

The determinants of tax haven use: Evidence from Canada

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Abstract

Purpose - This paper investigates the determinants of tax haven use of publicly-listed Canadian firms.

Design/methodology/approach - Based on alternative measures of tax havens, and referring to a sample of 235 Canadian firms over the period of 2014-2015, probit-regression analyses are used to examine the determinants of tax haven use.

Findings - The authors provide evidence that multinationality, intangible assets, thin capitalization, withholding taxes, equity-based management remuneration, and tax fees paid to auditing firms are positively associated with tax haven use. Furthermore, they show that the variable relating to R&D intensity is positively associated with tax haven use. They also document that strong corporate-governance structures are negatively associated to tax haven use.

Research limitations/implications - This study is only limited to Canadian firms, so the results may not be generalizable to other countries.

Practical implications - The results may assist tax watchdogs in their efforts to understand the tax behavior held by Canadian firms. They also may be interesting for tax authorities in planning enforcement activities.

Originality/value - This study uses a sample from publicly-listed financial and non-financial firms. It also uses various lists of tax havens published by various competent sources (IMF, 2000 and 2007; TJN, 2005; and OECD, 2012). The findings corroborate the recent media attention about the extensive use of tax havens by Canadian firms.

Keywords - Canada, tax havens, multinationality, intangible assets, thin capitalization, withholding taxes.

1. Introduction

Over the last decades, several document leaks- such as Luxleaks, the Panama Papers and the Paradise Papers- have raised anew the question about the full extent of corporate tax avoidance by multinational companies. These scandals have led to a great deal of interest in the activities of tax havens (TH). TH represent jurisdictions that are characterized by nil or nominal-corporate taxes, absence of effective exchange of information with foreign tax authorities, lack of transparency and no substantial activities (Organization for Economic Cooperation and Development (OECD), 1998, 2012). TH operations facilitate tax avoidance through both permitting the redistribution of taxable income from high-taxed jurisdictions to low-taxed jurisdictions or no-tax jurisdictions, and via reducing the amount of tax liability levied on foreign income (Desai et al., 2006).

Using TH as a tax-avoidance mechanism is a growing concern for Canada and for other countries (Taylor and Richardson, 2012). We thus focus our attention on incentives of TH utilization by Canadian firms and on the use of locations defined differently by various competent sources. We investigate the determinants of TH use of publicly-listed Canadian firms due to the growing importance of TH in Canadian foreign-direct investments (FDIs) (Hejazi, 2007). Specifically, we are interested in examining whether determinants relating to multinationality (MULTI), intangible assets (INTANG), thin capitalization (THINCAP), withholding taxes (WITHTAX), equity-based management remuneration (EMR), tax fees paid to auditing firms (TAXFEES) and corporate-governance structures (CGSs) are linked to TH use. Multinational firms (MNFs) are more able to shift income to TH in a variety of ways, including royalty arrangements for

intangibles assets, thin capitalization, transfer pricing¹, and other aggressive tax-planning schemes.

Statistics Canada estimates that \$272.4 billion in 2015 was located in the top 10-TH compared to \$21 billion in 1994 (Canadians for Tax Fairness (C4TF), 2017; Oved, 2017)². C4TF (2017) also found that 60 largest publicly-listed Canadian firms had over 1000 subsidiaries in jurisdictions listed as TH. For example, Valeant Pharmaceuticals International Incorporation and Sunlife Financial Incorporation have over 50 subsidiaries located in TH. Moreover, the world's 5 largest Canadian banks³ are operating over 81 subsidiaries in known TH jurisdictions (Committee on public finance (COPF), 2017). Publicly-listed Canadian companies are required to indicate the location of incorporation of any subsidiaries in their Annual Information Form (AIF)⁴. In fact, the Canadian investment in TH jurisdictions creates a tax-revenue loss in Canada. The C4TF (2017) estimates that \$10 billion to \$15 billion is lost annually across Canada, mainly as a result of the exploitation of TH. The use of TH has come under increasing scrutiny from the G-20, the OECD, and various global tax authorities in recent years. It has also been the subject of several debates and proposals (Gravelle, 2015). Therefore, various measures have been taken. Especially, in 2013, a report was endorsed by the OECD developing various actions plans to combat tax-Base Erosion and Profit Shifting (BEPS). Canada has been involved in the initiatives that the OECD has been promoting. The 2016-2017 budgets also include a \$444.4-million investment over five years in order to help the Canada Revenue Agency (CRA) fight against tax evasion and avoidance (COPF, 2017).

Based on a sample of 235 publicly-listed Canadian firms covering the period of 2014-2015, we document that variables relating to MULTI, INTANG, THINCAP, WITHTAX, EMR and TAXFEES are positively associated with the TH use. Our additional results show that the variable relating to R&D intensity is positively associated with TH use. Moreover, our results provide that strong CGSs are negatively associated to TH use. Highlighting the magnitude and significance of the regression coefficients, our results indicate that MULTI, INTANG, THINCAP, WITHTAX and R&D intensity are strong determinants of TH use.

Despite that there have been many media releases, reports and anecdotal evidence that have recently demonstrate the importance of investments in TH by Canadian multinational corporation, and their role to provide opportunities for tax planning, there has been no empirical research which has investigated the determinants of TH use in the Canadian context. Given the importance of TH use in Canada, this paper makes several contributions. First, our sample is drawn from publicly-listed financial and non-financial Canadian firms. Indeed, it is interesting to investigate the utilization of TH by financial firms due to the significant role of these firms in the use of TH (Cribb and Oved, 2016; COPF, 2017). Second, we use various lists of TH published by various competent

¹Transfer pricing is the pricing of goods, services and intangibles transferred between related parties.

²Barbados is Canada's top tax-haven destination. Barbados, Luxembourg and the Cayman Islands feature in the top three.

³The world's 5 largest Canadian banks: National Bank of Canada, Royal Bank of Canada, Scotia bank, TD Bank Group and Bank of Montreal.

⁴ AIF is a source of information that TSX companies are required to disclose through the System for Electronic Document Analysis and Retrieval (SEDAR). The AIF has a section entitled "Inter-Corporate Relationships" where companies are required to list subsidiaries.

sources (IMF, 2000 and 2007; TJN, 2005; and OECD, 2012). Indeed, each list of TH published by these organizations may have its own specific goals and own merits. Third, we empirically investigate the role of tax fees paid to auditing firms as determinant of TH use. Various document leaks like Panama Papers have shown anecdotally that the big-4 accountancy firms helped their clients escape the regulatory limits and to avoid the corporate tax. Our results are prominent to better understanding the role that TH play so as to decline corporate effective tax rate (ETR). The findings corroborate the recent media attention about the extensive use of TH by Canadian firms.

The rest of this paper is structured as follows. In the next section, we provide an overview on the TH phenomenon. Section 3 provides a brief overview of the Canada's corporate-taxation system. Section 4 discusses prior researches, and develops hypotheses. Section 5 details the methodological aspects, the main empirical results are reported in the section 6 and conclusion is provided in section 7.

2. Tax havens

There is a range of reasons why a TH might be used. Although firms can use TH for legitimate-business aims such as monitoring the treasury, service, business, and insurance functions for the corporate group members (Taylor and Richardson, 2012; Taylor et al., 2015a), the CRA and various tax authorities in the developed world have noted the important role that these jurisdictions play in reducing corporate-tax liabilities (CRA, 2010; OECD, 2012). In fact, the CRA (2010, p. 2) argues that: "tax administrators have no view on where Canadians invest as long as they comply with Canada's tax laws. What the CRA is concerned about are investments, transactions and schemes that use TH countries to reduce, avoid, or evade Canadian tax".

TH help to decrease overall corporate-tax liabilities through permitting the allocation of taxable income (e.g., royalties, dividends, and service fees) to low-tax countries, or via the allocation of tax-deductible costs (e.g., interest and R&D expenses) to high-tax countries. Large TH⁵ can benefit multinationals that can reallocate taxable income away from high-tax jurisdictions, and small TH can also benefit multinationals to defer the amount of domestic taxes on foreign income (Desai et al., 2006).

The lists of TH have been published differently by various competent sources. The first list was developed by the OECD in the late 1990s. The OECD uses four criteria to determine whether or not a country is a TH: no or low taxes, absence of effective exchange of information with foreign tax, lack of transparency and no substantial activities. The OECD has updated its list of TH in 2012.

The International Monetary Fund (IMF) and the Tax Justice Network (TJN) have also corresponding lists and generated definitions. The IMF uses the notion of Offshore Financial Centers (OFC). According to the IMF definition, an OFC is a country or jurisdiction with numerous of financial institutions engaged mainly in business with non-residents. It offers very low or zero taxation, light or moderate financial regulation and bank secrecy, and provides financial services to non-residents on a scale far exceeding the size and the financing of its domestic economy (IMF, 2000). The IMF initially identified 46 OFC. In 2007, the IMF research identified 22 jurisdictions considered as OFC (Zoromé, 2007). Statistics Canada estimates that Canadian firms have invested

⁵ Large tax havens are large countries with populations exceeding one million in 1982 (Desai et al, 2006), and exceeding 2 million in 2013 (Jones and Temouri, 2016).

important amounts in OFCs. Canadian assets in these countries went from \$9 billion to \$199 billion between 1988 and 2014 (COPF, 2017).

Regarding the 2005's list, it is a lengthy list published by the TJN, which is one of the most comprehensive lists. It includes all jurisdictions in the OECD TH list and OECD member countries with harmful preferential tax regimes as TH⁶.

3. Canada's corporate-taxation system

When foreign operations are carried out through a subsidiary, foreign earned income will not be taxed in Canada only when funds are repatriated to Canada shareholders as dividends, or when the Canadian firm dump its foreign subsidiary (Natural Resources Canada, 2016).

To alleviate double taxation, Canada operates a hybrid system⁷ of international taxation: the “exemption” and the “credit” system (Smart, 2011). Under the territorial system, exemption-based tax system is applied when a dividend is received from an affiliate situated in a country with which Canada has a tax treaty and with the countries which have signed Tax Information Exchange Agreement (TIEA) with Canada⁸. The income is paid out of “exempt surplus”, and the profits earned at a subsidiary are brought back to Canada tax-free. The share of investment stocks declared for low-tax treaty countries, for which the exemption applies, has grown substantially from 3.2 % in 1989 to 14.5 % in 2009 (Smart, 2011). Obviously, the exemption system makes multinational Canadian firms more inclined to engage in tax-planning activities. This creates an incentive to reallocate profits to the TH based subsidiary so as to avoid paying taxes in Canada (Markle, 2016). Collins and Shackelford (1995) find that Canadian firms have a lower ETR than that of the US, Japan and the UK. The authors explain this result by the fact that Canada operates a territorial tax system. However, repatriations from an affiliate situated in non-treaty countries are subject to worldwide tax system. The dividend is from “taxable surplus”, and a tax credit is offered for foreign-income taxes paid by subsidiaries.

4. Literature review and hypotheses development

4.1 Consequences of TH utilization

Prior studies show that operations in TH reduce the ETR of firms (Markle and Shackelford, 2012; Jaafar and Thornton, 2015). Dyreng and Lindsey (2009) find that having material operations in at least one TH country incrementally reduced global tax rate from 36% to 34.5%. This lower tax rate seems to have saved, between 1995 and 2007, about 64\$ billion of taxes. Markle and Shackelford (2012) document that firms with foreign subsidiaries located in TH have a significantly lower ETR than those without because TH ease the income moving from high-tax jurisdictions. Taylor and Richardson (2012) show that TH utilization is one of the tax-avoidance drivers.

⁶ The OECD (1998, p.30-35) distinguishes nine additional factors that can assist to identify harmful preferential tax regimes.

⁷ This hybrid system was adopted in 1972, but was not implanted until 1976, replacing a system which exempted all foreign incomes regardless of the state treaties of the host country.

⁸ In 1972, Canada limited its exemption system to countries with which it has income tax treaties. In 2008, exemption was extended to countries which had signed TIEA with Canada. In 2014, Canada signed 92 tax treaties and 19 TIEA (House of Commons, 2016).

4.2 Determinants of TH utilization

Jones et al. (2018) is the first cross-country study examining the relationship between using Big-4 auditors and the extent to which MNFs utilize TH subsidiaries. They find that MNFs hiring big 4-audit firms increase the size of their TH networks, compared to those companies that do not use a big 4. They also demonstrate that the growth rate of set up a subsidiaries in TH countries is 2.9 percent higher for those multinationals that take on a Big 4 accountancy, between 2005 and 2013, compared to other that do not. Richardson and Taylor (2015) document that multinational US firms shift profit to low-tax jurisdictions (TH) via transfer-pricing manipulation, transfer of intangible assets, and debt financing. Using data on Australian firms, Taylor et al. (2015a) also find that multinationality, transfer pricing, INTANG, interaction effects between transfer pricing and INTANG, WITHTAX, strong CGSs and equity compensation are the determinants of TH utilization. Hsieh and Willis (2015) provide evidence that US firms with executives compensation more based on equity are more likely to having subsidiaries in TH countries. Moreover, they find that larger firms, firms with higher return on assets, and higher stock returns are more likely to have subsidiaries in TH countries. Desai et al. (2006) also find that large firms with a greater degree of multinationality, with a growth volume of intrafirm trade, and with more R&D activities have more operations in TH countries.

In summary, several variables are argued to represent the determinants of TH use. The rationale and literature support for each of these determinants is now discussed.

4.3 Hypotheses development

4.3.1 Multinationality

A Canadian MNF will generally have to pay tax on its global income. However, in order to avoid double taxation, the firm may take into account the tax paid abroad in countries where the multinational has a permanent establishment. Moreover, because of the tax treaties signed by Canada with other countries, the multinational will not be taxed on some dividends paid by a foreign subsidiary located in a country with which Canada has a tax treaty (Government of Quebec, Canada, 2017).

Prior researches have provided evidence that MNFs have faced a higher tax avoidance than their only domestic counterparts. For example, Rego (2003) observed that, for a sample of US firms, the multinational companies with more extensive foreign operations have a higher tax avoidance than only domestic companies. Dyreng et al. (2008) showed that firms with greater international exposure are more likely to avoid taxes while others do not.

Firms with foreign subsidiaries and with operations situated in variably-taxed jurisdictions have greater opportunities to engage in tax-planning activities and invest more heavily in tax avoidance. More specifically, MNFs have tax-avoidance opportunities through locating more activities in low or no-tax locations, via shifting more income from high-tax countries to low-tax countries, and by allocating tax-deductible expenses into high-tax countries. It is also by exploiting the international tax-rule differentials of various countries offering different tax advantages (Rego, 2003; Gravelle, 2015) and by engaging in cross-border tax arbitrage and other techniques unavailable to purely domestic corporations.

Based on the aforementioned discussion, we expect the first following hypothesis:

H1: All else being equal, firms with high level of foreign operations are more likely to use TH subsidiaries.

4.3.2 Intangible assets

The relocation of INTANG (patents, trademarks, etc.) has raised increasing attention to government and global tax authorities (Hejazi, 2006; Gravelle, 2015). Several studies document that INTANG are the major facilitators of income shifting into low or no tax jurisdictions. For example, Grubert (2003) noted that half of the income shifted from high-tax to low-tax countries is attributed to the transfer of INTANG. Dischinger and Ridell (2011) argue that MNFs with higher intangibles to total assets ratio are more likely to utilize the low-tax countries. They show that MNFs transfer income from high-tax jurisdictions to low-tax jurisdictions via distorting the transfer pricing of INTANG. Using data on US MNFs, Taylor et al. (2015b) find that using TH and investing in INTANG are important determinants to facilitate aggressive transfer-pricing activities.

IAS 38 prescribes accounting treatment for INTANG, including intangibles acquired in a business combination, and valuation methods after first recognition: cost model, revaluation model, amortization and impairment. Since the value of INTANG is more difficult to determine than the value of tangible assets, the transfer pricing of INTANG (royalty prices) are hard to value at arm's length prices (Desai et al., 2006) which give MNFs an incentive to locate intangible property in low-tax countries. In fact, firms are more likely to engage in tax-avoidance opportunities through the transfer of high-value INTANG between affiliates situated in variably-taxed jurisdictions in order to shift profits to low-tax countries (Dyregang et al., 2008).

For example, MNFs domiciled in Canada invest in foreign subsidiaries located in high-tax jurisdictions, and distort the location of their INTANG. The parent firm sub-licenses a patent to a TH incorporated subsidiary located in Barbados at an advantageous price. The TH-country, then, sells the patent to a high-tax country, and receives the corresponding royalty payments as profits, and is taxed at low or nil-tax rates. In this case, not only an income shifts to TH, but also the royalties are treated as tax-deductible expenses in high-tax jurisdictions (Jones and Temouri, 2016).

Based on the aforementioned discussion, we expect the second following hypothesis:

H2: All else being equal, firms with significant levels of INTANG are more likely to use TH subsidiaries.

4.3.3 Withholding taxes

The Canadian law imposes WITHTAX on dividends, interests and royalties (25 per cent) (McKenzie, 2008). WITHTAX on dividends, royalties and interest payments effectively reduce the savings from intragroup payments, and thus constitute a fiscal barrier to profit shifting. For the purpose of WITHTAX, it's important to determine whether the return on investment is related to a debt interest or an equity interest. This treatment is relevant to determine whether or not a return paid by a firm on financing interest is non-deductible (treated as a dividend) or deductible (treated as an interest expense). If it is considered as a return on **equity**, it is subject to a dividend-withholding tax. If it is considered as a return on interest debt, it's subject to an interest-withholding tax (Taylor et al., 2015a).

The intragroup transfer of dividends, interests and royalties potentially triggers WITHTAX. Thus, if WITHTAX apply, they encourage companies to substantially

reduce taxable income on a worldwide basis (Collins and Shackelford, 1998). Cross border on dividends, royalties and interest payment can be structured to mitigate corporate-tax liabilities by recharacterizing transaction, or shifting funds to preferential jurisdictions. In related-party transactions, reduction in the rate of WITHTAX on certain type of income rather than the rate on other types of income may disguise the true character of payments by, for example, characterizing a transaction as a payment of interest instead of a dividend, or a royalty payment. With regard to the transfer of funds to preferential jurisdictions, reducing or abolishing WITHTAX on intrafirm interest, dividend and royalty payments may be canalled through conduit companies. One of the most famous and discussed examples that Google and many other companies (Facebook, Microsoft, etc.) use is “double Irish Dutch sandwich”. As the matter of fact, some MNFs canalled royalties free of WITHTAX from Ireland through the Netherlands to Bermuda. Tax avoidance of WITHTAX or the recharacterization of those payments potentially involves TH utilization.

Based on the aforementioned discussion, we expect the third following hypothesis:

H3: All else being equal, firms subject to WITHTAX are more likely to use TH subsidiaries.

4.3.4 Thin capitalization

THINCAP constitutes an important tax-planning strategy employed by MNFs referring to the situation in which companies finance their operations through a relatively high level of debt compared to equity (Richardson et al., 1998; Taylor and Richardson, 2012).

It is predictable that high-leveraged firms have a greater ability to reduce their worldwide tax obligation due to the deductibility of interest expenses. Rego (2003) find that firms use leverage to mitigate their global-tax liabilities. Similarly, Dyreng et al. (2008) find that leveraged firms have a lower cash flow ETR over long periods. Markle and Shackelford (2012) find that highly-leveraged firms enjoy lower tax liabilities. Finally, Taylor and Richardson (2012) find that thin capitalization is considered economically one of the most important drivers of tax avoidance.

Evidence from researches on income shifting suggests that firms can shift profit from high-tax jurisdictions to low-tax jurisdictions, using intra-firm debt (Desai and Hines, 2002; Richardson and Taylor, 2015). Indeed, MNFs could use more debt if they have a subsidiary located in low-tax jurisdictions. When an affiliate situated in a low-tax country extends loans to finance an investment in high-tax countries, the subsidiary in a high-tax country can make deductible interests to reduce taxable income. The deductible interests are taxed as profit in the low-tax country (Buettner and Wamser, 2013).

Faced with the large losses in tax revenue due to the excessive use of debt finance by MNFs, many developed countries have introduced thin-capitalization rules (Haufler and Runker, 2012). Canada becomes the first country that has implemented thin-capitalization rules in 1971 (Buettner et al., 2012). Thin-capitalization rules aim at restricting the ability of firms to deduct interest on debt when the capital structure is deemed to be excessively leveraged. Canada rules are in subsections 18(4) to 18(6) of the Income Tax Act, and they limit the deductibility of interest above 3 to 1. The Department of Finance released in 1998 a report from the Technical Committee on Business Taxation⁹ suggesting that the

⁹The Report is available at: https://www.fin.gc.ca/pub/pdfs/tsrep_e.pdf

debt equity ratio should be reduced to 2 to 1 (Farrar and Mawani, 2008). In 2008, Advisory Panel on Canada's System of International Taxation recommends to reduce the maximum debt-to-equity ratio from 2:1 to 1.5:1¹⁰. In the situation where the maximum debt- to- equity ratio is exceeded the limit, the disallowed interest is reclassified as a dividend for tax purposes (PwC, 2012).

Based on the aforementioned discussion, we expect the fourth following hypothesis:

H4: All else being equal, thinly-capitalized firms are more likely to use TH subsidiaries.

4.3.5 Equity-based management compensation

The motivations of key management to engage in tax avoidance are influenced by compensation incentives (Watts and Zimmerman, 1990). Managers' remuneration helps to align the managers' incentives with the interest of shareholders (Jensen and Meckling, 1976). To align managers' incentives with the shareholders' interests, management remuneration is tied to the effective-tax rate or after-tax profit. One of the most effective ways to increase after-tax profit for shareholders is decreasing income-tax expenses.

Numerous studies show that the executive compensation is an important determinant in the firm-tax avoidance. Under agency theory, Desai and Dharmapala (2006) argue that the high-equity compensation provides incentives for managers to engage in more tax avoidance. Dyreng et al. (2010) find evidence that individual top executives (CEOs, CFOs, and other managers) seem to play a statistically significant role in determining the level of tax avoidance. Minnick and Noga (2010) find a positive relation between pay-performance sensitivity for CEOs and the direction and lower long-run ETR. Rego and Wilson (2012) show that equity-based remuneration incentives encourage managers (CEOs and CFOs) to undertake risky tax in order to increase portfolio-value activities. Armstrong et al. (2012) find a strong negative links between the incentives of tax directors and GAAP ETR. The equity compensation provides incentives for managers to reduce the tax liabilities through shifting profit to subsidiaries located in TH.

Before the implementation of compensation disclosure regulation in Canada, most firms did not disclose details of remuneration arrangements they offer to their executives. In October 1993, Ontario Security Commission mandates all firms listed on the Toronto Stock Exchange (TSX) to disclose detailed amount and composition of individual executives remuneration (Craighead et al., 2004) through an amendment to regulation 638 closely follow those mandated by the Securities and Exchange Commission (SEC)¹¹. In the United States, the SEC initiated changes in the Securities Exchange Act of 1934, and effective October 15, 1992, the SEC now instructs U.S. corporations to provide shareholders with more understandable reports on executive compensation. The U.S. corporations are mandate to disclose all compensation awarded to the CEO and to the four most highly compensated executive officers. Canada has adopted U.S. inspired compensation disclosure regulations with the goal of achieving greater governance transparency and intended to improve the quality of executive compensation disclosures. The information on executive compensation in Canadian firms is available in Management Information proxy Circulars provided to regulators at the end of each fiscal

¹⁰The final Report is available at: <https://www.fin.gc.ca/access/tt-it/apcsit-gcrfci/pdf/apcsit-report-rapport-gcrfci-eng.pdf>

¹¹ See Craighead et al. (2004, p.24-25) for an example to Premandated and Postmandated disclosure.

year and can be found on the SEDAR and we will therefore use the term "proxy" to describe this data source (Ben-Amar and Zeghal, 2011).

Based on the aforementioned discussion, we expect the fifth following hypothesis:

H5: All else being equal, firms with high EMR are more likely to use TH subsidiaries.

4.3.6 Audit and tax-related fees

The utilization of external tax services constitutes a strategy employed by firms that affects tax decisions. Prior studies illustrate that auditors receive significant fees to elaborate tax planning activities. For example, Mills (1998) demonstrates a significant negative relationship between tax fees and tax expenses. McGuire et al. (2012) demonstrate a positive relationship between levels of auditor-provided tax services and tax avoidance when the external audit firm is a tax expert. Donohoe and Knechel (2014) show that tax aggressive firms pay higher fees for external audit services. Hogan and Noga (2015) find that firms that pay significant fees for auditor provided tax services pay less tax over the long run.

Other researches (McGuire et al., 2012; Jones et al., 2018) find that multinationals taking on a Big-4 firm to audit their accounts become more tax aggressive. Given that the Sarbanes Oxley Act of 2002 allows big 4-international accountancy firms to provide both audit services and tax services to their clients, many cases of tax avoidance are helped by big 4-audit firms.

Various document leaks have shown anecdotally the role of the big 4-audit firms. Recently, the scandal of Panama Papers details information about anonymous offshore companies created by Panamanian law firms around the world. The papers linked a number of such companies to big 4-audit firms (Jones et al., 2018). Furthermore, the revelations of Luxleaks, in 2014, shed light on aggressive tax-planning practices implanted in Luxemburg, and set up by PwC from 2002 to 2010. In 2012, the CRA discovered the Isle of Man scheme in which KPMG in Canada help their wealthy-Canadian clients to shift profit to low-tax Isle of Man for dodging their taxes. In 2015, lawyers of CRA made a secret-amnesty offer to KPMG's wealthy clients. According to this amnesty, KMPG's wealthy clients would not be penalized. Multimillionaires only had to pay taxes and some interest (Cashore et al., 2017). The majority of the billions in annual-revenue losses is explained by the multinational transfer of profits around the world, that big four participate in it (Cobham, 2017).

Auditors use their knowledge and expertise to help their clients to achieve higher levels of tax avoidance (McGuire et al., 2012). Auditing firms are the key drivers of TH, and are often the creators and vendors of tax planning strategies (Jones et al., 2018). Firms with a significant ratio of tax fees to audit fees are more likely to have purchased the majority of their tax consulting services from their external audit firm.

Based on the aforementioned discussion, we expect the sixth following hypothesis:

H6: All else being equal, firms with significant level of TAXFEES are more likely to use TH subsidiaries.

4.3.7 Corporate-governance structure

The last two decades are characterized by famous financial scandals (Enron, WorldCom, Parmalat, etc.). These financial scandals have used the TH as a support. In the wake of

major corporate scandals in the early 2000s, there has been an increasing interest in researches examining the effect of corporate governance on tax-avoidance activities. Previous studies (e.g., Lanis and Richardson, 2011; Richardson et al., 2013) suggested that the CGS of a firm has a significant effect on corporate-tax avoidance. These studies indicate that board of directors represents the top level of internal-control mechanisms for controlling the decision of top management in a company, and for mitigating tax aggressiveness.

Indeed, strong-corporate governance allowing better monitoring of firms engaging in aggressive-tax planning, implies more transparency, making it difficult for opportunist managers to divert firm resources resulting from tax avoidance for their own benefit, to manipulate earnings, and to keep tax-avoidance activities hidden. Hence, CGSs play a key role in determining the propensity of firms to engage in activities of tax avoidance.

The Canadian governance system can be qualified as "principles-based" approach which relies on the "comply or disclose" principle (Anand et al., 2006). Under this principle, Canadian companies are not required to implement the best practice guidelines (voluntary disclosure) (section 472 of TSX Company Manual). They are only required to disclose and explain in an annual report or information circular about governance guidelines adopted and any non-compliance. The regime has been in place since 1995 when the TSX issued a list of best practice guidelines to improve corporate governance practices of Canadian public companies.

Based on the aforementioned discussion, we expect the seventh following hypothesis:

H7: All else being equal, firms with weaker CGSs are more likely to use TH subsidiaries.

5. Methodology

5.1 Sample and data sources

Our initial sample consists of 263 firms listed on the Toronto Stock Exchange (S&P/TSX) Composite Index over the period of 2014-2015. We began in 2014 because in this year, Canada's balance sheet of the net FDIs reached its best in its history. However, the sample was reduced to 235 firms after excluding firms with no subsidiaries (9), and firms for which we don't have data available for our independent and control variables (defined below) (19). These requirements yield 470 firm-year observations.

Several different data sources are integrated to analyze the determinants of TH use and to test our hypotheses. All TH data are hand-collected from the annual reports and annual informations of the sample firms. Executive-compensation data are collected from proxy documents (available on SEDAR Website). Audit tax fees data are collected from annual information. Corporate-governance scores are obtained from The Globe and Mail. Finally, financial data are obtained from DATASTREAM.

5.2 Variables measurement

5.2.1 Dependent variable

Our dependent variable is represented by the TH. To make sure that our results are robust, we use four-alternative measures of TH published by various organizations. Our four-TH measures are summarized as follows:

- TH1 is a dummy variable coded as 1 if the firm has at least one subsidiary firm incorporated in an IMF (2000) listed-TH, and 0 otherwise;
- TH2 is a dummy variable coded as 1 if the firm has at least one subsidiary firm incorporated in a TJN (2005) listed-TH, and 0 otherwise;
- TH3 is a dummy variable coded as 1 if the firm has at least one subsidiary firm incorporated in an IMF (2007) listed-TH, and 0 otherwise;
- TH4 is a dummy variable coded as 1 if the firm has at least one subsidiary firm incorporated in an OECD (2012) listed-TH, and 0 otherwise.

5.2.2 Independent variables

The independent variables consist of multinationality (MULTI), intangible assets (INTANG), withholding taxes (WITHTAX), thin capitalization (THINCAP), equity-based management remuneration (EMR), audit tax fees (TAXFEES), and the strength of corporate governance structure (CGS).

MULTI is measured as foreign sales scaled by total sales (Crabtree and Maher, 2009; Huseynov and Klamm, 2012), and its sign is predicted to be positive. INTANG is measured as intangible assets divided by total assets (Dyreng et al., 2008; Richardson and Taylor, 2015), and its sign is predicted to be positive. WITHTAX is measured as a dummy variable coded as 1 if the firm is subject to Canadian WITHTAX, and 0 otherwise (Taylor and Richardson, 2013; Taylor et al., 2015a). WITHTAX is expected to have a positive sign. THINCAP is measured as a dummy variable coded as 1 if a firm's debt-to-equity ratio exceeding 1.5 to 1.0, and 0 otherwise. THINCAP is expected to have a positive sign. EMR is measured as the total equity-based remuneration paid to key-management personnel divided by the total remuneration paid to key-management personnel (Desai and Dharmapala, 2006). EMR is expected to have a positive sign. TAXFEES is measured as tax fees scaled by total fees paid to auditing firms¹² (Hogan and Noga, 2015), and its sign is predicted to be positive. Finally, CGS is employed to take the overall strength of a firm's CGS. The corporate-governance scores are developed by The Globe and Mail¹³, and its sign is predicted to be negative.

5.2.3 Control variables

According to prior literature, we include in our analysis a set of control variables allowing us to control the effects on TH utilization.

Firm size (SIZE) controls the impact of the firm's size on TH use. Most studies claim that larger firms dispose both incentives and resources to engage in tax-planning activities (Rego, 2003), and reduce corporate taxes through locating their operations in low-tax countries. We measure SIZE as the natural logarithm of total assets (Richardson and Taylor, 2015; Taylor et al., 2015a). SIZE is expected to have a positive sign.

¹² For Canadian companies, the compensation of the external auditor is disclosed pursuant to the Multilateral Instrument 52-110 on Audit Committees comprising four categories: (1) Audit Fees, (2) Audit-Related Fees, (3) Tax Fees, and (4) All Other Fees, which be disclosed in AIF.

¹³ The Globe and Mail corporate governance ratings include several elements. The ranking scores are calculated, using a 100-point scale comprising four components: board composition and effectiveness (40), compensation policies (23), shareholder rights (22) and disclosure practices (15).

We use return on assets (ROA) as a proxy for firm performance. It is measured as pre-tax profit scaled by total assets. However, due to the conflicting results of ROA obtained in prior tax avoidance researches (Gupta and Newberry, 1997; Adhikari et al., 2006), we don't accord a sign of prediction for this variable.

We also include industry fixed effects. Industry sectors are defined by the one-digit Standard Industry Classification (SIC) codes and are included as control variables in our study due to the difference that could exist in tax avoidance across different industry sectors (Rego, 2003). We include nine industry sectors: (1) Agriculture, Forestry and Fishing, (2) Mining, (3) Construction, (4) Manufacturing, (5) Wholesale trade, (6) Wholesale retail, (7) Utilities, (8) Services, and (9) Finance, Insurance and Real Estate.

Eventually, we include year fixed effects to take into account the difference that may exist in TH activities over the sample period.

5.3 Regression procedure

As mentioned above, in order to improve the robustness of our empirical results, our dependent variable TH is measured by TH1, TH2, TH3 and TH4 which are published by various organizations (IMF, TJN and OECD). Thus, we can determine whether or not there is a preferential utilization of TH by Canadian firms. Given the binary nature of all measures of TH, we use probit-model to empirically test our hypotheses.

5.4 Specification of the econometric model

This study aims to examine the determinants of TH use. The equation of our empirical model is as follows:

$$TH_{it} = a_0 + a_1 MULTI_{it} + a_2 INTANG_{it} + a_3 WITHTAX_{it} + a_4 THINCAP_{it} + a_5 EMR_{it} + a_6 TAXFEES_{it} + a_7 CGS_{it} + a_8 SIZE_{it} + a_9 ROA_{it} + \text{Industry fixed effects} + \text{Year fixed effects}$$

Where i= firms: 1-235; t= fiscal years: 2014-2015; MULTI = foreign sales scaled by total sales; INTANG= intangible assets divided by total assets; WITHTAX= a dummy variable coded as 1 if the firm is subject to Canadian WITHTAX, and 0 otherwise; THINCAP = a dummy variable coded as 1 if a firm's debt to equity ratio exceeding 1.5 to 1.0 , and 0 otherwise; EMR= total equity-based remuneration paid to key-management personnel divided by the total remuneration paid to key-management personnel; TAXFEES = tax fees scaled by total fees paid to auditing firms; CGS = corporate-governance scores developed by The Globe and Mail; SIZE= natural logarithm of total assets; ROA= pre-tax profit divided by total assets. We also include industry and year fixed effects.

6. Empirical results

6.1 Descriptive analysis

Table1 displays a summary of descriptive statistics of our sample for dependent variables (TH1, TH2, TH3 and TH4), independent variables (MULTI, INTANG, WITHTAX, THINCAP, EMR, TAXFEES and CGS) and control variables (SIZE and ROA). The dependent variable TH1 has a mean of 0.472. Hence TH1 provides evidence showing that, on average, 47.2% of the firms in our sample have at least one-subsidary firm incorporated in an IMF (2000) listed-TH. TH2 has a mean of 0.566 indicating that, on

average, 56.6% of the sample firms have at least one-subsubsidiary firm incorporated in a TJN (2005) listed-TH. TH3 has a mean of 0.513 showing that 51.3% of the sample firms have at least one-subsubsidiary firm incorporated in an IMF (2007) listed-TH. TH4 has a mean of 0.662 indicating that 66.2% of the sample firms have used subsidiaries incorporated in an OECD (2012) listed-TH. In regards to the independent variables, foreign sales (MULTI) represent, on average, 41.1% of total sales. Intangible assets (INTANG) represent, on average, 16.9% of total assets. An average of 60.9% of the sample firms are subject to Canadian WITHTAX. 14.8% of the firms in our sample are, on average, thinly capitalized (THINCAP). EMR is, on average, 41.4% of total management remuneration. TAXFEES represent, on average, 10.8% of total fees paid to auditing firm. Finally, CGS averages 73% for the sample firms. For control variables, SIZE and ROA have means of 15.393 and 3.143, respectively.

[Insert Table 1 here]

Table 2 presents a sample-industry distribution according to one-digit SIC codes. Our sample includes a greater proportion of firms represented in industries- such as Mining (31.06%), Finance, Insurance and Real Estate (20%), Manufacturing (15.32%), Utilities (14.04%), and Services (10.21%)- than in other industries.

[Insert Table 2 here]

In addition, Table 2 reports descriptive statistics of TH1, TH2, TH3 and TH4 by industry classification (one-digit SIC codes). For TH1, we observe that the frequency of at least one-subsubsidiary firm incorporated in an IMF (2000) listed-TH is more frequent in Mining (39.64%), Finance, Insurance and Real Estate (21.62%) and Manufacturing (18.02%) compared with other industries. The results are quite similar for TH2 (TJN 2005 listed-TH), TH3 (IMF 2007 listed-TH) and TH4 (OECD 2012 listed-TH).

6.2 Correlation results

Table 3 presents Pearson correlation results of all variables. We find significant correlations (with predicted signs) between TH1, TH2, TH3, TH4 and MULTI ($p < 0.01$). We find significant correlations (with predicted signs) between TH2, TH3, TH4 and WITHTAX ($p < 0.05$ or better). Significant correlations (with predicted signs) are found between INTANG, EMR and only TH3 ($p < 0.10$ or better) and also between TAXFEES and only TH4 ($p < 0.10$). However, we find no significant correlations between THs and THINCAP. For the control variables, we find significant correlations between TH1, TH3, TH4 and SIZE ($p < 0.10$ or better) and also between ROA and all TH measures ($p < 0.01$). Table 3 also demonstrates that the correlations between independent variables are generally weak. Specifically, the highest correlation coefficient is between CGS and SIZE of 0.395 ($p < 0.01$). Finally, variance inflation factor (VIF) statistics show no multicollinearity problem.

[Insert Table 3 here]

6.3 Regression results

Table 4 provides the regression analysis of our hypotheses in terms of the four-TH measures. It indicates that the regression coefficient for MULTI is positive and significantly associated with TH use ($p < 0.01$) across all of the regression models (TH1-

TH4), which support our H1: Firms with a greater proportion of foreign sales are more likely to utilize TH (Rego, 2003; Richardson and Taylor, 2015; Taylor et al., 2015a). The regression coefficient for INTANG is positive and significantly associated with TH use ($p < 0.05$ or better) across some of the regression models (TH1 and TH3), so H2 is also supported. Given that many intangible assets are hard to value, intangible assets are used as a means to facilitate transferring profits in variably-taxed jurisdictions through the use of TH (Dyreng et al., 2008; Richardson and Taylor, 2015; Taylor et al., 2015a). The regression coefficient for WITHTAX is also positive and significantly associated with TH use ($p < 0.10$ or better) across several regression models (TH2, TH3 and TH4), thus providing support for H3. This result implies that firms exposed to WITHTAX utilize TH to exploit differences in tax treatments of transactions and the tax rules of different countries to reduce their corporate-tax liabilities (Taylor and Richardson, 2013; Taylor et al., 2015a). The regression coefficient for THINCAP is positive and significantly associated with TH use ($p < 0.10$) across some regression models (TH2 and TH3), so H4 is also supported. It seems that thinly-capitalized firms could use a financing entity located in a TH country to obtain tax deductions for interest payments through its subsidiaries in high-tax countries (Richardson et al., 1998; Wilson, 2009). In addition, Table 4 shows that the regression coefficient for EMR is positive and significantly associated with a TH use ($p < 0.05$) in only the TH3-regression model, so H5 is marginally supported by the results. It seems that equity compensation may provide incentives for managers to reduce the tax liabilities through the utilization of TH (Desai and Dharmapala, 2006). In summary, the results in Table 4 provide support for H1, H2, H3, H4, and H5 but not for H6 and H7. Finally, for our control variables, the regression coefficient for SIZE is positive and significantly associated ($p < 0.01$) with a TH use (Richardson and Taylor, 2015; Taylor et al., 2015a) across all of the regression models (TH1-TH4).

[Insert Table 4 here]

6.4 Robustness tests

6.4.1 Alternative intangible-asset measure

A robustness check of our main regression results (see Table 4) is executed in accordance with an alternative measure of intangible assets (R&D intensity). Specifically, we measure R&D as a research and development expenses scaled by total sales¹⁴. We present the regression results based on the alternative intangible-asset measure in Table 5. We show that R&D regression coefficient is positively and significantly associated with a TH use ($p < 0.10$ or better with predicted signs) in some regression models (TH1 and TH4). This finding shows that firms spending more on R&D engage in tax avoidance through the use of TH (Grubert, 2003; Desai et al., 2006; Dyreng et al., 2008). Furthermore, we find robust evidence consistent with our primary analysis showing regression coefficients for MULTI, WITHTAX, THINCAP, EMR are statistically significant ($p < 0.10$ or better with predicted signs) in a number of our regression models. These findings provide additional support for H1-H2-H3- H4 and H5.

[Insert Table 5 here]

¹⁴ When missing, remit to 0 (Dyreng et al., 2010).

In addition, Table 5 shows that the regression coefficient for TAXFEES is positive and significantly associated with TH use ($p < 0.10$) in only the TH1-regression model, so H6 is also marginally supported by the results. This finding is important because auditing firms possess knowledge of legislation and have access to higher quality-tax expertise to help their clients escape the regulatory limits and to avoid the corporate tax (Jones et al., 2018). Thus firms with significant level of TAXFEES invest more heavily in tax planning strategies such as the use of TH. However, despite the regression coefficient for CGS is negatively associated with TH use across several of the regression models (TH1, TH2 and TH3), the regression coefficient for CGS is not significant in any of our regression models. Thus H7 is not supported. Finally, for the control variables, Table 5 shows that the regression coefficient for SIZE is positively and significantly associated with TH use ($p < 0.10$ or better with predicted signs) across all of the regression models (TH1-TH4). Moreover, the ROA regression coefficient is negatively and significantly associated with TH use ($p < 0.10$) in only the TH4-regression model.

Highlighting the magnitude and significance of the regression coefficients, our results show that MULTI, INTANG, R&D, THINCAP, WITHTAX are strongly positively associated with TH use. Whereas EMR and TAXFEES are less important.

6.4.2 Years effect

This study investigates the determinants of TH use of publicly-listed Canadian firms during the period of only two years. During this period, some variables used in our study—such as TH use, WITHTAX, and THINCAP could remain relatively stable over time. Therefore, we also reproduce the same model without taking into account the effect of years. Table 6 and 7 reports all the regression results.

[Insert Tables 6 and 7 here]

Consistent with the main regression results presented in Table 4 and 5, statistically-significant regression coefficients are shown for MULTI, INTANG, R&D, WITHTAX, THINCAP, EMR and TAXFEES ($p < 0.10$ or better with predicted signs) in a number of our regression models. Furthermore, Table 7 shows that the CGS-regression coefficient is negative and significantly associated with TH use in only the TH2-regression model ($p < 0.10$ with predicted sign), so H7 is marginally supported by the results. This finding implies that firms with weaker CGSs are more likely to use TH. Finally, for the control variables, Tables 6-7 show that the SIZE regression coefficient is significantly associated with TH use ($p < 0.01$ with predicted signs) across all of our regression models.

7. Conclusion

This paper investigates the determinants of TH use, using a sample of 235 publicly-listed Canadian firms (470 firm-years) during the period of 2014-2015. Based on alternative measures of TH, our probit-regression results indicate that variables relating to MULTI, INTANG, THINCAP, WITHTAX, EMR and TAXFEES are positively associated with TH use. We find additional evidence that the variable relating to R&D intensity is positively associated with TH use. Moreover, our results also provide that strong CGSs weaken the TH use activity. Highlighting the magnitude and significance of the regression coefficients, our results show that MULTI, INTANG, R&D intensity THINCAP and WITHTAX are strong determinants of TH use.

Our results indicate that, to avoid tax planning activities, corporate governance should do a heavy control on managers, allowing better monitoring and transparency in their firms. Moreover, our results may assist tax watchdogs in their efforts to understand the tax behavior held by Canadian firms. They also may be interesting for tax authorities in planning enforcement activities.

However, this study is not without its limitations. First, our sample is limited to only publicly-listed Canadian firms and to a short time period. It will be interesting for future research to extend the research beyond the Canadian context to assess the generalization of our results using a sample of UK firms for example, or other European Union countries. It will be also interesting to expand the dataset to include additional years. Second, it is possible that firms may have not disclosed all of their subsidiaries in AIF due to materiality¹⁵. Finally, our regression model may be incomplete. Further research may include other determinants that could influence the TH utilization of Canadian firms such as transfer pricing or income shifting.

¹⁵ Canadian securities regulations allow companies to omit subsidiaries that do not meet designated materiality thresholds. Specifically, subsidiaries need not be disclosed if they do not exceed 10% of the company's consolidated assets or consolidated revenues.

Table 1: Descriptive statistics

Variables	Mean	SD	Q1	Median	Q 3	Minimum	Maximum
TH1	0.472	0.500	0.000	0.000	1.000	0.000	1.000
TH2	0.566	0.496	0.000	1.000	1.000	0.000	1.000
TH3	0.513	0.500	0.000	1.000	1.000	0.000	1.000
TH4	0.662	0.474	0.000	1.000	1.000	0.000	1.000
MULTI	0.411	0.382	0.000	0.335	0.795	0.000	1.000
INTANG	0.169	0.227	0.002	0.041	0.277	0.000	0.847
WITHTAX	0.609	0.489	0.000	1.000	1.000	0.000	1.000
THINCAP	0.148	0.356	0.000	0.000	0.000	0.000	1.000
EMR	0.414	0.181	0.298	0.424	0.534	0.000	0.857
TAXFEES	0.108	0.120	0.010	0.068	0.171	0.000	0.540
CGS	0.730	0.145	0.630	0.740	0.850	0.380	0.980
SIZE	15.393	1.715	14.149	15.176	16.398	12.191	20.566
ROA	3.143	8.392	0.750	3.905	7.310	-25,620	30.080

Variable definitions: TH1, a dummy variable coded as 1 if the firm has at least one-subsubsidiary firm incorporated in an IMF (2000) listed-tax haven, and 0 otherwise; TH2, a dummy variable coded as 1 if the firm has at least one-subsubsidiary firm incorporated in a TJN (2005) listed-tax haven, and 0 otherwise; TH3, a dummy variable coded as 1 if the firm has at least one-subsubsidiary firm incorporated in an IMF (2007) listed-tax haven, and 0 otherwise; TH4, a dummy variable coded as 1 if the firm has at least one-subsubsidiary firm incorporated in an OECD (2012) listed-tax haven, and 0 otherwise; MULTI, foreign sales scaled by total sales; INTANG, intangible assets divided by total assets; WITHTAX, a dummy variable coded as 1 if the firm is subject to Canadian withholding taxes, and 0 otherwise; THINCAP, a dummy variable coded as 1 if a firm's debt-to-equity ratio exceeding 1.5 to 1.0, and 0 otherwise; EMR, total equity-based remuneration paid to key-management personnel divided by the total remuneration paid to key-management personnel; TAXFEES = tax fees paid to auditing firms scaled by total fees paid to auditing firms; CGS, The corporate-governance scores developed by The Globe and Mail; SIZE, natural logarithm of total assets; ROA, pre-tax profit divided by total assets. All variables are winsorized at the 1 percent level to control for outliers.

Table 2: Industry summary

Industry	Sample distribution		TH1		TH2		TH3		TH4	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Mining	146	31.06	88	39.64	96	36.09	87	36.10	98	31.51
Finance, Insurance and Real Estate	94	20	48	21.62	52	19.55	48	19.92	61	19.61
Manufacturing	72	15.32	40	18.02	52	19.55	48	19.92	58	18.65
Utilities	66	14.04	12	5.41	16	6.02	12	4.98	34	10.93
Services	48	10.21	28	12.61	40	15.04	40	16.59	38	12.22
Retail Trade	26	5.53	2	0.90	6	2.25	2	0.83	10	3.22
Wholesale trade	10	2.13	4	1.80	4	1.50	4	1.66	10	3.22
Construction	6	1.28	0	0	0	0	0	0	2	0.64
Agriculture, Forestry and Fishing	2	0.43	0	0	0	0	0	0	0	0
Total	470	100%	222	100%	266	100%	241	100%	311	100%

Table 3: Pearson correlations

	TH1	TH2	TH3	TH4	MULTI	INTANG	WITHTAX	THINCAP	EMR	TAXFEES	CGS	SIZE	ROA
TH1	1												
TH2	0.829***	1											
TH3	0.880***	0.898***	1										
TH4	0.514***	0.508***	0.482***	1									
MULTI	0.412***	0.418***	0.440***	0.494***	1								
INTANG	0.049	0.066	0.102**	0.030	0.097**	1							
WITHTAX	0.069	0.151***	0.090**	0.108**	0.072	0.009	1						
THINCAP	0.044	0.038	0.034	-0.007	-0.110**	0.091*	-0.073	1					
EMR	0.047	0.073	0.079*	-0.004	-0.043	-0.075	0.168***	0.056	1				
TAXFEES	0.002	0.011	0.013	0.080*	0.093*	0.089*	0.027	0.039	-0.113**	1			
CGS	-0.004	-0.023	-0.030	0.110**	-0.026	-0.154***	0.175***	0.106**	0.147***	-0.109**	1		
SIZE	0.121***	0.052	0.078*	0.093**	-0.033	-0.124***	-0.063	0.356***	0.202***	-0.133***	0.395***	1	
ROA	-0.262***	-0.182***	-0.169***	-0.193***	-0.125***	0.131***	-0.055	0.008	-0.149***	0.150***	0.034	-0.113**	1

See Table 1 for variable definitions. *, **, ***, indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 4: Regression results

	Predicted sign	TH1	TH2	TH3	TH4
Intercept	?	- 27.539 (- 4.52)***	- 17.113 (- 3.35)***	- 26.202 (- 5.25)***	- 16.859 (- 4.17)***
MULTI	+	11.205 (6.04)***	10.749 (5.37)***	13.661 (8.72)***	15.569 (12.85)***
INTANG	+	8.381 (2.36)**	4.617 (1.50)	9.021 (2.57)***	2.190 (1.19)
WITHTAX	+	0.623 (0.51)	3.339 (3.32)***	1.735 (1.72)*	2.194 (2.99)***
THINCAP	+	2.390 (1.56)	2.381 (1.86)*	2.866 (1.77)*	- 0.025 (- 0.03)
EMR	+	2.339 (0.80)	2.156 (0.80)	5.449 (2.02)**	- 0.504 (- 0.24)
TAXFEES	+	4.610 (1.24)	2.852 (0.84)	2.122 (0.65)	- 0.362 (- 0.09)
CGS	-	0.659 (0.17)	-1.093 (- 0.37)	-1.864 (- 0.52)	3.470 (1.36)
SIZE	+	1.115 (3.16)***	0.989 (2.82)***	1.517 (4.69)***	0.925 (3.44)***
ROA	?	-0.048 (- 0.83)	-0.029 (- 0.59)	-0.016 (- 0.33)	- 0.087 (- 1.58)
Industry fixed effects	?	Yes	Yes	Yes	Yes
Year fixed effects	?	Yes	Yes	Yes	Yes
χ^2		95.91	81.91	178.94	334.75
Prob>χ^2		0.0000	0.0000	0.0000	0.0000

See Table 1 for variable definitions. The p-values are one-tailed for the directional hypotheses, and two-tailed, otherwise. *, **, ***, indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 5: Regression results (R&D)

	Predicted sign	TH1	TH2	TH3	TH4
Intercept	?	- 37.010 (- 6.58)***	- 13.482 (- 2.46)**	- 28.726 (- 3.76)***	- 18.976 (- 3.56)***
MULTI	+	15.728 (12.09)***	15.280 (9.16)***	15.525 (6.93)***	18.799 (11.40)***
R&D	+	0.129 (1.78)*	0.044 (0.35)	0.162 (1.49)	0.466 (4.17)**
WITHTAX	+	1.413 (1.73)*	3.528 (3.49)***	2.078 (1.51)	2.089 (1.99)**
THINCAP	+	3.236 (1.90)*	4.442 (2.70)***	3.144 (1.69)*	0.084 (0.06)
EMR	+	0.906 (0.25)	3.049 (1.09)	6.472 (1.86)*	- 3.390 (- 1.22)
TAXFEES	+	5.850 (1.72)*	2.941 (0.87)	4.350 (0.90)	2.593 (0.67)
CGS	-	- 3.833 (- 1.15)	- 1.814 (- 0.51)	- 1.387 (- 0.30)	4.255 (0.96)
SIZE	+	2.031 (5.63)***	0.735 (1.68)*	1.771 (3.79)***	1.129 (2.75)***
ROA	?	- 0.058 (-1.08)	- 0.024 (-0.44)	- 0.020 (-0.38)	- 0.134 (-1.80)*
Industry fixed effects	?	Yes	Yes	Yes	Yes
Year fixed effects	?	Yes	Yes	Yes	Yes
χ^2		305.84	168.44	88.56	240.42
Prob>χ^2		0.0000	0.0000	0.0000	0.0000

R&D is research and development expenses scaled by total sales. See Table 1 for all remaining variable definitions. The p-values are one-tailed for the directional hypotheses, and two-tailed, otherwise. *, **, ***, indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 6: Regression results without the years effect

	Predicted sign	TH1	TH2	TH3	TH4
Intercept	?	- 34.204 (- 5.86) ***	- 26.362 (- 5.03) ***	- 27.057 (- 5.30) ***	- 20.655 (- 3.55) ***
MULTI	+	12.917 (9.51) ***	13.949 (8.72) ***	13.764 (8.71) ***	17. 287 (12.39) ***
INTANG	+	10.217 (4.05) ***	6.565 (1.51)	9.337 (2.63) ***	1.814 (0.80)
WITHTAX	+	0.939 (0.94)	5.252 (5.54) ***	1.769 (1.64)	2.445 (2.79) ***
THINCAP	+	1.903 (1.44)	2.736 (1.77) *	2.966 (1.66) *	- 0.520 (- 0.51)
EMR	+	2.912 (1.10)	1.682 (0.65)	5.457 (2.03) **	- 0.498 (- 0.20)
TAXFEES	+	4.244 (1.08)	5.806 (1.64)	2.566 (0.78)	0.678 (0.14)
CGS	-	- 1.776 (- 0.56)	- 3.133 (- 0.92)	- 2.017 (- 0.58)	2.126 (0.76)
SIZE	+	1.615 (5.12) ***	1.644 (4.55) ***	1.571 (4.76) ***	1.167 (2.92) ***
ROA	?	- 0.057 (-1.04)	- 0.029 (-0.56)	- 0.013 (-0.27)	- 0.062 (-0.92)
Industry fixed effects	?	Yes	Yes	Yes	Yes
χ^2		190.23	261.44	187.89	344.15
Prob> χ^2		0.0000	0.0000	0.0000	0.0000

See Table 1 for variable definitions. The p-values are one-tailed for the directional hypotheses, and two-tailed, otherwise. *, **, ***, indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

Table 7: Regression results without the years effect (R&D)

	Predicted sign	TH1	TH2	TH3	TH4
Intercept	?	- 25.921 (- 4.91) ***	- 31.254 (- 6.47) ***	- 28.115 (- 2.78) ***	- 20.857 (- 4.07) ***
MULTI	+	12.098 (4.99) ***	13.748 (9.94) ***	15.322 (5.91) ***	15.758 (7.60) ***
R & D	+	0.001 (0.00)	0.100 (1.27)	0.157 (1.41)	0.421 (1.95) *
WITHTAX	+	0.632 (0.61)	6.958 (5.32) ***	2.014 (1.50)	2.103 (1.82) *
THINCAP	+	2.935 (2.01) **	1.806 (1.60)	3.127 (1.75) *	- 0.227 (- 0.19)
EMR	+	0.662 (0.25)	4.558 (1.52)	6.598 (1.99) **	- 2.472 (- 0.95)
TAXFEES	+	6.166 (1.58)	9.978 (3.28) ***	4.252 (0.86)	3.196 (0.60)
SCGS	-	- 1.311 (- 0.38)	- 6.714 (- 1.89) *	- 1.879 (- 0.40)	3.350 (0.94)
SIZE	+	1.356 (3.84) ***	2.110 (6.48) ***	1.752 (3.18) ***	1.166 (2.84) ***
ROA	?	- 0.038 (-0.71)	- 0.039 (-0.73)	- 0.016 (-0.31)	- 0.074 (-0.86)
Industry fixed effects	?	Yes	Yes	Yes	Yes
χ^2		118.01	303.19	83.17	200.49
Prob> χ^2		0.0000	0.0000	0.0000	0.0000

R&D is research and development expenses scaled by total sales. See Table 1 for all remaining variable definitions. The p-values are one-tailed for the directional hypotheses, and two-tailed, otherwise. *, **, ***, indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

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