generated by the firm ($1000) is equal to $290, which is lower to the total tax paid between the firm and the shareholder ($350=$221+$129). As we can see, for small business there is full integration, because it is irrelevant to pay corporate and dividend taxes or to pay only personal taxes for the same taxable income.

2.3 The 2006 tax reform

In November of 2005 a major dividend tax reform was announced and implemented in 2006. The main objective of this tax reform was to attain full corporate and personal tax integration for large corporations. The reform increases the dividend tax credit as well as the gross up rate faced by shareholders of large corporations (or non CCPCs corporations). Table 2 shows a numerical example of the effects of this reform on taxation.

	General	Small business
Federal corporate tax (-)	221	131
Dividend (net of corporate tax receive)	779	869
Gross up dividend (+)	1000	1000
Personal tax paid (-)	290	290
DTC (+)	221	131
Dividend tax paid	69	159
Dividend received	710	710

Table 2: Full integrated tax system after 2006 reform. Taxable income equal to 1000.

In contrast to Table 1, it can be seen that the net of tax dividend received is the same for both firms paying the generate rate and for firms eligible for the SDB. To differentiate between dividends that pay a higher dividend tax credits and dividends from small businesses the concept of eligible dividends was created. For firms that are eligible for the SDB but have income in excess of the federal threshold (which is taxed at the general rate), the concept of an "eligible" dividend was created to ensure proper integration. An "eligible" dividend is a dividend paid out of income exceeding the federal threshold and is entitled to a DTC that matches the general corporate tax rate. A "non-eligible" dividend (paid out of profits below the federal threshold) only receives a DTC

equal to the small business tax rate.[10] To differentiate between 'eligible' and 'non-eligible' dividend given by those firms, a tax form was created, the schedule 55 which contains the general income rate pool (GRIP). The GRIP registers the amounts of eligible dividends that a CCPC can issue on a given year. Small firms can only pay eligible dividends up to the amount that appears in the GRIP. The creation of eligible dividends and the GRIP was unannounced and 'eligible' dividends could be tracked retroactively until 2001 using the GRIP account.[11]

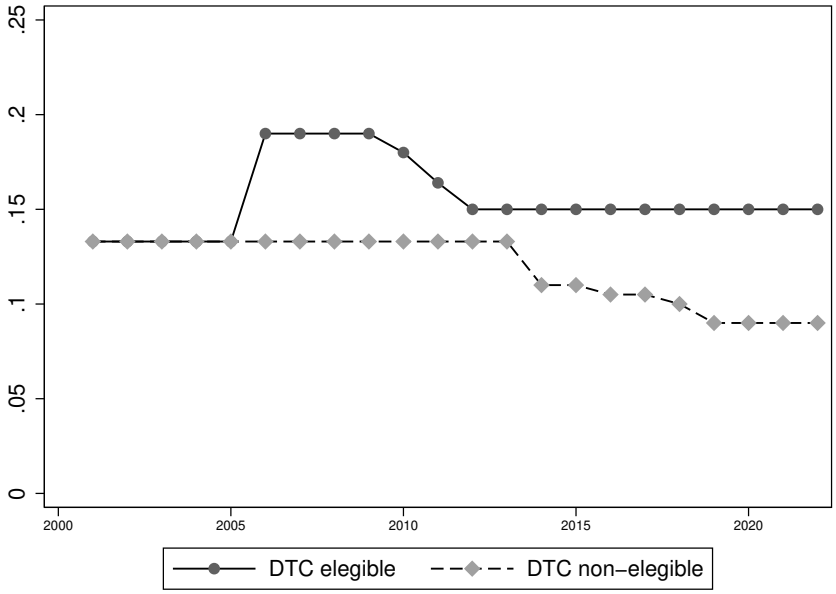


Figure 3: Dividend tax credit for eligible and non-eligible dividends.

[10]During 1988-2005 there was a tax credit close to 20 percent of grossed up dividends where the statutory tax rate (provincial and federal) was in average close to 17 percent for small firms and 35 percent for large firms. Thus, there was some over-integration for small firms and under-integration for large corporations. This was corrected after the 2006 tax reform where the combination of the higher federal dividend tax credit and provincial tax credits achieve almost full integration for large corporations.

[11]If a CCPC gives more eligible dividends that is allow, an additional tax is applied to the dividends higher than the limit (given by the GRIP).

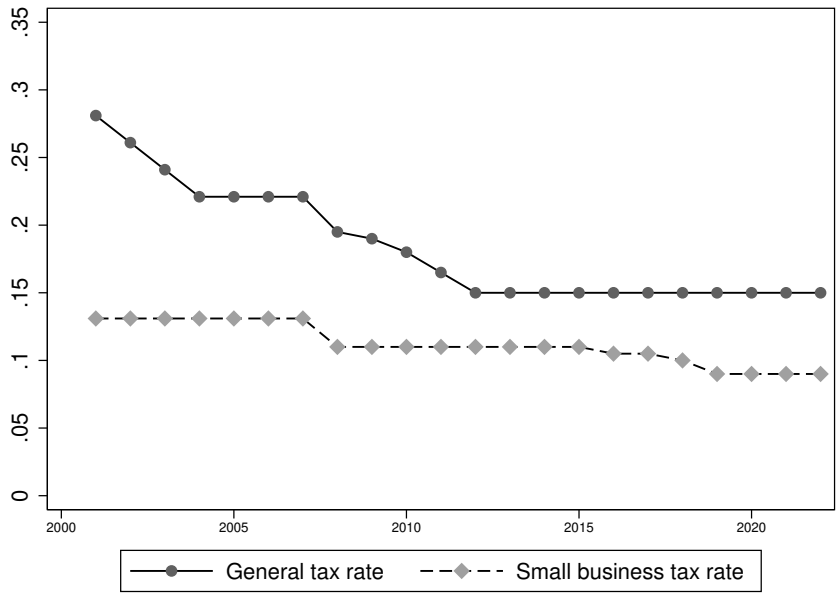


Figure 4: Small business tax rate and general tax rate.

Figure 3 shows the evolution between dividend tax credits applied to eligible and non eligible dividend. We can notice from Figure 3 that after 2005 there is a jump on the dividend tax credit from 13.13% to 18.25%. This higher dividend tax credit translates into a lower dividend tax rate for the shareholder. In 2008, the eligible dividend tax credit was reduced to be consistent with the reduction in the general corporate tax rate.

2.4 Data

We use longitudinal administrative data from the T2 form which has tax information for all businesses in Canada. We have this information at the business number level. In addition, we have information on the balance sheet of businesses from the General Index of Financial Information (GIFI), including information on assets and liabilities Investment-related variables are derived from schedule 8 (attached to the T2). Schedule 8 includes information on acquisition of new assets, disposition of old assets, and amortization and depreciation information by asset categories.

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businesses in Canada. We have this information at the business number level. In addition, we have information on the balance sheet of businesses from the General Index of Financial Information (GIFI), including information on assets and liabilities Investment-related variables are derived from schedule 8 (attached to the T2). Schedule 8 includes information on acquisition of new assets, disposition of old assets, and amortization and depreciation information by asset categories. Information on firms' labour inputs is provided by the Longitudinal Employment Analysis Program (LEAP) database which contains annual employment information for each employer in Canada, starting with the 1983 reference year. The information in LEAP is generated from the annual statements of remuneration paid (T4 slips) that Canadian businesses are required to issue to their employees for tax purposes. The LEAP covers incorporated and unincorporated businesses that issue at least one T4 slip in any given calendar year but excludes self-employed individuals or partnerships where the participants do not draw salaries. The LEAP has the advantage of covering all sectors of the economy, though some of the information it contains is more meaningful for the business sector than the public sector. The administrative data in the LEAP is collected at the level of the statistical enterprise, which is the level associated with a complete set of financial statements. This statistical enterprise is different than the business number associated to each firm.[12]

This payroll and employment information is then organized longitudinally, that is, each observation on the database corresponds to an enterprise whose employment, payroll and industry characteristics are recorded at different points in time. The longitudinal nature of LEAP allows entry and exit times to be measured with precision. Entrants in any given year are enterprises that have current payroll data, but that did not have payroll data in the previous year. Similarly, exits in any given year are identified by the absence of current payroll data, where such data had existed in the previous year. The T2 tax information is linked with the LEAP information, forming the

[12]The target population of LEAP is every employer in Canada whether incorporated or not. This universe consists of every business that issued one or more annual statements of remuneration paid for tax purposes (a T4 slip). The self-employed that do not draw a salary are not included in this universe, and thus are not counted in LEAP. Businesses comprised solely of individuals or partnerships that do not draw a salary are also excluded. The LEAP is a longitudinal file of enterprises, not establishments. The LEAP is constructed using three sources of information: T4 administrative data received from the Canada Revenue Agency, data from Statistics Canada's Business Register (see record no. 1105), and data from Statistics Canada's Survey of Employment, Payrolls and Hours (SEPH, see record no. 2612). The estimated employment for each enterprise in the LEAP is based on payroll as reported to Canada Revenue Agency. Two measures of employment are available: the Average Labour Unit (ALU) and the Individual Labour Unit (ILU). Payroll is converted to ALU using conversion factors derived from the SEPH. The ILU measure is generated using only the payroll information reported by enterprises. The LEAP tracks businesses through time by linking yearly T4 employment data records with enterprise information on Statistics Canada's Business Register.

T2-LEAP database. This paper uses longitudinal information on firms from 2000 to 2011.

3 The elasticity of taxable income with respect to the integration rate

3.1 Dead weight loss and the elasticity of the taxable income

Under standard assumptions, the elasticity of the taxable income is a sufficient parameter to estimate the dead weight loss associated with a tax rate. In the literature, several attempts have been made to estimate this parameter (Bunching literature). The recent literature uses the bunching technique to identify this parameter. To use the bunching technique we need a kink o a notch in the tax system. That is, there should be some type of non linear taxation. And under the assumption of continuity of the counter-factual distribution it is feasible to estimate the the elasticity of the taxable income. This technique has been used in several empirical works to estimate the elasticity of the taxable income with respect to the corporate tax rate [Literature]. We can use the following theoretical model to find such elasticity:

Assume that firm's profits π can be defined as:

$$\pi = y - c(y) - T, \tag{1}$$

where y are revenues, $c(y)$ are costs and T are the tax paid. Assume that $T = \tau_c (y - c(y))$. Then, the welfare on this economy is defined by:

$$W = \pi + T \tag{2}$$

Then, we have that:

$$dW = \frac{d\pi}{d(1-\tau^c)} \cdot d(1-\tau^c) + \frac{dT}{d(1-\tau^c)} d(1-\tau^c) \tag{3}$$

Using the envelope theorem we know that $\frac{d\pi}{d(1-\tau^c)} \cdot$ is just -$(y - c(y))$ and that $\frac{dT}{d(1-\tau^c)} = -(y - c(y)) +$

$\tau^c \frac{\partial \pi}{\partial (1-\tau^c)}$

Then,

$$dW = \tau^c \frac{\epsilon \cdot \pi}{(1-\tau^c)} d(1-\tau^c) \tag{4}$$

Following Saez, Slemrod and Giertz (2012) and Devereux et al. (2014) we can aggregate by firms and then replace $\bar{\epsilon}$ which is the aggregate elasticity with respect to the taxable income.

We can extend the following analysis when there is integration between the corporate and the personal tax rate:

First, we have that profits are defined by:

$$\pi = y - c(y) - T, \tag{5}$$

And taxes paid are defined as:

$$T = \tau^p \left(1-\tau^c\right)\left(y - c(y)\right) + \tau^c \left(y - c(y)\right) - \lambda \left(y - c(y)\right), \tag{6}$$

where τ^p are personal taxes and λ is the net refundable corporate tax credit. For example, with perfect integration between the corporate and the dividend tax we have that:

$$\tau^p = \tau^p \left(1-\tau^c\right) + \tau^c - \lambda \tag{7}$$

Then, λ with perfect integration is equal to:

$$\lambda = \tau^c \left(1-\tau^p\right) \tag{8}$$

Now, repeting the previous analysis, we have that:

$$dW = \frac{[\tau^p (1-\tau^c) + \tau^c]}{(1-\tau^c)} \epsilon^{1-\tau^c} \pi d(1-\tau^c) + \lambda \frac{\epsilon^{1-\lambda}}{1-\lambda} \pi d(1-\lambda) \tag{9}$$

.

Where $\epsilon^{1-\tau^c}$ is the elasticity of the taxable income with respect to one minus the corporate tax and $\epsilon^{1-\lambda}$ is the elasticity of the taxable income with respect to one minus the net dividend tax credit. Intuitively, an increase of the corporate tax rate decreases welfare because of the behavioural response, that is, a higher corporate tax credit means that there are incentives to declare a lower amount of taxable income. Also, a higher dividend tax credit is associated with a higher welfare, again given by the fact that is cheaper to pay dividends, thus there are incentives to declare more taxable income. Moreover, to aggregate firms we follow Devereux et al. (2014) where we compute $d\bar{W}$ and we have that

$$dW = \frac{[\tau^p (1-\tau^c) + \tau^c]}{(1-\tau^c)} \epsilon^{1-\bar{\tau^c}} \pi d(1-\tau^c) + \lambda \frac{\epsilon^{1-\bar{\lambda}}}{1-\lambda} \pi d(1-\lambda) \tag{10}$$

Now, we can use the derived formulas to compute the dead weight losses before and after the 2006 dividend tax reform. Indeed, we can use the tax 2006 tax reform along with the bunching methodology, to estimate $\epsilon^{1-\bar{\tau^c}}$ and $\epsilon^{1-\bar{\lambda}}$ and consequently the deadweight losses.

3.2 The standard bunching methodology

First, we approximate the distribution with a histogram, dividing the distribution into bins of size κ. Denote by c_j the number of firms in bin j and z_j the mean earnings level relative to the federal threshold (or kink point). The objective is to estimate counterfactual values of c_j, denote these by $\hat{c}_j$, for bins near the threshold where bunching due to tax planning would be expected to occur. To obtain these estimates, we fit a flexible polynomial of order q to the bin counts in the empirical distribution, excluding bins in the range (z_l, z_u) around the kink point. This region is termed the bunching area and does not necessarily have an upper bound below the kink point; firms engaging in bunching may it optimal to declare taxable income above the kink point if their marginal cost of

incrementally reducing their taxable income is sufficiently high. We therefore choose the bunching area by inspection of the distribution for graphical evidence of bunching. The equation that define the observed distribution is given by:

$$c_j = \sum_{l=0}^{q} \beta_l z_j^l + \sum_{i=z_l}^{z_u} \gamma_i \mathbb{1}\left[z_j = j\right] + \sum_{r \in R_k} \rho_{r_k} \mathbb{1}\left[\frac{z_j}{r} \in N\right] + \epsilon_j, \tag{11}$$

where $\sum_{l=0}^{q} \beta_l z_j^l$ is the polynomial part of the estimation, γ_i is a bin fixed effect for each bin in the bunching region, and $\sum_{r \in R_k} \rho_{r_k} \mathbb{1}\left[\frac{z_j}{r} \in N\right]$ accounts for rounded-numbers dummies to address the concern that some firms declare income with round numbers and ϵ_j is a stochastic error. The initial estimate of the counterfactual distribution is the predicted values from the previous regression when setting all the dummies in the excluded range to zero, but not omitting the contribution of the round-number dummies:

$$\hat{c}_j^0 = \sum_{l=0}^{q} \beta_l z_j^l + \sum_{r \in R_k} \rho_{r_k} \mathbb{1}\left[\frac{z_j}{r} \in N\right] \tag{12}$$

The initial estimate of excess bunching, defined as the difference between the observed and counterfactual bin counts within the excluded range, is given by $\hat{B}^0 = \sum_{j=z_l}^{z_u} \left(c_j - c_j^0\right)$ This value of B^0 is overestimated. This is because the higher tax rate above the kink induces companies above the threshold to decrease their taxable income. Given that the number of firms in each bin tends to fall with taxable income, the observed number of firms in each bin to the right of the kink will tend to be lower than if there were a uniform tax rate (no kink). Hence the estimated counterfactual is likely to underestimate the number of companies that would have been observed in higher income bins had there been a uniform tax rate. To address this issue we follow Chetty et al. (2011) and Devereux et al. (2014) and shift the counterfactual distribution to the right of the kink upward until it satisfies the constraint that the number of companies in the counterfactual distribution is equal to the number of companies in the observed distribution. Then we obtain $(\hat{c}_j)$ by estimating:

$$c_j^{n+1}\left(1 + \mathbb{1}\left[j > z_u\right] \frac{\hat{B}^n}{\sum_{j=z_u+1}^{\infty} c_j}\right) = \sum_{l=0}^{q} \beta_l z_j^l + \sum_{i=z_l}^{z_u} \gamma_i \mathbb{1}\left[z_j = j\right] + \sum_{r \in R_k} \rho_{r_k} \mathbb{1}\left[\frac{z_j}{r} \in N\right] + \epsilon_j \tag{13}$$

We estimate this equation by iteration until we reach a fixed point, that is when $|B^{n+1} - B^n| \approx 0$. After the fixed point is reach, we can compute $\hat{c}_j$ and B with the estimated parameters and Thus,

we can derive the relative excess bunching as:

$$b = \frac{B}{\left(\sum_{j=z_l}^{z_u} \frac{\hat{c}_j}{N}\right)}, \tag{14}$$

with N the number of bins in the excluded range. Standard errors are computed using a residual- based bootstrap approach. From equation (13), we obtain the estimated residual $\hat{e}_j$. We draw a new set of errors by sampling from the estimated residuals with replacement and create bootstrapped firms counts by adding the new set of errors to the original counts $c_j^h = c_j + \hat{\epsilon}_j^h$. We use bootstrap firms' frequencies and follow the same steps above to compute new estimates for the excess mass. We repeat this procedure 500 times and we estimate the standard error as the standard deviation of the 500 estimates. Finally, the standard error of the elasticity of taxable income with respect to the under-integration rate is computed using the delta method.

3.3 The identification and estimation of the elasticity of the taxable income with respect to the integration rate for Canada

To estimate the 2005 and 2006 bunching parameters, we follow closely the methodology developed in Saez (2010), Chetty et al. (2011) and Devereux et al. (2014). Consider a corporate tax system that introduces a small increase in the marginal corporate tax rate from τ_1 to τ_2 at some income level k. Taxable income below k continues to be taxed at the rate τ_1, and income above k is now taxed at the rate τ_2. In addition, taxable income below k is integrated with the dividend tax credit at a rate λ_1 and income above k is integrated with the dividend tax at a rate λ_2. Ignoring any effect firms' actual revenue or costs, the fraction of companies who choose to declare income at the kink point k in response to the small increase in the marginal tax rate can be expressed as:

$$B = B(\tau_1, \tau_2) + B(\lambda_1, \lambda_2) = \int_k^{k+\Delta z} g(v)dv, \tag{15}$$

where, $B(\tau_1, \tau_2)$ is the bunching generated by the small business deduction and $B(\lambda_1, \lambda_2)$ the bunching generated by partial integration, $g(v)$ is the counterfactual density of taxable income that

would prevail if there were a constant marginal tax rate τ_1,integrated at a rate λ_1, and $k + \Delta z$ is the highest level of corporate income earned by firms that now bunch at the kink point.

Now, assume that in the following year there is a tax reform such that, $\tau_1' = \tau_1$, $\tau_2' = \tau_2$ and $k = k'$ where ' variables represent the tax values after the reform. Then we have that:

$$B' = B(\tau_1', \tau_2') = \int_{k'}^{k'+\Delta z'} g(v)dv \tag{16}$$

We can identify $B(\lambda_1, \lambda_2)$, the bunching generated by the difference in tax credits, with the following assumption:

- i) $B(\tau_1, \tau_2) = B(\tau_1', \tau_2')$

Then if assumptions 1 holds, $then B(\lambda_1, \lambda_2)$ is identified by subtracting (15) from (16). The first assumption requires that the excess bunching mass due to the kink in the corporate tax rate is the same before and after the reform. The object $B(\lambda_1, \lambda_2)$ is a measure of the underreported taxable income that is due to the differential in integration rates. A higher value means that firms' behaviour reacts more to the dividend tax credit. With this value, we can estimate the elasticity of the taxable income with respect to the dividend tax credit, a parameter of interest for policy analysis given its relationship to the excess burden of taxation and tax avoidance effects. The empirical literature thoroughly discusses the elasticity of taxable income with respect to the corporate income tax, however, to our knowledge, this is the first attempt to estimate the elasticity of the taxable income with respect to the dividend tax credit. To estimate this parameter, we need an additional assumption, namely that: $g_c(k) = g_c'(k)$ The second assumption states that the counterfactual density $g_c()$ at k is the same before and after the reform. Then, we have that:

$$b(\lambda_1, \lambda_2) = \frac{\int_k^{k+\Delta z} g'(v)dv - \int_k^{k+\Delta z} g'(v)dv}{g_c(k)} \tag{17}$$

Where $b(\lambda_1, \lambda_2)$ is the relative excess bunching generated by the difference in the dividend tax credit. Thus, we can estimate the elasticity of the taxable income related to the under-integration

rate as:

$$e \sim \frac{b(\lambda_1, \lambda_2)}{kln\left(\frac{1-\lambda_1}{1-\lambda_2}\right)} \tag{18}$$

To estimate $B(\tau_1, \tau_2) + B(\lambda_1, \lambda_2)$ and $B'(\tau_1', \tau_2')$ we need an estimate $g_c(\cdot)$ of a counterfactual distribution and the excess bunching. To do this, we follow Devereux et al. (2014).

We apply the methodology described above to estimate the excess bunching for Canada during 2005 and 2006. First, we define bins of \$CAD 250. Second by inspection, we set $z_l = \$280,000$ and $z_u = \$304,000$. Then, we estimate the counterfactual distribution by following the methodology described above.

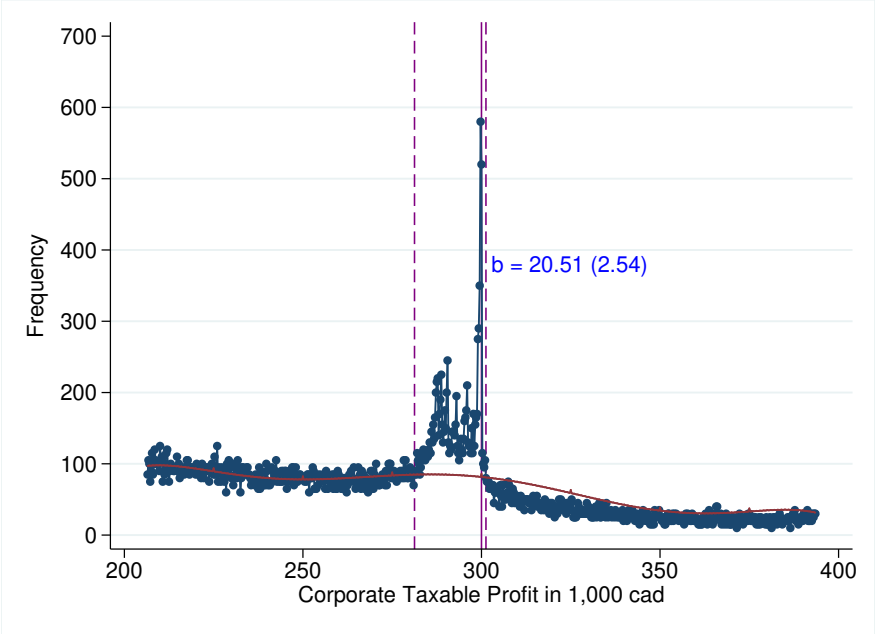


Figure 5: Bunching for 2005. Counterfactual distribution estimated using the methodology from Chetty et al. (2011) and Devereux et al. (2014). Dashed lines denote the bunching area.

To identify the bunching interval we use Bosch et al. (2020) methodology. Which use an iterative procedure to find the most likely bunching area.

Figure 5 shows the observed and counterfactual densities around \$300,000 for 2005, with the excluded income ranges demarcated by the dashed vertical lines and the \$300,000 tax by the solid

vertical line. The blue points plot the observed number of firms in each bin, with the horizontal axis value indicating the upper bound of a given bin. The solid red curve shows the counterfactual distribution based on a fifth-order polynomial using firms with taxable income between $200,000 and $400,000. There are a few notable observations from the figure. First there is a large and sharp bunched mass around $300,000. The relative excess mass b_2005 is estimated as 20.51 times the density predicted by the counterfactual distribution. This provides strong evidence that firms respond to the tax structure. Second, bunching at $300,000 is asymmetric. The income range that is clearly affected by the bunching around the kink lies between $280,000 and $304,000 and there is considerably more excess mass to the left of the kink than to the right. Greater mass to the left of the kink appears instead to reflect some risk aversion in the sense that firms do not want to decrease revenues or increase cost to report revenues too close to the threshold.

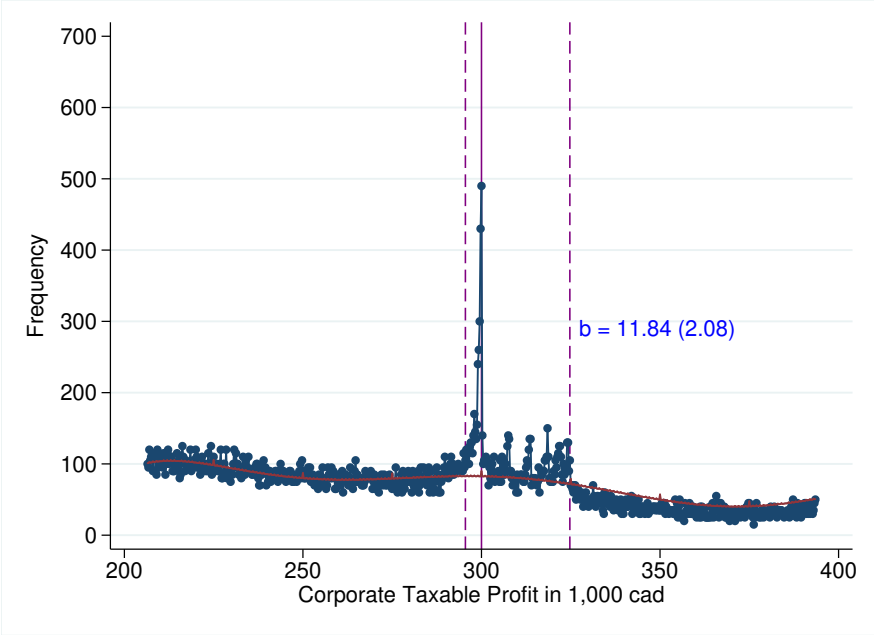


Figure 6: Bunching for 2006. Counterfactual distribution estimated using the methodology from Chetty et al. (2011) and Devereux et al. (2014). Dashed lines denote the bunching area.

Figure 6 shows the observed and counterfactual densities around $300,000 for 2006. Again the excluded income range is demarcated by the dashed vertical lines and the $300,000 tax kink by the solid vertical line. Again, we use Botch et. al. (2020) to define the bunching area. The blue points again show the number of firms in each bin and the solid red curve shows the counterfactual

distribution, again estimated by fitting a fifth-order polynomial for firms with taxable income between $200,000 and $400,000. A few comparisons relative to the figure for 2005 are worth noting. First there is sharp bunching around $300,000, though less than in 2005. Also, although the bunching is still asymetric, now it is more pronounced to the right of the threshold point, which is evidence that there is a shift to the right of the distribution. Also, the relative excess mass b_2006 is 11.84 times the density predicted by the counterfactual distribution which is close to a half of the relative mass excess found in 2005. This provides evidence that in 2006, firms responded less strongly to the tax structure than in 2005. With this in mind, we estimate the excess bunching due to different dividend tax credits as:

$$b_{dct} = b_{2005} - b_{2006} \tag{19}$$

	Coefficient	s. e.
Relative bunching area 2005	20.51	2.54
Relative bunching area 2006	11.84	2.09
Dividend tax credit elasticity $e^{1-\lambda}$ 2006	-0.45	0.022
Corporate tax elasticity $e^{1-\tau^c}$ 2006	0.36	0.022
ΔW as % of π in 2006	-1.99 %	0.022
ΔW from τ^c as % of π in 2006	-2.55 %	0.022
ΔW from λ % of π in 2006	0.55 %	0.022

Table 3: Estimates of relative bunching area for 2005, 2006 and the elasticity of the taxable income related to the dividend tax credit.

Table 3 summarizes the information regarding the estimates for 2005, 2006 and the elasticity of the taxable income related to the dividend tax credit.[13] We can see that the excess bunching attributed to the dividend tax credit is 8.67. With this information we estimate an elasticity of the taxable income related to the dividend tax credit as 0.45. This elasticity is in the range of values estimated by Devereux et al. 2014 for UK. The main difference is that this elasticity is only attributable to the dividend tax credit. The elasticity of taxable income with respect to the corporate tax rate is lower than the dividend tax credit elasticity. This suggests that in Canada, the main driver of tax avoidance for CCPCs with income near the SBD threshold is the difference in dividend tax credits and not the small business deduction itself. Also, the implementation of

[13] We use the following parameters to estimate Table 3. $\tau^p = 0.5$, $\tau_1^c = 0.1313$, $\tau_2^c = 0.2213$, $\lambda_1 = 0.1313$, $\lambda_2 = 0.185$, $threshold = \$300,000$.

the 2006 reduces the Deadweight loss associated to the SBD by 0.55 percentages points of profits. Thus, by evaluating profits at the threshold, the efficiency gains associated with the reform are 1,657 Canadian dollars, thus the net efficiency losses of the SBD decreases from 7,640 to 5,984 at the threshold.[14]

4 The effect of the dividend tax reform on investment and dividends of small firms

The effect of dividend taxes on investment remains an open question in economics. There are two opposite views regarding the real effect of an increase of dividend taxes on investments. The so called "old view" states that an increase in dividend taxes will decrease future investment. The main assumption behind this view is that firms use equity to finance new investments. In this case, an increase in dividend taxes decreases the net present discounted value of future dividends that would be issued a firm. Thus, the before-tax rate of return on new investments must be higher, causing fewer projects to be pursued and/or smaller scale investments . In contrast, the "new view" states that an increase in the dividend tax rate will not affect investment. The main assumption behind this view is that firms use internal funds to finance investment because of tax advantages. In this case, firms use internal funds to invest and the remainder is used to pay dividends.

4.1 Identification strategy

The 2006 increase in the dividend tax credit can be viewed as a reduction in the dividend tax rate paid by shareholders. It can therefore be used to understand the effect of dividend taxes on the investment and dividend behaviour of CCPC's that receive the small business deduction. As noted above, the reform only affected firms reporting taxable income in excess of the federal threshold and with funds accumulated accumulated in the General Rate Income Pool can from which to issue eligible dividends. As such, the policy change creates a quasiexperiment where we can identify a treatment group affected by the reform and an unaffected control group. The control group consists of firms who reported income below the threshold two periods before the policy came into effect $(t-2)$ and the treatment group consists of firms that reported income above the federal threshold

[14] Results are qualitatively similar using a non-parametric estimate, based on previous empirical distributions as a counterfactual distribution, for the excess bunching area.

in $t-2$.

We first test whether the 2006 dividend tax reform caused the treatment group to increase investment. We begin by presenting visual evidence using the residualized trends of the investment variable following Chetty et al. (2011) and Yagan (2015). To do so, we first scale each corporation's annual investment by its lagged tangible capital assets and top-code observations at the ninety-ninth percentile and regress each year investment variable by a rich set of controls: indicators for two digit NAICS industry classification, indicators for province and quartics on age and lagged total assets. We then construct the two series shown in the figure by setting each year's difference equal to that year's regression coefficient for the treatment group indicator and setting the weighted average of that year's data points equal to the year's sample average.

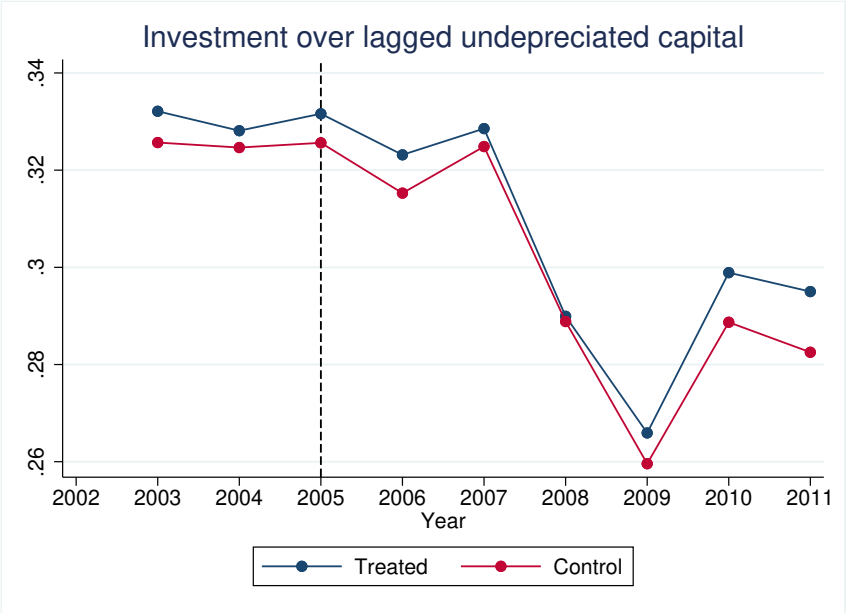


Figure 7: Effect of the 2006 tax reform on small business investment. The red time serie are small CCPC (those that report taxable income lower than the federal threshold) and the blue line are large CCPCs (those that report taxable income higher than the threshold). Investment defined as acquisition of physical investment in t divided by the sample average of t-1 and t-2 total undepreciated capital. Each value is weighted by the sample average of t-1 and t-2 total revenues. Values are winsorized (top coded) at the 99 percent.

Figure 7 plots the time series of mean investment for small CCPCs (control group) and large CCPCs (treatment group) in the unbalanced panel, purged of the effects of a rich set of controls as in Chetty et al (2011) and Yagan (2015). We also control for the effects of bunching in the design

by trimming all firms that report taxable income between the federal threshold and the federal threshold less $CAD 25,000. Thus, our specification is a "donut hole" difference in difference. Our identification assumption is that treated and control firms would have behaved similarly in the years after the reform, had the reform not take place, also known as the parallel trends assumption. Also, Figure 7 shows that the time series of large CCPC investment tracked the time series of the small CCPC investment closely in several years prior to 2006, suggesting that the two series would have continued to track each other in the absence of the 2006 dividend tax reform (the common trends assumption appears to hold). Also, after 2006 the series remain similar in trends and levels, suggesting that there is no an effect of the dividend tax reform on investment.

Table 4 formalizes this visual evidence by reporting estimates of the following difference-in-difference (DD) regression adding fixed effects.

$$Investment_{it} = \lambda_i + \gamma_t + \alpha_2 theshold_{i,t-2} \cdot post_t + \epsilon_{it}, \tag{20}$$

where $Investment_{it}$ is the scaled investment over total capital for firm i in year t, λ_i is the firm fixed effect, γ_t is the year fixed effect, $threshold_{i,t-2}$ denotes an indicator variable for whether firm i reported more income than the federal threshold in $t-2$, and $post_t$ is an indicator for whether year t is 2006 or later. Standard errors are clustered by firm are reported below each estimate.

	Investment
Effect	-0.006
s.e.	[0.011]
Firm f.e.	yes
N	3,071,502

Table 4: This table reports the difference in difference estimates of the effect of the 2005 dividend tax credit increase. Standard errors (s.e) are clustered at the firm level. * is for Significance at 10%, ** significance at 5%, *** significance at 1%.

Columns 2 report a negative and non-significant effect of the tax reform on investments and dividends, a change in the dividend tax credit of 10 percentage points increases investment (as a percent of lagged undepreciated capital) by 0.6 percentage points.

4.2 The effect of the 2006 tax reform on dividend issued.

We use the same identification strategy to study the effect of dividend taxes on dividend payouts. Figure 7 again plots the time series of mean investment for small CCPCs (control group) and large CCPCs (treatment group) in the unbalanced panel, purged of the effect of controls. We again adopt the "donut hole" approach to control for bunching by trimming all firms that report taxable income between the federal threshold and the federal threshold less $CAD 25,000. Figure 7 shows that the time series of large CCPC dividend payouts tracked the time series of the small CCPC closely in the years prior to 2006, suggesting that the two series would have continued to track each other in the absence of the 2006 dividend tax reform. However, after 2006 the series are detached suggesting a positive effect of the 2006 tax reform on large CCPC dividends.

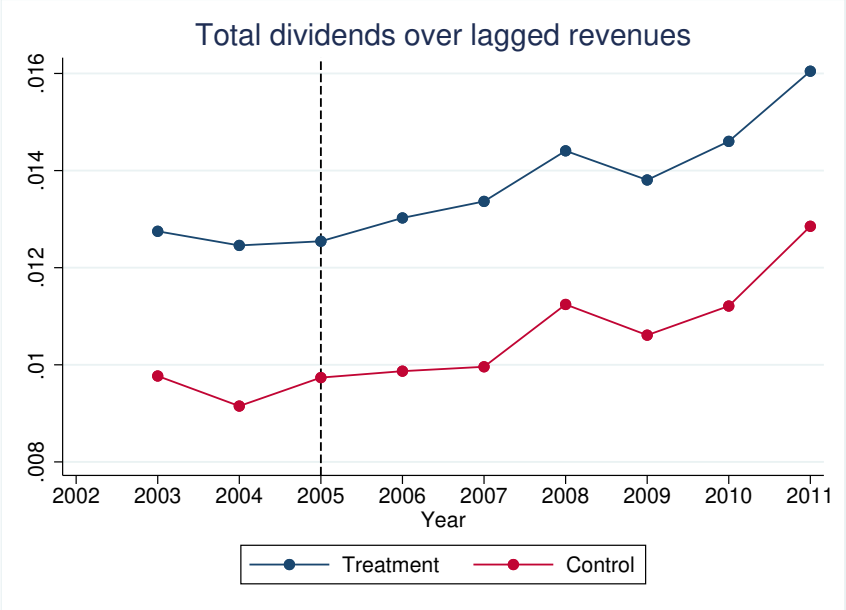


Figure 8: Effect of the 2006 tax reform on dividends. The red time series is for small CCPCs (those that report taxable income lower than the federal threshold) and the blue line is for large CCPCs (those that report taxable income higher than the threshold). Dividend are defined as total dividend payouts in t divided by the sample average of t-1 and t-2 total revenues. Each value is weighted by the sample average of t-1 and t-2 total revenues. Values are winsorized (top coded) at the 99 percent.

$$Dividends_{it} = \lambda i + \gamma_t + \delta_2 theshold_{i,t-2} \cdot post_t + \epsilon_{it}, \tag{21}$$

where $Dividends_{it}$ is the scaled dividend payout for firm i in year t, λ_i is the firm fixed effect, γ_t is the year fixed effect, $threshold_{i,t-2}$ denotes an indicator variable for whether firm i reported more income than the federal threshold in $t-2$, and $post_t$ is an indicator for whether year t is 2006 or later. Standard errors are clustered by firm are reported below each estimate.

	Investment
Effect	0.0014***
s.e.	[0.0005]
Firm f.e.	yes
N	3,071,502

Table 5: This table reports the difference in difference estimates of the effect of the 2005 dividend tax credit increase. Standard errors (s.e) are clustered at the firm level. * is for Significance at 10%, ** significance at 5%, *** significance at 1%.

Table 5 reports estimates of the difference-in-difference (DD) regression we used to estimate impacts on dividends:

Columns 2 and 3 on Table 5 reports that when controlling for years fixed effects and the full set of controls used in figure 3, the 2006 dividend tax cut is estimated to have had a significant and positive effect on dividends: using only year fixed effects as controls, a change in the dividend tax credit of 10 percentage points as affects dividends (as a percent of lagged revenues) by 0.57 percentage points and 0.21 percentage points when a full set of controls is used.

4.3 Heterogeneity analysis

. Although the above results show a positive effect of the dividend tax reform on treated firms' investment and dividend behaviour, it is possible that there exists some diversity in the effect of the reform over firms' employment levels. To disentangle this heterogeneity and following Yagan (2015), we estimate two triple difference regressions. We do so by estimating the following triple difference regressions models:

$$\begin{aligned} Investment_{it} = \lambda_i + \gamma_t + \alpha_2 threshold_{i,t-2} \cdot post_t + \alpha_3 size_{it} + \\ \alpha_4 threshold_{i,t-2} \cdot size_{i,t} + \alpha_5 size_{it} \cdot post_t + \alpha_6 threshold_{i,t-2} \cdot size_{it} \cdot post_t + \\ \epsilon_{it} \end{aligned} \tag{22}$$

$$Dividends_{it} = \lambda i + \gamma_t + \delta_2 theshold_{i,t-2} \cdot post_t + \delta_3 size_{it} + \\ \delta_4 threshold_{i,t-2} \cdot size_{i,t} + \delta_5 size_{it} \cdot post_t + \delta_6 threshold_{i,t-2} \cdot size_{it} \cdot post_t + \\ + \epsilon_{it} \tag{23}$$

Where size is a dummy that is activated when the numbers of employees of the enterprise is10 or more . The rationale behind this is to identify closely held firms (or family firms) that are possibly being used purely as tax shelters. Table 6 shows the results of the DDD estimates

	Investment	Dividends
Effect	-0.0826**	0.0054**
s.e.	[0.0337]	[0.0024]
Effect*size>4.9	0.0797**	-0.0034
s.e.	[0.0354]	[0.0024]
Firm f.e.	Yes	Yes
N	3,071,517	3,071,517

Table 6: This table report the difference in difference in difference estimates of the effect of the 2005 dividend tax credit increase on investment and dividends. Standard errors (s.e) are clustered at the firm level. * significant at 10%, ** significant at 5%, *** significant at 1%.

Columns 2 on Table 6 reports that the 2006 dividend tax cut is estimated to have had a significant and negative effect on investment for firms with less than 5 employees. A change in the dividend tax credit of 10 percentage points affects scaled investment by 8.3 percent points. However, for firms with more than 5 employees, there was no statistically significant effect. Column 3 and 5 report that the 2006 dividend tax cut is estimated to have had a significant and positive effect over dividends payouts: for enterprises with 5 or more employees, a change in the dividend tax credit of 10 percentage points affects scaled dividends by 0.2 percent points. However, for firms with few employees, the effect is higher: 0.054 percent points. These results seem to indicate that smaller enterprises (in number of employees) respond differently to tax incentives. The behaviour of large CCPCs (in taxable income) with few employees is consistent with tax planning behaviour: no effects on tangible variables only dividends payments. However, large CCPCs in taxable income and number of employees behave according the "new view"; that is, higher dividend tax rates does not affect investment.

5 Conclusion

This work corroborates Smart's (2018) statement that integration between the corporate and dividend taxes has real and tax avoidance effects. On the real effect side, we show that for large CCPCs with a with 5 or less employees decreases investment after the 2006 tax reform. Regarding behavioural effects, or tax avoidance behaviour, we show that firms reduce tax avoidance after the 2006 tax reform. Tax avoidance related to dividend tax was greater than tax avoidance attributed to the dividend tax credit discontinuity. This implies that the main driver of tax avoidance was the dividend tax credit and not the small business deduction. Future research should be focus on the mechanisms behind those results. For example, they might have lumpier investment opportunities or firms might not need to invest in order to expand. Instead firms can hire better management.

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