INTERNATIONAL TAXATION AND INCOME-SHIFTING BEHAVIOUR OF MULTINATIONAL CORPORATIONS

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Abstract

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This thesis examines the income-shifting behaviour of multinational corporations when they are facing international corporate income tax rate differentials. Multinational corporations may apply tax-planning strategies in order to shift their pre-tax profits from a high-tax country to a low-tax country; therefore, the same amount of money would be subject to a lower tax rate. By doing so, multinational corporations minimize their global tax liabilities without changing their total income.

The first essay\(^a\) develops a simple general equilibrium model by which to explore the effect of tax planning on the host country in terms of social welfare and optimal taxation. We endogenize multinational corporations’ investment decisions by allowing the user cost of capital to be affected by shifting decisions. We find that if tax rates are not

\(^a\)This essay is coauthored with Professor Michael Smart.
excessively high, then an increase in tax planning activity causes a rise in optimal corporate tax rates, and a decline in multinational investment. Thus, fears of a “race to the bottom” in corporate tax rates may be misplaced. Also, we find that the residents in high-tax countries may be better off with (some) income shifting. We prove that there is an interior optimal thin capitalization rule (a restriction on the debt-to-equity ratio) that is lower than the degree of tax planning preferred by multinational firms.

The second essay empirically examines the evidence of income-shifting behaviour of Canadian multinational corporations. The results are consistent with the income-shifting hypothesis that multinationals are inclined to shift their pre-tax profits to low-tax jurisdictions. I find that having non-arm’s length transactions with related parties in tax-haven countries has a significant negative impact on the taxable income that is reported in Canada. Further, I compare the different roles between small havens and large havens\(^b\) and find that the effect of having transactions with small havens is significantly negative, while the effect of having transactions with large tax havens is not significant. Also, I find that if Canadian corporations control their foreign-related corporations with whom they had non-arm’s length transactions, then they are more likely to report lower taxable incomes in Canada than are those that have other types of relationships with their foreign-related corporations.

\(^b\) A small haven refers to a tax haven country with a population equal to or less than one million while a large haven refers to be a tax haven country with a population greater than one million.
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1 INTRODUCTION

In the process of globalization, multinational corporations (MNCs) are becoming more important. Not only are foreign direct investments (FDI) mobile under MNCs, but the income generated from these investments is also thusly mobile. Taxation is one of the factors that have crucial impact on the competition for these resources and incomes. Recently, there has been increasing interest in the issues associated with international tax planning and income shifting. This dissertation contributes to the fast-growing literature on these subjects.

This thesis undertakes both theoretical and empirical examinations on the income-shifting behaviour of MNCs when faced with international corporate income tax rate differentials. The research objective of the first essay is to explore the effect of tax planning on the host country in terms of social welfare and optimal taxation. The first essay develops a two-sector general equilibrium model of corporate income taxation in a small, open economy. A fixed amount of immobile capital is employed in the domestic sector, while internationally mobile capital is employed in the multinational sector. The labour supply is immobile and fixed—split between the two sectors. The two sectors are treated equally for tax purposes. The tax revenues are paid to workers as lump sum transfer and workers’ consumption is given greater weight in the social welfare function than is the entrepreneurs’ consumption. In our model, corporate income tax is essentially redistributive.

The key contributions of the first essay are as follows. First, in the absence of
income shifting, our model proves that the optimal corporate tax is positive under certain circumstances. A higher tax rate leads to more tax revenue, which therefore means more redistribution to workers. Meanwhile, a higher tax rate increases the user cost of capital, therefore dampening FDI and causing a negative impact on domestic wages. The necessary and sufficient condition for a positive optimal tax rate is the following: the labour productivity is marginally higher in the domestic sector.

Second, this essay takes into account the interaction between income-shifting and investment decisions, which interaction has thus far been ignored in most of the studies in the literature. We endogenize multinational corporations’ investment decisions by allowing user cost of capital to be affected by the shifting decisions. When multinational firms shift income to a tax haven, the user cost of capital is reduced as a direct result. Despite erosions to the host country’s tax base caused by income shifting, it nonetheless may attract more FDI since multinational firms’ FDI decisions are less responsive in countries with high-tax rates when income shifting is present. We show that when the tax rate is not excessively high, the investment-enhancing effect may dominate the revenue-eroding effect. Hence, an increase in tax planning activity may cause a rise in optimal corporate tax rates. The residents in high-tax countries may even be better off with (some) income shifting. Also, we show that there is an interior optimal thin capitalization rule that is lower than the degree of tax planning preferred by multinational firms.

Our results have important theoretical implications by offering an explanation regarding the conflict between the theoretical prediction of a “race to the bottom” in corporate tax rates and the lack of evidence of a dramatic reduction of effective tax rates
in the real world. Also, our results have important policy implications. They point out that when the interaction between income shifting and investment decisions are taken into account, an increase in income shifting may become the optimal tax policy under certain circumstances.

The second essay empirically examines the international income-shifting behaviour of Canadian corporations and the possible fiscal impacts of such behaviour. With access to a unique data set (containing firm-level information collected from corporate income tax returns filed by Canadian corporations), I am able to compare the income-reporting behaviour of firms with, and without, non-arm’s length transactions with related parties in tax havens. Non-arm’s length transactions cover almost all possible forms that income shifting could take, e.g., transfer pricing in intra-firm trade, interest payments and payments for R&D, management, intangible assets shared in a single multinational enterprise, etc. The existence of non-arm’s length transactions with non-residents\(^1\) in tax havens is used to capture potential opportunities to shift income to low-tax regions.

The question I want to answer is this: Among the corporations that have the flexibility to shift income overseas through non-arm’s length transactions, what is the effect on Canadian reported taxable income of having these transactions with non-residents in tax havens? In the benchmark model, taxable income scaled by total assets is regressed on a haven dummy, which indicates the existence of a haven non-resident. The estimated coefficient on the haven dummy is significantly negative, which finding is consistent

\(^1\)The use of non-resident in this study is from the viewpoint of Canadian tax authority. A haven non-resident refers to a non-Canadian resident that resides in a tax haven.
with the hypothesis of income shifting. Valued for the Canadian corporations that have at least one haven non-resident in non-arm’s length transactions, eliminating the haven connections in the transactions increases the Canadian government’s tax base by $15.2 billion.

Other main findings follow. First, the effect of having transactions with small havens is significantly negative, while there is no significant effect of having transactions with large havens. Second, if Canadian corporations control their non-residents in non-arm’s length transactions, then they are more likely to report lower taxable income in Canada than are those that have other types of relationship with their non-residents. Third, having non-arm’s length transactions with related parties in havens reduces Canadian reported taxable income of corporations with zero loss opening balances, but does not reduce that of corporations with positive balances. Finally, there is evidence for income shifting in non-manufacturing corporations but not in manufacturing corporations; further, public corporations show support for income shifting while private corporations do not.

The important assumption of my analysis is that the existence a haven non-resident in a transaction is exogenous to income-reporting behaviour. The potential validity and consequences of this assumption are discussed, though not directly tested.

Due to data limitations, there are some questions left unanswered in this essay. For example: How do the ownership structure and the location of the parent and subsidiary companies affect reported taxable income and income-shifting strategies of Canadian corporations? Is the income-shifting pattern related to the financial situation of non-
residents with whom Canadian corporations have non-arm’s length transactions? Is there any evidence for joint decisions of international income shifting and investment in Canadian corporations? These are all interesting areas for future research.


2 IN PRAISE OF TAX HAVENS: INTERNATIONAL TAX PLANNING AND FOREIGN DIRECT INVESTMENT

2.1 Introduction

In recent years, the process of globalization has brought nations closer together and, apparently, increased the international mobility of corporate activity. Two aspects of globalization have had important and conceptually distinct implications: reductions in transportation and communication costs may make real business investment more mobile across jurisdictional boundaries, and financial innovation and liberalization may facilitate international tax avoidance even without any real changes in foreign investments by multinational firms. In this paper, we argue that these two aspects of globalization can have very different implications for the welfare of citizens and for the appropriate policy response by governments.

Increased mobility is apt to give rise to an erosion of corporate tax bases in high-tax industrialized countries, a decline in tax revenues and a rise in competition among governments. Countries seeking to attract and retain mobile investment and the associated tax revenues may be induced to reduce tax rates below the levels that would obtain in the absence of mobility. In some theories, indeed, increased mobility can lead to a “race to the bottom” driving business tax rates to zero, due to the fiscal externalities that mobility creates (Gordon 1986; Razin and Sadka, 1991). These arguments

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2 This chapter is coauthored with Professor Michael Smart.
notwithstanding, there appears to be very little evidence of a general decline in effective
tax rates on international capital flows in recent years (Slemrod, 2004).

But when mobility operates through the financial rather than real decisions of
multinational firms, its implications are more subtle. When firms may costlessly shift
income to tax havens and other low-tax jurisdictions through financial transactions, real
investment choices of firms and the tax policy environment of governments are changed.
Such international tax planning devices tend to make the location of real investment less
responsive to tax rate differentials, even as taxable income becomes more elastic. While
income shifting may reduce revenues of high-tax jurisdictions, it may have enhancing
effects on real investment that are attractive to governments. The presence of
international tax-planning opportunities may allow countries to maintain or even increase
high business tax rates, while preventing an outflow of foreign direct investment (FDI).

However, how the interaction between investment decision and income-shifting
activity affect the optimal corporate taxation has not been well addressed in the current
literature on the effect of income shifting. Gordon and MacKie-Mason (1995a) study how
cross-border income shifting (in the form of transfer pricing), interacting with domestic
income shifting, affects the optimal corporate taxation. Capital is excluded in their model.
They claim that higher corporate tax rate discourages domestic income shifting from
wage income to corporate income, while it motivates shifting corporate income abroad.
That is a trade-off problem that governments are facing. Even though limiting domestic
income shifting provides a reasonable explanation for a higher corporate tax, the
possibility of cross-border income shifting makes it more difficult to tax corporate
income. They conclude that the optimal corporate income tax rate is lower in the case with income shifting than that in the case without income shifting. However, the role of investment decisions is not taken into account in their analysis.

In Haufler and Schjelderup (2000) model, a government can choose simultaneously a corporate tax rate and tax base, constrained to collect a fixed amount of tax revenue. The tax base is defined in terms of the investment cost deductibility. They claim that when there is no transfer pricing, the optimal tax system allows a full deduction for the investment cost (which is fairly equivalent to the argument of zero optimal corporate tax, taking the given tax revenue constraint into consideration). When multinational firms manipulate tax planning through transfer pricing, a lower tax rate should be set to limit income (/profit) shifting at the expense of distorting investment. Even though Haufler and Schjelderup (2000) incorporate capital in their model, they assume that both the quantity and price of intra-firm trade for income shifting purposes are independent of investment decisions. Actually, the role of investment is isolated from the interaction between income shifting and corporate taxation.

A recent research, Kind, Midelfart, and Schjelderup (2003), develops the current literature on income-shifting effect by incorporating trade cost and endogenizing the quantity decision of intra-firm trade. However, they assume a Cournot product market and focus on the supply quantities, excluding investment decisions. The implied result is that the optimal corporate tax rate should be lower in the case with transfer pricing than that in the case without transfer pricing.
Mintz and Smart (2004) point out that international tax planning may have positive effects on real investment that can offset the negative consequences of lost revenue. In their model, governments in high-tax countries nevertheless prefer to eliminate tax planning loopholes and reduce statutory corporate tax rates in order to achieve the same level of inward investment at a lower aggregate deadweight cost to the economy.

In this paper, we offer a simple model of these competing effects of international tax planning on the mobility of business tax bases and business investment. We argue that the investment-enhancing effects of international tax planning can dominate the revenue-eroding effects. When multinational income shifting (specifically, strategic internal-borrowing planning) is feasible, everything else being the same, shifting taxable income to a low-tax country reduces the effective user cost of capital, which would motivate more FDI. The more FDI, the higher the labour demand is in multinational sector, hence the higher the wage rate, which is desirable to domestic government. On the other hand, tax revenue decreases because tax base is shifted abroad. The mechanism through which income shifting affects social welfare is complicated. In brief, we find that an increase in international tax avoidance can lead to an increase in statutory tax rates on corporate income and an increase in the welfare of citizens of high-tax countries.

Early empirical research on international tax planning has focused its effects on tax bases and tax revenues. Grubert and Mutti (1991), and Hines and Rice (1994), using the U.S. data, find strong negative relationship between tax rates and the measures of multinational profitability in host countries. Harris, Morck, Slemrod and Yeung (1993) find that having a subsidiary in a low-tax jurisdiction is associated with lower U.S. tax
liabilities filed by the U.S. multinational corporations (MNCs), while having a subsidiary in a high-tax region is associated with higher U.S. tax liabilities. Mintz and Smart (2004) find evidence of greater tax responsiveness of reported income among Canadian firms that have affiliates in a low-tax jurisdiction than those that do not.

Grubert and Slemrod (1998) is one of the few papers study the interaction between income-shifting and investment decisions. They develop a simple model of multinational after-tax profit taking into account the benefit and cost associated with income shifting. Based on this structure model, they develop the estimation model. The main finding is that the probability the U.S. multinationals invest in Puerto Rico is increasing in the index of the advantages of shifting income to Puerto Rico. They conclude that the income-shifting advantages are the predominant reason for U.S. investment in Puerto Rico. However, the task of this paper is to explain MNC behavior, not the optimal corporate taxation. More recently, Desai et al. (2004) have examined the effects of tax havens on investment by MNCs in neighbouring non-haven countries. They find that the use of affiliates in tax havens is associated with greater investment in non-havens.

This paper also contributes to the literature on redistributive corporate taxation. This body of literature focuses on reasoning corporate taxation in a small open economy without considering multinational income-shifting activities. The main conclusion in this literature is that domestic redistribution concern makes a political pressure to increase tax rate on capital income, balancing somehow the downward pressure from international capital competition.

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3 See for example, Haufler (1997), Persson and Tabellini (1992), and Huizinga and Nielsen (1997b)
The most related study to our work is Haufler (1997) in the literature strand. We both assume a two-class domestic economy: workers, who supply labour and earn wage income, versus entrepreneurs, who earn profits. Workers are immobile internationally and total labour supply is fixed. Government objective includes a weighted sum of a function of each class’ income\(^4\) and tax revenue. There are several differences between Haufler (1997) and our study. First, as mentioned above, Haufler (1997) does not take into account multinational income-shifting behavior. Second and also the important one, our model has two sectors: domestic and multinational sectors. Domestic firms produce using labour and a fixed factor which is immobile internationally while multinational firms employ labour and mobile capital to produce. Corresponding to our structure, Haufler (1997) model has one sector, which uses both capital and labour to produce, and capital is mobile at some cost. Based on this difference, the source of, and hence the tax effect on, entrepreneur income is fairly different in the two studies. It is important in the perspective of a government who has domestic redistribution motivation. Finally, in order to focus on the effect of multinational income shifting on corporate tax rate, we simplify the model by considering only corporate income tax, while Haufler (1997) models two taxes: wage tax and capital income tax in order to rationalize capital taxation and demonstrate the effect of capital market integration on capital taxation. So, even though we all find the positive pressure on corporate (capital) tax rate from domestic redistribution motivation, the implications of the result should be delivered carefully and differently.

\(^4\) In Haufler (1997), governments maximize a political support function subject to a fixed revenue constraint. The political support function he used is a weighted average of the utility levels attained by different classes, and the utility of each group is a concave function of its own level of income. However, in our paper, we assume government maximize the sum of wage income, entrepreneur income and tax revenue, valuing wage income (at 1) higher than entrepreneur income (at \(\beta<1\)).
In our model, when there is no income shifting, an increase in tax rate increases the user cost of capital, then foreign investment is driven away, consequently, lower labour demand from multinational sector. Since no one is unemployed, there is labour force movement from multinational sector to domestic sector. Meanwhile, wage rate is driven lower. The net effect of tax change on tax revenue and wage income is illustrated by the comparison of productivity of the marginal shifting labour in the two sectors. If labour productivity is marginally higher in domestic sector, then this labour shifting is desirable in terms of social welfare\(^5\). When the two sectors share the same capital-intensive production technology, our model reproduces the conventional argument of zero optimal tax on capital in a small open economy\(^6\).

The plan of this paper is as follows. Section 2.2 lays out the a two-sector general equilibrium model of corporate income taxation in a small, open economy. In this environment, corporate taxes can have desirable effect on the extent of income redistribution between domestic capitalists and domestic workers, but have deleterious effects on the level of FDI and on domestic wages. We establish necessary and sufficient conditions for the first effect to dominate, so that an optimizing government chooses a positive tax rate. In Section 2.3, we introduce international tax avoidance, in the form of intra-corporate borrowing between the affiliate in the high-tax host country and an affiliate in a tax haven. We consider the effects of tax avoidance on the optimal tax policy of the host country and the welfare of its workers and capitalists. Section 2.4 considers an

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\(^5\) The labour force movement will stop at some point since we assumed fixed amount of capital employed in domestic firms, increasing labour employed balances the marginal labour productivity down.

\(^6\) Wilson (1987) provides a through discussion of the role of relative capital-intensity on the equilibrium results of capital tax competition.
extension of thin capitalization rules. Section 2.5 concludes the paper.

2.2 International taxation and domestic redistribution

2.2.1 The model

Our initial objective is to study the effects of international taxation in the absence of income shifting. Consider an economy consisting of two classes of consumers—workers and entrepreneurs—and a single, homogeneous consumption good that can be produced with either of two technologies. The first technology, available in what we label the multinational sector, produces output using domestic labour $L_m$ and imported capital $K_m$ according to production function $F(K_m, L_m)$, which is concave in the arguments and exhibits constant returns to scale. The second technology, owned by entrepreneurs in the domestic sector, employs labour $L_d$ alone to produce output $G(L_d)$, where $G$ is a strictly concave function.

Multinational capital $K_m$ is rented in the world market at fixed rental price $r$; that is, the economy is a small, open economy. The output of the two sectors may be absorbed domestically or exported at a fixed world price, which is normalized to one. Labour is immobile internationally but mobile between domestic and multinational sectors and earns wage rate $w$. The aggregate labour endowment of workers in the domestic economy is inelastically supplied, and we normalized it to one. The entrepreneurial class supplies no labour but consumes (after-tax) entrepreneurial rents accruing in the domestic sector.
Government levies a “classical” corporate income tax on the two sectors; that is, the tax base is firms’ gross revenues less wage payments. Given the corporate tax rate $t$, firms in the multinational sector therefore maximize after-tax profit

$$(1 - t)(F(K_m, L_m) - wL_m) - rK_m$$

so that capital and labour demands satisfy

$$F_K(K_m, L_m) = \frac{r}{1 - t}$$

(1)

$$F_L(K_m, L_m) = w$$

(2)

To simplify subsequent notation, let $\rho = r/(1 - t)$ denote the after-tax user cost of capital in the multinational sector, given by (1). Since capital is not employed in the domestic sector, the corporate tax there acts as a (lump-sum) tax on entrepreneurial rents

$$\pi(w) = \max_{L_d} G(L_d) - wL_d$$

(3)

and domestic labour demand satisfies the first-order condition

$$G'(L_d) = w$$

(4)

Given $t$ and the optimizing decisions of firms, corporate tax revenues may be calculated as
\[ T = t(F(K_m, L_m) - wL_m) + t(G - wL_d) \]

\[ = (\rho - r)K_m(w, \rho) + t\pi(w) \]  \hspace{1cm} (5)

where we have used (3) and the zero-profit condition of multinational firms

\[ F - wL_m = \rho K_m. \]

Let \( w(\rho) \) be the wage rate that clears the domestic labour market

\[ L_m(w, \rho) + L_d(w) = 1 \]  \hspace{1cm} (6)

where \( L_d \) and \( L_m \) are the derived profit-maximizing demands satisfying (1)–(4).

Applying the implicit function theorem to (6) shows that \( dw/d\rho \equiv w'_{\rho} < 0 : \) an increase in the user cost of capital induces a decline in the equilibrium wage rate, since (a fortiori) capital and labour are complements in the multinational sector.

### 2.2.2 Optimal tax policy

Let us suppose that government seeks to redistribute income from the entrepreneurial class to the worker class, and that revenues from taxing both domestic and multinational firms are simply paid to workers as a lump sum. To capture the redistributive motive in a simple way, we suppose that government places a parametric value \( \beta \leq 1 \) on the consumption of entrepreneurs, relative to the consumption of workers. The objective function of the government is therefore \( \Omega = C_w + \beta C_x \), where

\[ C_w = w + T \]  \hspace{1cm} (7)
\[ C_E = (1-t)\pi(w) \]  

\[ C_W \text{ and } C_E \text{ are consumption levels of workers and entrepreneurs, and } T \text{ is corporate tax revenues. More convenient for our purposes, we define} \]

\[ Y = F(K_m, L_m) - rK_m + G(L_d) \]

\[(9)\]

as gross national product (GNP). The material balance condition\(^7\) for the economy \(C_W + C_E = Y\) allows us to write the government’s problem as

\[
\max_t Y(w, \rho) - (1 - \beta)C_E(w, t)
\]

Subject to \( \rho = \frac{r}{1-t} \)

\[ L_m(w, \rho) + L_d(w) = 1 \]

That is, government in this economy seeks to maximize GNP minus a fraction \((1 - \beta)\) of net-of-tax profits that accrue to entrepreneurs. This formulation illustrates in a particularly stark way of the equity–efficiency tradeoff that is at the heart of our model: the only means of redistribution from domestic entrepreneurs to domestic workers is the corporate tax, which distorts inward foreign direct investment (FDI) and causes GNP to fall below its maximal level.

An optimal tax rate \( t^* \) therefore satisfies the first-order necessary condition

---

\(^7\) The material balance condition for this economy is merely Walras’s law, and can be verified from (5)–(8) and the zero-profit condition for multinational firms.
\[- \frac{dY}{dt} = -(1 - \beta) \frac{dC_E}{dt} \]  

(10)

In equation (10), the marginal deadweight loss of the tax on the left-hand side is equated to the marginal redistributive benefit of the tax on the right-hand side at the optimum.

Totally differentiating (9) with respect to \( t \) and using (1), (2) and (4), equation (10) can be rearranged to obtain a typical inverse-elasticity expression for the optimal tax rate:

\[
\frac{t^*}{1 - t^*} = - \frac{(1 - \beta)}{\rho K_m} \frac{1}{\varepsilon_K} \frac{dC_E}{dt}
\]  

(11)

where \( \varepsilon_K = -\rho K_m' / K_m \) is the elasticity of capital demand with respect to its user cost.\(^8\)

To understand the implications of (11), it is useful first to consider a number of special cases. First, observe that, if there were no domestic sector \( (C_E = 0) \) then the optimal corporate tax rate would be zero. This replicates the standard result that a small open economy prefers taxes on domestic factors to taxes on imported capital. Second, if the government did not wish to redistribute from entrepreneurs to workers \( (\beta = 1) \) then the optimal corporate tax rate would again be zero. Without the redistribution motive, there is again no reason to tax or subsidize capital, since this would merely distort the multinational investment decision and labour market as well, as taxes on imported capital were shifted backward to domestic workers. Third, the optimal tax rate approaches to zero as the user-cost elasticity of international capital demand \( \varepsilon_K \) becomes large, so that the excess burden of the corporate tax becomes prohibitive. We summarize this

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\(^8\) Please see appendix for the proof of equation (11).
discussion as:

**Proposition 1** If the optimal corporate income tax rate is not zero then:

1. The domestic sector is not too small relative to the multinational sector \((E_C > 0)\);
2. The government wishes to redistribute from domestic entrepreneurs to workers \((\beta < 1)\); and
3. The derived demand for international capital is imperfectly elastic \((\varepsilon_K < +\infty)\).

When these conditions hold, (11) shows that the sign of the optimal tax rate is the same as the sign of the redistributive benefit of the tax, \(-dC_E/dt\). This can in turn be computed from (3) and (8) as

\[
-\frac{dC_E}{dt} = \pi - \rho L_d w' \rho
\]

The first term measures the direct redistributive effect of taxing entrepreneurial profits and transferring the revenues to workers. The second is the indirect or general-equilibrium redistributive effect of the corporate tax, resulting from its deterrence of foreign direct investment, which decreases the wage and increases pre-tax entrepreneurial profits. Thus redistribution via a corporate tax occurs both post-fisc, through the transfer of tax revenues to workers, and pre-fisc, through the effect of the tax on wages, and the two effects are offsetting.

Indeed, if the indirect effect of the corporate tax dominates the direct effect, then the optimal corporate tax rate is negative: foreign direct investment should be subsidized to
raise wages, even at the expense of the resulting transfers to domestic entrepreneurs. To determine which effect dominates, we develop that:

Lemma 1 If the equilibrium wage satisfies (6), then

\[
- \frac{dC_E}{dt} = L_d \left( \frac{G(L_d)}{L_d} - \frac{F(K_m, L_m)}{L_m} \right)
\]

Proof. See appendix.

Using Lemma 1, we write (11) as

\[
\frac{t^*}{1 - t^*} = \frac{(1 - \beta)}{\varepsilon_K} \frac{L_d}{\rho K_m} \left( \frac{G}{L_d} - \frac{F}{L_m} \right)
\]  \hspace{1cm} (12)

That is, our model implies:

Proposition 2 The optimal corporate income tax rate is positive if and only if, being evaluated at the optimum point, output per worker is greater in the domestic sector than in the multinational sector.

The proposition gives a (local) necessary and sufficient condition for the direct effect on redistribution to outweigh the indirect effect, and so for the optimal corporate tax rate to be positive rather than negative. The condition is intuitive: when the multinational sector is relatively labour intensive, capital market distortions are of relatively little importance to labour demand, and redistribution is better achieved through the fisc policy than by subsidizing capital. As a loose heuristic, the condition says that international call
centres are an appropriate target for host country taxation, while international financial centres should be subsidized.

Indirect redistributive effects in this model are particularly strong because of our assumption that the outputs of domestic and multinational sectors are perfect substitutes in consumption. A more realistic framework would allow for imperfect substitutability, which would attenuate the indirect effect and allow scope for positive corporate taxation even if labour intensities were (somewhat) reversed. For our purposes, however, it will suffice to assume that the condition of Proposition 2 holds at the optimum, so that $t^* > 0$.

### 2.3 Optimal corporate taxation with income shifting

We now extend our model to incorporate the tax avoidance behaviour of multinational firms. To do so in a simple way, we simply posit that each multinational firm has an affiliate located in a “tax haven” jurisdiction, and the firm may finance investment in the (high-tax) host country through a loan from the haven affiliate, rather than a direct equity injection from the parent. Since the host country operates a classical corporation income tax, interest payments to the haven affiliate are deductible from host country taxable income. We assume that the haven imposes no taxes at all on income remitted there, though none of our qualitative results would change if the haven levied some positive but lower tax rate than the host country\(^9\).

\[^9\] More restrictive is our assumption that the haven's tax rate is exogenous, and independent of the degree of multinational income shifting that takes place. That is, we study the optimal tax policies of a single high-tax country, rather than a tax-competition game among countries. However, Janeba and Peters (1999) study the emergence of tax havens in a two sector model of tax competition that has some similarity to our environment. They show that even small differences in technologies between countries can lead to large differences in equilibrium tax rates on mobile tax bases.
If the interest payment to the haven affiliate is $rB$, then the firm’s after-tax profit is therefore

$$\Pi = (1-t)(F - wL) - rK + trB$$

That is, the possibility of lending between affiliates facing different tax rates creates an unlimited tax arbitrage opportunity. More realistically, even related-party borrowing creates deadweight costs for the firm and its outside investors, related to transactions costs, the potential for affiliate default, and agency problems associated with the complex financial structures that international tax planning entails (“Parmalat costs”)\textsuperscript{10}. Such costs serve as a “brake” on international tax planning and, to capture this in a simple way, we simply assume for now that the firm is constrained not to issue debt to the haven affiliate in excess of an exogenous debt-to-capital ratio $b$: the $B \leq bK_m$. We return to an analysis of agency costs below in Section 2.4.

Since the debt constrain will bind at the optimum, we may substitute it into the profit function to obtain

$$\Pi(K_m, L_m) = (1-t) \left[ F(K_m, L_m) - wL_m - \frac{r(1-bt)}{1-t} K_m \right]$$

(13)

Profit-maximizing input demands therefore again satisfy $F_L = w$ and $F_K = \rho$ where now the user cost of capital is

\textsuperscript{10} Desai, Dyck and Zingales (2004) provide a discussion of such costs and the effects of international tax planning in Russia.
\[ \rho = \frac{r(1 - bt)}{1 - t} \equiv \rho(b, t) \]  

while the domestic sector’s labour demand is still characterized by \( G'(L_d) = w \).

The consequence of income shifting is to reduce the host country's tax revenues to

\[ T = t \left( \pi + \frac{1 - b}{1 - t} rK_m \right) \]

and ceteris paribus to reduce the consumption of domestic workers and social welfare as perceived by the host country government. However, this ignores the optimal response in tax policies to income shifting. To study this, we note that the multinational's first-order conditions and the constant returns assumption imply that multinational profits are zero at the profit-maximizing demand levels. That is, the decline in marginal effective tax rate on capital due to income shifting induces the firm to expand foreign direct investment and so to bid up domestic wages until its rate of excess profit is again zero. Given the zero-profit condition, and using (6)–(8) and (15), the material balance condition is again

\[ C_w + C_E = Y = F - rK_m + G \]

and the government's objective is again equivalent to

\[ Y - (1 - \beta)C_E. \]

To study the optimal policy, it is more convenient to formulate the problem as one of choosing an effective tax rate on capital \( \rho - r \), rather than a statutory rate \( t \). Accordingly, define
\[ t = g(\rho, b) \equiv \frac{\rho - r}{\rho - rb} \quad \Leftrightarrow \quad \rho = \rho(t, b) \quad (16) \]

Observe that \( g \) is increasing in \((\rho, b)\). In the presence of income shifting, then, the host government acts to

\[
\max_{\rho} Y(\rho, w) - (1 - \beta)C_{\beta}(t, w)
\]

subject to \( t = g(\rho, b) \)

\[ L_{m}(\rho, w) + L_{d}(w) = 1 \]

The first-order necessary condition is

\[
(\rho - r) \frac{\partial K_{m}(\rho, w)}{\partial \rho} + (1 - \beta) \left[ \pi \frac{\partial g(\rho, b)}{\partial \rho} + (1 - t) L_{d} \frac{\partial w(\rho)}{\partial \rho} \right] = 0 \quad (17)
\]

which can be inverted to obtain an optimal tax formula analogous to (11) for the no-shifting case.\(^{11}\)

Our first substantive result concerns the effect of income shifting on the optimal user cost of capital \( \rho^{*} \). Totally differentiating (17) we find

\[ \frac{t^{*}}{1 - t^{*}} = \frac{(1 - \beta) L_{d}}{\varepsilon_{k}} \left( \frac{G}{L_{d}} - \frac{F}{L_{m}} \right) \frac{1}{\rho - rb} + (1 - \beta)(1 - t^{*}) \frac{b}{1 - b} \frac{\pi}{K_{m} \varepsilon_{k}} \frac{1}{\rho - rb} \]

where \( t^{*} \) is the optimal tax rate. When there is no income shifting, \( b = 0 \), this equation becomes equivalent to (12). Since \( t^{*} \leq 1 \), the second term on the right hand side is non-negative, and sufficient condition of Proposition 2 for a positive optimal tax rate is sufficient in the case with international tax planning as well.

\(^{11}\) After some manipulations, (17) can be transformed to
\[
\text{sign } \frac{\partial \rho^*}{\partial b} = \text{sign} \left( L_d \frac{K_m}{L_m} \frac{\partial g(\rho^*, b)}{\partial b} + \pi \frac{\partial^2 g(\rho^*, b)}{\partial \rho \partial b} \right)
\]

Straightforward manipulations then yield:

**Proposition 3** An increase in income shifting \( b \) causes an increase in the user cost of capital \( \rho^* \) and a decline in foreign direct investment if \( t^* \leq 1/2 \).

*Proof.* See appendix.

Furthermore, since

\[
\frac{\partial t^*}{\partial b} = \frac{\partial g(\rho^*, b)}{\partial \rho} \frac{\partial \rho^*}{\partial b} + \frac{\partial g(\rho^*, b)}{\partial b} > 0 \quad \text{if } \frac{\partial \rho^*}{\partial b} \geq 0
\]

we may also establish:

**Proposition 4** An increase in income shifting \( b \) causes an increase in the statutory tax rate \( t^* \) if \( t^* \leq 1/2 \).

Our results suggest a new view of income shifting and its effects on high-tax countries. The standard view is that the rise in income shifting may lead to erosion in corporate tax revenues, and a decline in statutory rates as high-tax countries compete to protect tax bases, with a consequent decline in consumer welfare. Our results suggest a rather different view. While multinational corporate tax revenues do inevitably decline with greater ease of income shifting, this is without direct consequence for consumers in a small, open economy, since the burden of such taxes is shifted to other agents in any
case. However, the indirect consequence is the decline in effective taxes on foreign direct investment, and so an opportunity to increase statutory rates with reducing foreign investment. Proposition 4 shows that statutory rates will indeed increase, if the initial rate is not too high. More surprising, Proposition 3 implies that under the same conditions it is optimal to increase the statutory rate so much that the increase more than offsets the effect of income shifting, the effective tax on foreign capital rises and investment declines in consequence.

Applying the envelope theorem, we obtain

\[ \frac{\partial \Omega}{\partial b} = (1 - \beta) \pi \frac{\partial g(\rho^*, b)}{\partial b} > 0 \]

since \( \frac{\partial g}{\partial b} > 0 \). Thus we have:

**Proposition 5** An increase in income shifting \( b \) causes domestic social welfare to rise.

This may provide explanation why some high-tax countries have shown a reluctance to take steps to reduce international tax planning by multinational firms.

Since the effect of income shifting in our model is to reduce the excess burden of redistributive taxation, it might be expected that its effect is a Pareto improvement for citizens of the host country, and not merely a welfare gain. But this is not the case: To see the effect of shifting on the consumption of domestic entrepreneurs, define

\[ C_e^*(t, b) = (1 - t) \pi (w(\rho(t, b))) \]

and totally differentiate to obtain
Since Proposition 2 implies $\partial C_E^*/\partial t < 0$ when $t^* > 0$, $\partial \rho / \partial b < 0$, and Proposition 4 implies $\partial t^* / \partial b > 0$ if $t^* \leq 1/2$, we have:

**Proposition 6** An increase in income shifting $b$ causes the utility of domestic entrepreneurs to fall if $0 \leq t^* \leq 1/2$.

### 2.4 Optimal thin capitalization rules

In the previous section, we assume that income shifting is restricted by an exogenous debt-to-capital ratio, $b$. In this section, we relax this assumption to allow government to use $b$ as a policy instrument to pursue social welfare maximization, which is more realistic. There are a great number of countries using thin capitalization rule to prevent corporations from over-withdrawing profits in the form of interest deduction. The question we try to answer here is what the optimal thin capitalization rule is in the presence of income shifting.

Borrowing strategy entails real deadweight costs $C(B, K_m)$, a function of both debt and investment. Further, we assume $C(B, K_m) = c(rb)K_m$, where $b = B/K_m$ represents a firm's decision of debt per dollar of foreign investment. $c(rb)$ represents the shifting costs associated with each dollar of investment which depends only on the interest

---

12 For example in Canada, effective for tax years commencing after 2000, the debt-to-equity ratio has been reduced from 3:1 to 2:1 for purposes of calculating the amount of allowable interest on debts payable to specified non-residents.
payment \((rB)\) per dollar of investment \((K_m)\). We assume that \(c(x)\) is non-negative, increasing, and strictly convex in \(x\), whereas \(c(0) = 0\), \(c'(x) \geq 0\) and \(c'(0) = 0\).

With income shifting, firm's problem in multinational sector is to maximize after-tax profits,

\[
\Pi_m = (1-t)[F(K_m, L_m) - wL_m] - rK_m + trbK_m - c(rb)K_m
\]

(18)

\(trbK_m\) is the total saved tax payment, while \(c(rb)K_m\) is total cost associated with the amount of shifted income. Manipulating the first-order necessary condition for optimal shifting strategy, we get

\[
t = c'(rb^*)
\]

(19)

The economic implication of (19) is quite standard: firms in multinational sector shift income to the point where the marginal cost of shifting \(c'(rb)\) is equal to the marginal tax benefit from it. Given that marginal shifting cost is greater at higher shifting level \(c'(x) \geq 0\), we are able to say that the optimal amount of income shifting per dollar of foreign investment \(K_m\) is increasing in tax rate. In other words, the incentives of tax planning are low (high) at low (high) tax rate. Satisfying condition (19), \(b^*\) is defined as the optimal debt-to-capital ratio. The firm’s optimal capital demand and labour demand are determined by the first-order necessary condition \(F_K = \rho\) and \(F_L = w\), where

\[
\rho = \frac{r - trb + c(rb)}{1-t} \equiv \rho(b,t)
\]

(20)
while the domestic sector’s labour demand is still characterized by $G'(L_d) = w$.

We assume that governments regulate income-shifting activities by laws. The limit of deductible interest payment per dollar of investment is set to be $\gamma$. It is reasonable to assume further that the restricted level is lower than firms' optimal shifting level, that is, $\gamma < rb^*$. In this case, the statutory tax rate function $g$ is defined as,

$$t = g(\rho, \gamma) \equiv \frac{\rho - r - c(\gamma)}{\rho - \gamma} \quad \Leftrightarrow \quad \rho = \rho(t, \gamma) \quad (21)$$

Again, $g$ is increasing in $(\rho, \gamma)$.

The host government is assumed to have two policy instruments, effective tax rate on capital $\rho - r$ and income shifting $\gamma$. The host government problem can be written as

$$\max_{\rho, \gamma} Y(\rho, w) - (1 - \beta)C_e(t, w) - c(\gamma)K_m$$

subject to $t = g(\rho, \gamma)$

$$L_m(\rho, w) + L_d(w) = 1$$

The last term in the objective function $c(\gamma)K_m$ represents the total shifting cost, which is a deadweight loss and hence should be subtracted away from gross national product.

The first-order necessary condition for the optimal thin capitalization rule, $\gamma^*$, is
\[ \Omega'_\gamma = (1 - \beta)\pi \frac{\partial g(\rho^*, \gamma^*)}{\partial \gamma} - c'(\gamma^*)K_m = 0 \]  

Equation (22) implies that income shifting affects social welfare only through tax-revenue effect \((1 - \beta)\pi g'_\gamma\) and shifting-cost effect \(-c'(\gamma)K_m\). At the optimal user cost of capital \(\rho^*\), \(g'_\gamma \geq 0\), which suggests that if incoming shifting \(\gamma\) increases, the statutory tax rate \(t\) would be allowed to increase without affecting real operation activities. Higher tax rate leads to higher tax revenue from entrepreneurs, which can be redistributed to workers, social welfare increases as a consequence. So the tax revenue effect is positive. On the other hand, \(c'(x) \geq 0\), the more income is shifted abroad, the more deadweight loss is paid. The two effects are setting-off to each other.

To investigate the effects of income shifting on social welfare further, we study it at two special values of \(\gamma\). First, at \(\gamma = 0\), (22) simplifies as,

\[ \Omega'_\gamma = (1 - \beta)\pi \frac{t}{\rho} \geq 0 \]

since

\[ \frac{\partial g(\rho, \gamma)}{\partial \gamma} = \frac{t - c'(\gamma)}{\rho - \gamma} \]

and \(c(0) = 0\) and \(c'(0) = 0\) by assumption. Second, at \(\gamma = rb^*\), which is, by assumption, the upper limit of the restriction on income shifting, we have \(c'(rb^*) = t\), using equation (19). Then we obtain
\[ \Omega'_\gamma = -tK_m \leq 0 \]

We summarize the results in the following proposition:

**Proposition 7** The optimal level of income shifting is positive but less than that preferred by multinational firms: \( 0 < \gamma < rb^* \).

The implication of Proposition 7 is that at a relatively low level of income shifting, income shifting is desirable. The positive tax-revenue effect dominates the negative shifting-cost effect, so raising the level of income shifting would lead to greater social welfare. In contrast, at a relatively high level of income shifting, tax-revenue effect is dominated, then the net effect goes to the opposite direction and lowering income shifting would be beneficial. So, income shifting is not always desirable, while it is not completely undesirable at all.

To solve for the optimal income shifting \( \gamma^* \), we expand (22) and have

\[
\Omega'_\gamma = \frac{1}{\rho - \gamma} \left[ (1 - \beta)\pi t - (1 - \beta)\pi c'(\gamma) - (\rho - \gamma)c'(\gamma)K_m \right] \tag{23}
\]

And hence \( \gamma^* \) satisfies,

\[
c'(\gamma^*) = \frac{t(1 - \beta)\pi}{(1 - \beta)\pi + (\rho - \gamma)K_m} \tag{24}
\]

Based on this result, together with Proposition 7, we conclude when \( c'(\gamma) < (>)c'(\gamma^*) \), \( \Omega'_\gamma > (<)0 \). Given \( c'(x) \geq 0 \), when \( c'(\gamma) < (>)c'(\gamma^*) \), \( \gamma < (>)\gamma^* \).
Corollary 1 At a fixed tax rate, domestic social welfare is increasing in income shifting iff $\gamma < \gamma^*$, where $\gamma^*$ satisfies (24).

Proof. See appendix.

2.5 Conclusion

The main task of this study is to examine the effect of international income shifting on the optimal corporate taxation. We set up a model of a host country with both multinational and domestic sectors, where the government has the motivation to redistribute income from entrepreneurs to workers. Starting with the simple case with multinational income shifting being absent, our result shows that when labour productivity is higher in domestic sector than that in multinational sector, it is optimal to set a positive corporate tax rate. This result contributes to the current literature on international tax competition by offering an explanation regarding the conflict between the theoretical prediction of a “race to the bottom” in corporate tax rates and the lack of evidence from the real world.

When there is multinational income shifting, our model allows the interaction between multinationals' income-shifting decisions and foreign direct investment (FDI) decisions. On the one hand, FDI provides the flexibility to shift income abroad; on the other hand, shifting income to low-tax jurisdictions helps lower the user cost of capital and, hence, enhances FDI. While income shifting to tax havens may erode the tax bases of high-tax host countries, the FDIs in those countries tend to be less responsive to tax rate differentials. Therefore, with multinational income shifting being allowed, a high-
tax country may stay attractive to FDI in international competition for capital in the same way a country with a lower rate but no income shifting can do. Our results show that an increasing in income shifting will cause the domestic social welfare to rise; and, under some circumstances, increasing statutory corporate income tax rate along with increasing income shifting may be a desirable policy combination.

Our results are different from the results of many previous studies in the current literature on international income shifting, which predict that the presence of international income shifting will cause a lower optimal corporate tax rate. Our main contribution is to allow the interaction of firms’ shifting decisions and investment decisions. Our results have an important policy implication: the investment-enhancing effect of income shifting should not be ignored when policies are made. The empirical test of the result will be an interesting topic for future research.

2.6 Appendix

2.6.1 Proof of equation (11)

The first order necessary condition of the government’s maximization problem is stated in (10)

\[
\frac{dY}{dt} = (1 - \beta) \frac{dC_e}{dt}
\]

Recall that the gross national product is defined to be

\[
Y = F(K_m, L_m) - rK_m + G(L_d)
\]

Then, we develop \( \frac{dY}{d\rho} = (\rho - r)K'_{\rho} \). We also derive \( \frac{d\rho}{dt} = r/(1-t)^2 \) from the identity \( \rho \equiv r/(1-t) \). Then, we are able to compute the marginal deadweight loss \( \frac{dY}{dt} \) to obtain

\[
\frac{dY}{dt} = \frac{dY}{d\rho} \frac{d\rho}{dt} = \frac{(\rho - r)K'_{\rho}}{(1-t)^2} = -\frac{t}{1-t} \rho K_m \epsilon_K
\]

where \( \epsilon_K = -\frac{\rho K'_{mp}}{K_m} \) is the elasticity of capital demand with respect to its user cost.

Substituting the left-hand side of equation (10) with this expression, at the optimal corporate tax rate \( t^* \), we obtain

\[
\frac{t^*}{1-t^*} = -\frac{(1-\beta)}{\rho K_m} \frac{1}{\epsilon_K} \frac{dC_E}{dt}
\]

### 2.6.2 Proof of Lemma 1

In equation (11), we get

\[
\frac{t^*}{1-t^*} = -\frac{(1-\beta)}{\rho K_m} \frac{1}{\epsilon_K} \frac{dC_E}{dt}
\]

where the marginal drop in entrepreneurs’ consumption \( C_E = (1-t)\pi(w(\rho)) \) due to the increase in the corporate tax at the general equilibrium is

\[
-\frac{dC_E}{dt} = \pi + (1-t)w'_\rho \rho' = \pi + L_d w'_\rho
\]

where \( w(\rho) \) is the equilibrium wage of labour in the economy given the user cost of
capital $\rho$.

Recall that, given the government’s choice of user cost $\rho$, the equilibrium wage solves the system of equations:

$$F_L (K_m, L_m) = w \quad (26)$$

$$F_K (K_m, L_m) = \rho \quad (27)$$

$$G_L (L_d) = w \quad (28)$$

$$L_m (\rho, w) + L_d (w) = 1 \quad (29)$$

Let $K_m^*(\rho, L_m)$ solve equation (26) and note $K_{m\rho}^* = 1 / F_{KK}$ and $K_{mL}^* = -F_{LK} / F_{KK}$. We may therefore characterize equilibrium allocation of labour by:

$$F_L (K_m^*(\rho, L_m), L_m) = G(1 - L_m)$$

Totally differentiating this condition gives

$$F_{LK} K_{m\rho}^* d\rho + (F_{LK} K_{mL}^* + F_{LL}) dL_m = -G_{LL} dL_m$$

or

$$\frac{\partial L_m}{\partial \rho} = -\frac{F_{LK}}{(F_{LL} + G_{LL}) F_{KK} + (F_{LK})^2}$$

Since $F$ is linear homogeneous,
\[ F_{LK} = -\frac{L_m}{K_m} F_{LL} \]
\[ = -\frac{K_m}{L_m} F_{KK} \]

and \((F_{LK})^2 = F_{LL} F_{KK}\), so

\[ \frac{\partial L_m}{\partial \rho} = -\frac{F_{LK}}{G_{LL} F_{KK}} = \frac{K_m}{L_m} \frac{1}{G_{LL}} \]

Since \(\partial w/\partial \rho = -G_{LL} \partial L_m/\partial \rho\),

\[ w' = \frac{\partial w}{\partial \rho} = -\frac{K_m}{L_m} \]

Substituting this expression into (25) gives

\[ -\frac{dC_E}{dt} = L_d \left[ \frac{\pi}{L_d} - \frac{\rho K_m}{L_m} \right] \tag{30} \]

Given the identity \(\pi = G - wL_d\) and the zero-profit condition of multinational firms \(\rho K_m = F - wL_m\), we further develop (30) as

\[ -\frac{dC_E}{dt} = L_d \left[ \frac{G - wL_d}{L_d} - \frac{F - wL_m}{L_m} \right] \]
\[ = L_d \left[ \frac{G}{L_d} - \frac{F}{L_m} \right] \]
2.6.3 Proof of Proposition 3

Totally differentiating equation (17) and collecting it, we have

\[
\text{sign } \frac{\partial \rho^*}{\partial b} = \text{sign} \left( L_d \frac{K_m}{L_m} \frac{\partial g(\rho^*, b)}{\partial b} + \pi \frac{\partial^2 g(\rho^*, b)}{\partial \rho^* \partial b} \right)
\]

Based on the definition that \( g(\rho, b) = (\rho - r)/(\rho - rb) \), we derive

\[
g'_i(\rho^*, b) = \frac{r(\rho^* - r)}{(\rho^* - rb)^2} > 0
\]

and

\[
g''_i(\rho^*, b) = \frac{r(1 - 2g(\rho^*, b))}{(\rho^* - rb)^2} = \frac{r(1 - 2t^*)}{(\rho^* - rb)^2}
\]

It is obvious that \( g''_i(\rho^*, b) \geq 0 \) if \( t^* \leq 1/2 \). Hence \( \partial \rho^*/\partial b > 0 \) if \( t^* \leq 1/2 \).

2.6.4 Proof of Corollary 1

Recall the first order necessary condition of the optimal thin capitalization rule in (22),

\[
\Omega'_y = (1 - \beta)\pi \frac{\partial g(\rho^*, \gamma^*)}{\partial \gamma} - c'(\gamma^*)K_m = 0
\]

We derive

\[
\Omega''_y = -\frac{(1 - \beta)\pi}{(\rho - \gamma)^2} \left( c''(\gamma)(\rho - \gamma) + 2c'(\gamma) + 2t + c''(\gamma)K_m \right) < 0
\]
using the conditions that \( c'(\gamma) > 0 \) and \( c''(\gamma) > 0 \).

Since \( \Omega(\rho, \gamma) \) is strictly concave in \( \gamma \) for all \( \rho \), it follows that, at a fixed tax rate, domestic social welfare is increasing in income shifting \( \text{iff} \ \gamma < \gamma^* \), where the optimal capitalization rule \( \gamma^* \) satisfies (24)

\[
c'(\gamma^*) = \frac{t(1 - \beta)\pi}{(1 - \beta)\pi + (\rho - \gamma)K_m}
\]
Chapter 3 empirically explores evidence for international income-shifting behaviour in multinational corporations (MNCs). Operating businesses worldwide, MNCs have the flexibility and incentive not only to allocate capital around the world in order to pursue higher profitability, but also to shift pre-tax profits among subsidiaries internationally in order to avoid high tax costs. Firms can achieve income shifting either by manipulating transfer prices in cross-border intra-firm trade of goods and services or by financing an entity in a high-tax jurisdiction in the form of debt at non-market interest rates within a group. Such income-shifting behaviour affects the amount of reported taxable income in different jurisdictions and therefore affects the tax revenue collected by each government. Due to their potential impact on the economy, income shifting and related tax policy issues are gaining more and more attention lately.

In the past decade, the number of empirical studies on international income shifting has grown quickly. Most studies focus on U.S. multinationals, while very little research has been conducted using Canadian data (mainly due to a shortage of data). This study contributes to the literature by examining empirical evidence of income shifting in Canadian corporations, using a unique data set and employing a new empirical strategy.

The data set used in this study contains firm-level information about Canadian
corporations that report non-arm’s length transactions with non-resident affiliates. Non-arm’s length transactions are those that take place between related corporations and are not priced according to the free-market pricing rules. Non-arm’s length transactions cover almost all the forms that income shifting might take, e.g., transfer pricing in intra-firm trade, interest payments and payments for R&D, management, intangible assets shared in a single multinational enterprise, etc. The existence of non-arm’s length transactions with non-residents in tax havens is used to capture potential opportunities to shift income out of Canada and into low-tax regions.

In the benchmark empirical specification, reported taxable income in Canada is regressed on a haven dummy variable, which is defined to indicate the existence of non-arm’s length transactions with non-residents in tax havens. The estimation results show that the haven dummy has a significantly negative effect on the dependent variable, which finding is consistent with the hypothesis of income shifting.

After examining the haven effect on taxable income, my study compares the difference between small and large haven effects (see footnote b in Abstract). The results show that the effect of having non-arm’s length transactions with non-residents in small havens is significantly negative; however, there is no significant effect on taxable income of having transactions with large haven non-residents. In addition, the study investigates the role of the relationship between Canadian corporations and their non-resident affiliates with whom they have non-arm’s length transactions.\textsuperscript{14} Income shifting is more

\textsuperscript{14}The relationship between a Canadian corporation and its non-resident is either that: the Canadian corporation controls non-residents; or the Canadian corporation is controlled by non-residents; or other.
likely to occur between closely connected corporations due to the shifting-related management costs. The empirical model is also estimated for several subsamples and the findings include the following: first, having non-arm’s length transactions with havens reduces Canadian reported taxable income of the corporations with zero loss opening balances, but not the corporations with positive balances; second, the effect of the haven dummy is significantly negative in the non-manufacturing corporations but not in manufacturing corporations; and third, public corporations show support for income shifting while private corporations do not.

The empirical strategies for the above estimations are based on the assumption that the locations of non-residents, with whom Canadian corporations had non-arm’s length transactions, are exogenous and independent of any income-shifting decision. The endogeneity issue arises when this assumption is invalidated. The haven dummy is endogenous if the Canadian reported taxable income and the haven dummy are both related to an unobserved variable of a corporation’s profitability. The potential validity of this assumption and the possible solutions to the endogeneity issue are discussed, though not directly tested.

It is safe to conclude that our results show evidence that there is international income-shifting behaviour in Canadian corporations to some extent. However, due to data limitations, some questions remain unapproached and are left for future research. For example: How does the location of parent and subsidiary companies that are under the same multinational enterprise as a Canadian corporation affect the profitability and income-shifting strategies of said Canadian corporation? Is there any evidence for
interaction between international income shifting and investment decisions?

Following this introduction, Section 3.2 briefly reviews several recent empirical studies. Section 3.3 develops the empirical model and introduces the main variables. Section 3.4 gives a general introduction of corporate taxation in Canada, focusing on taxation on foreign-source income. The main data sources are explained in Section 3.5 and the descriptive statistics of the sample data are analyzed in Section 3.6. The estimation results are reported in Section 3.7 and Section 3.8 discusses the endogeneity issue. Section 3.9 provides an analysis of possible income-shifting channels. In Section 3.10, results of the replication of the model in Harris et al. (1993) are discussed. Section 3.11 analyzes the data limitations and possible model improvements and conclusions appear in Section 3.12.

3.2 Literature review

In the past two decades, there has been increased attention to the impact of income shifting, especially in light of the increasing importance of multinational corporations in the world economy. Using either aggregate data or firm-level data, a large number of studies provide empirical evidence of the effect of income shifting in multinational corporations. The following is a review of recent empirical research contributing to the literature.

3.2.1 Studies on income shifting using aggregate data

Grubert and Mutti (1991) is one of the early studies to empirically test the relationship
between reported profits and tax rates in order to examine whether U.S. firms shifted income to low-tax countries. Using 1982 data on a cross-section of 33 countries\textsuperscript{15} from the Bureau of Economic Analysis, the authors run regressions of the profitability measure of U.S. manufacturing affiliates reported in the host country regarding the host country’s statutory tax rate. As an alternative to the statutory rate, the average effective rate is also used in the analysis. Two measures of affiliate profitability are used: the ratio of book income to sales net of any purchases from the parent company; and the ratio of book income to equity. The foreign country’s GDP growth rate between 1975 and 1982 is included as a proxy of economy-wide profitability. Grubert and Mutti (1991) find that there is a significant negative relationship between reported profits and host-country tax rates. The growth rate in GDP turns out to have a significant positive impact on profits, though its inclusion does not greatly change the estimated coefficients on tax rates. These results are consistent with income shifting. In addition, Grubert and Mutti (1991) also test the non-linear relationship between after-tax profits and the tax rate by using the inverse of the tax rate; they find that the after-tax profits are 5.6 percent of sales in a country with a tax rate of 40 percent, while they are 12.6 percent in a country with a tax rate of 20 percent.

Hines and Rice (1994) also use country-level aggregate data. They investigate the effect of host-countries’ tax rates on U.S. firms’ pre-tax non-financial income and net pre-tax total income (financial and non-financial) in foreign countries. The data on U.S. non-bank majority-owned affiliates are developed from the 1982 U.S. Commerce

\textsuperscript{15} The regressions are based on 29 countries in which positive profits are reported.
Department’s comprehensive benchmark survey. The authors find a negative relationship between the profitability measures and the host-countries’ tax rates. For total income in particular, a one-percentage-point tax-rate increase leads to a six percent decrease in the reported net pre-tax total income of the haven country. Including the square of the tax rate in their regressions, Hines and Rice (1994) find that there is significant curvature in the reaction of reported profits to tax rates: if tax rate increases from zero to one percent, then the pre-tax total income drops by 20 percent; and the marginal effect of taxes on profits declines to zero when the tax rate reaches beyond 43 percent.

However, there is one concern with using aggregate data in Grubert and Mutti (1991) and Hines and Rice (1994). Without controlling for firm-specific characteristics, it is difficult to defend the notion that the estimated effect of tax rates on profits is sufficient evidence for income shifting since the differences in firm-specific characteristics could possibly be correlated with differences in tax rates. Firm-level data allow us to control for heterogeneity among firms.

### 3.2.2 Studies on income shifting using firm-level data

Harris, Morck, Slemrod and Yeung (1993) use firm-level data to explore the relationship between U.S. tax liability per unit of assets (or sales) and the location of foreign affiliates. Instead of using tax rate as an independent variable, they construct a set of 13 location dummies and use them as the key explanatory variables. These location dummies are carefully designed in order to capture the difference in tax rates, the cost of income shifting, business climates and tax enforcement regimes across the foreign countries. The
authors point out that there are several advantages to using indicator dummies rather than tax rates: first, the difficulty in calculating a representative tax rate for a country is avoided; second, factors other than tax differentials, which influence income-shifting decisions, are considered and reflected in the location grouping. Harris et al. (1993) use a panel data of 200 large U.S. manufacturing firms randomly selected from Compustat for the period from 1984 to 1988. The dependent variables are: U.S. tax liability scaled by U.S. sales; and U.S. tax liability scaled by U.S. assets. The authors find that having a subsidiary in a tax haven (i.e., Ireland or one of the “four dragon” Asian countries—all characterized by low tax rates) is associated with lower U.S. tax ratios, while having a subsidiary in a high-tax region is associated with higher U.S. tax ratios. These results suggest that U.S. manufacturing companies do indeed engage in shifting income into the U.S. from high-tax jurisdictions and out of the U.S. towards low-tax jurisdictions.

Early empirical literature on international income shifting predominantly focuses on U.S. corporations. However, there are some recent studies using non-U.S. data that are worth noting.

Hoffman (2001) studies the income-shifting behaviour of multinational enterprises (MNEs) that have a presence in Canada. His data are constructed from the Corporation Sample File, which is composed of 94 large Canadian corporations that are entities of MNEs that survived from 1987 to 1994. Using various issues of Who Owns Whom, Hoffman (2001) collects information of the ownership structure of each sample corporation, including the parent corporation’s country of residence and all subsidiaries.

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16 The “four dragons” refers to Hong Kong, South Korea, Singapore and Taiwan.
under the same MNE. Using this location information, Hoffman (2001) then develops an empirical methodology in order to examine the effect of the statutory tax differential between foreign jurisdictions and Canada on Canadian tax liability scaled by total assets, interacting with 18 location dummies (17 country dummies and one tax-haven region dummy). He finds that there is evidence that MNEs with a presence in Canada shift income to subsidiaries located in low-tax jurisdictions. He also finds that the magnitude of income shifting depends upon the size of the tax differential and that the effect of a one percent change on the tax differential is not constant across jurisdictions. However, his results also show that having a subsidiary in a tax haven increases the Canadian tax liability, which finding conflicts with the income-shifting hypothesis. The author also estimates a variety of subsamples. The results show that: first, relative to public corporations, private corporations seem to undertake more income shifting; second, corporations parented by the U.S. provide the strongest support for income shifting while the results are mixed for Canadian-parented corporations and corporations parented by the rest of the world. Finally, the results for manufacturing and non-manufacturing corporations are mixed and there is no evidence to show that the income-shifting behaviour of manufacturing corporations is significantly different from that of non-manufacturing corporations.

Hoffman (2001) develops an alternative model to examine income shifting. Following Harris et al. (1993), he focuses solely on the presence of MNEs in a particular location without using tax differentials. He groups countries into nine low-tax regions, nine high-tax regions and an additional four specially defined regions. Then he runs regressions of
the Canadian tax liability on location-based dummies. The results show evidence of income shifting from Canada to some low-tax regions and from high-tax regions into Canada.

Huizinga and Laeven (2005) focus on intra-European profit-shifting by European multinationals. They use micro-data on multinational firms in Europe from the Amadeus database. This unique data set allows them to match European parent companies and their European subsidiaries. In the cross-sectional study, data from 1999 are aggregated by firm in any given European country. The authors then regress the log of earnings before interest and taxes (EBIT) on a composite tax variable and (like Hines and Rice (1994)) on capital and labour input, which are measured by the log of fixed assets and the log of total labour compensation, and on the productivity parameter measured by a log of GDP per capita. For their base sample, which is restricted to the observations of foreign subsidiaries excluding parents and is also restricted to manufacturing firms, the estimation results show that the composite tax variable has a significant negative effect on EBIT. In the authors’ robustness tests, when expanding the sample to include parent companies or non-manufacturing firms, the significant negative relationship between EBIT and tax variable remains. Huizinga and Laeven (2005) also discuss the endogeneity of tax policy. Whether higher pre-tax profits raise tax levels or higher tax rates help finance better public goods and hence provide a relatively friendly environment to generate higher pre-tax profits, they expect such endogeneity to lead to an underestimation of the coefficients on the tax variable in OLS regressions. They use country population as the instrument variable for the statutory tax rate in order to
compute the composite tax variable. The estimated coefficients on the tax variable are high and significant. The evidence shown in Huizinga and Laeven (2005) strongly suggests significant income shifting.

Weichenrieder (2007) detects the profit-shifting behaviour in German inbound and outbound foreign direct investment (FDI). He uses a panel data set from 1996 to 2003, collecting information from foreign corporations’ Germany operations and German-based corporations’ foreign subsidiaries. He first examines foreign corporations’ German operations. The ratio of net-of-tax profits after interest payments (but before dividends) to assets is used as the dependent variable. The key explanatory variable is the tax rate in the home country. Other explanatory variables used in various specifications include logs of employment, sales, fixed assets, debt-to-asset ratio, the whole ownership indicator variable (equal to one if a foreign investor holds 100 percent of a German firm and zero otherwise) and the interaction term of the ownership indicator and tax rate. The estimation results show that the effect of the home country’s tax rates on the return on assets of foreign multinationals’ subsidiaries in Germany is significant. An increase of 10 percentage points in the tax rate leads to an increase in the return on assets of a German affiliate by approximately half a percentage point. In the case of outbound FDI, Weichenrieder (2007) looks at a different issue: whether the host country tax rate has a stronger impact on wholly owned foreign subsidiaries of German multinationals than it does on partially owned subsidiaries. The significance of the distinction between wholly owned and partially owned affiliates is inconsistent across different specifications.

Apart from the above studies that investigate income shifting, there are several
studies that explore certain specific forms of payments by multinationals, which payments may indirectly result in income shifting.

### 3.2.3 Studies detecting shifting through different channels

Collins and Shackelford (1997) point out that inter-firm payments are sensitive to tax differentials and hence play an important role in global tax-planning activities. Data are taken from the 1990 foreign subsidiary information returns (Form 5471) and aggregated at the country level. Different types of payment regression are run separately. Collins and Shackelford (1997) examine the effect of tax rates on inter-affiliate payments by running regressions of payment between a pair of countries on the net transfer tax, which reflects deductions, taxes and credits for both paying and receiving countries. The authors also introduce three other variables to control for country-specific characteristics: total exports and imports between the pair of countries from 1990 and financial service affiliate assets as a percentage of total assets in either country. The results show that the tax rate has a significant negative impact on cross-border transfers of dividends, interests and royalties. However, management fee payments are not sensitive to the tax factor. These results provide empirical evidence that inter-firm payments are important tools for multinational corporations when shifting income across a border to minimize their global tax liabilities.

Jog and Tang (2001) examine debt-shifting behaviour in Canadian corporations. They observe that the tax reforms undertaken in Canada and the U.S. from 1984-1994 change Canada to a high-tax jurisdiction relative to the U.S. They discuss whether Canadian corporations, facing a relatively high tax rate in Canada, seek to increase their debt level
so that they can deduct higher interest payments and reduce their tax payments in Canada. Using a panel data of 388 Canadian non-financial large corporations compiled by the Canada Revenue Agency (CRA) from the Corporation Sample File of tax return files, Jog and Tang (2001) empirically examine the effect on debt-to-asset ratio of the U.S.-Canada tax differential. Their econometric strategy is to interact tax differentials with four corporation-type dummies, which are defined to classify sample corporations into four groups: Canadian-controlled corporations with and without a foreign affiliate (FA) and U.S.-controlled with and without a FA. The authors find that the debt-to-asset ratio of firms in groups other than those that are Canadian-controlled without FAs increases as Canadian tax rates increase relative to U.S. tax rates. This provides evidence for debt shifting in Canadian corporations with multinational operations.

Clausing (2003) empirically investigates intra-firm trade prices in U.S. international trade. She uses monthly data on U.S. international trade prices from 1997 to 1999 taken from the Bureau of Labour Statistics. Data on firms’ characteristics are not available. In the regressions, the dependent variable is transaction price, intra-firm or non-intra-firm. The independent variables are net-of-tax rate (e.g., 1- tax rate), monthly exchange rate, an intra-firm dummy, and a set of dummies of special transactions or special goods. All variables except for dummies are in natural logs. The intra-firm dummy is interacted with the net-of-tax rate to indicate whether the tax effect on prices differs in intra-firm trade from non-intra-firm trade. Export and import prices are estimated separately. The results indicate that a one percent decrease in foreign statutory tax rates leads to a decrease of 1.8 percent in intra-firm export prices and an increase of about two percent in import
prices. These results are confirmed again in the test of regressions run separately for intra-firm trade versus non-intra-firm trade. Clausing (2003) provides strong empirical evidence for transfer pricing in international intra-firm trade, which finding is consistent with the theoretical predictions of tax-motivated income-shifting behaviour.

### 3.2.4 Sub-national level income shifting

There are two studies examining income shifting between sub-national jurisdictions. Both of these studies find empirical evidence for sub-national income shifting.

Klassen and Shackelford (1998) empirically examine income shifting between sub-national jurisdictions. The authors’ argument is that tax revenue is meant to be linear with regard to tax rate; hence, if the estimates show there is a non-linear relation between the tax revenue and tax rate, then this would be consistent with firms shifting income to low-tax jurisdictions. The authors use aggregated data of American states and Canadian provinces from 1983 to 1991. In the regression model, both sub-national statutory corporate income tax rate and its square are introduced as explanatory variables to test the possible non-linear relation. The results show that corporate tax revenue is concave in sub-national corporation income tax rates, which finding presents evidence of income shifting.

Mintz and Smart (2004) examine Canadian corporations’ income shifting among provinces within Canada. In Canada, corporations are not required to consolidate income earned for tax purposes. Therefore, corporations that are part of a multi-jurisdictional corporate group and that pay taxes in a single province are expected to have significant
interprovincial income-shifting opportunities that other corporations do not have. Using aggregated firm-level data over the period of 1986 to 1999, the authors investigate the elasticity of reported taxable income to local tax rates. They find evidence to support significant effects of income shifting on provincial tax bases: the elasticity of taxable income to tax rates for firms with shifting opportunities is significantly higher than for other firms.

3.2.5 Contribution

This chapter offers a contribution to the growing empirical literature on multinational corporations’ income-shifting behavior by using unique firm-level confidential data on Canadian corporations’ non-arm’s length transactions with non-resident affiliates. Non-arm’s length transactions occur between Canadian corporations and their related parties in the form of intra-firm trade, interest payments and payments for R&D, management and intangible assets that are shared under one multinational enterprise. Payments in non-arm’s length transactions with non-residents may be manipulated for the purposes of income shifting. Information on non-arm’s length transactions with non-residents provides a unique data source by which to empirically examine Canadian corporations’ income-shifting behaviour.

In terms of data, there is some similarity between Hoffman (2001) and this essay, since they both use the data collected from the administrative income tax return files of Canadian corporations. However, compared to the data in Hoffman (2001), there are three advantages to the data in this study. First, this data is more recent: from 2001.
Hoffman (2001) studies the period from 1987 to 1994. Second, the data used in this study is more representative of Canadian corporations. The working sample is constructed from the universe of corporations that filed both T2 corporate income tax returns and non-arm’s length transactions with non-residents, which totals 8679 observations. Comparatively, Hoffman (2001) studies 94 large corporations. Finally, this study is the first to use data on non-arm’s length transactions with non-residents in order to investigate international income shifting in Canadian corporations.

The empirical strategy employed in this paper differs from most studies found in the literature. Previous studies examine the effect of tax rates (or tax differentials) of different jurisdictions on the measure of multinational corporations’ tax liability (or profitability). Following Harris et al. (1993) and Hoffman (2001), this essay uses a location-based dummy instead of tax rates (or tax differentials) as the key explanatory variable. As pointed out in Harris et al. (1993), the main advantages of using indicator dummies rather than tax rates (or tax differentials) are: first, to avoid the difficulties in calculating a representative tax rate; and, second, to reflect the factors’ information (other than tax rates) that also influence income-shifting decisions. Though different from Harris et al. (1993) and Hoffman (2001), both of which develop a set of location-based dummies, we simply define one location-based dummy to distinguish between tax-haven countries and non-tax-haven countries. The tax-haven dummy is equal to one if a Canadian corporation filed non-arm’s length transactions with at least one haven non-resident and zero otherwise. Assuming that the corporations are otherwise identical, a negative coefficient on the haven dummy provides empirical evidence for income shifting.
By using a single location-based dummy, this strategy provides a more focused explanation of income shifting from Canada to tax-haven countries, which are the most attractive targets of income shifting. This study develops a list of 45 tax havens for purposes of Canadian businesses.

### 3.3 Model development

The objective of this study is to investigate empirical evidence for income-shifting behaviour in Canadian corporations and, if income shifting is found, to examine the size of its magnitude in terms of Canadian reported taxable income. Since income-shifting behaviour is difficult to observe directly, I rely on observable variables that may capture potential income shifting in order to estimate the income-shifting effect indirectly. A similar strategy has been used in previous studies, such as Harris et al. (1993), and Hoffman (2001).

Consider two otherwise identical firms with the same level of actual profitability. It is expected that two such firms would report the same amount of taxable income to the Canada Revenue Agency (CRA). However, now consider that one firm has the opportunity to shift income out of Canada in order to reduce tax costs, while the other does not have this opportunity. We would expect the firm with external tax-planning opportunities to report less income to the CRA. Therefore, a Canadian corporation’s reported taxable income depends both on the actual profitability and on income-shifting activities. Defined as a simple function:

\[ Y_i = f(A_i, d_i) \]  

(1)
where $Y_i$ is Canadian reported taxable income; $A_i$ is Canadian actual income, which is defined as income before any income is shifted; $d_i$ is tax planning opportunities; and subscript $i$ stands for corporation $i$. Obviously, the function increases in $A_i$ and decreases in $d_i$. A simple version of this function would be:

$$Y_i = A_i - \theta(d_i)$$  \hspace{1cm} (2)

Canadian reported taxable income is Canadian actual income less the amount hidden by firms that have the opportunity to do so.

Unfortunately, we do not observe $A_i$, but we can model it as a function of firm characteristics, $X_i$, $A_i = \gamma X_i + \epsilon_i$. Nor do we observe $d_i$, but we can choose a particular summary of such opportunities, such as the existence of a haven non-resident, with whom a Canadian corporation has non-arm’s length transactions, $\theta(d_i) = \beta h_i$, where $h_i$ is a dummy variable capturing the existence of a haven non-resident. This yields the estimating equation:

$$Y_i = \gamma X_i - \beta h_i + \epsilon_i$$  \hspace{1cm} (3)

We assume that the relationship between $Y_i$ and the existence of a haven non-resident reveals information about $\theta(d_i)$. It is this revealed information that will be used to confirm or refute income shifting. For example, if a Canadian corporation files non-arm’s length transactions with a non-resident in a tax-haven country, then we expect the Canadian reported taxable income to be lower since income would be shifted to the tax
haven, suggesting a higher value of $\theta(d_i)$. Therefore, whether or not the non-residents with whom Canadian corporations have non-arm’s length transactions are in a tax haven should reveal information regarding income shifting. In equation (3), I wish to test whether the coefficient on $h_i$ is negative. It is assumed that the location of the non-resident in a transaction is exogenous and independent of any income-shifting decision. I address the concern regarding endogeneity in Section 3.8.

The benchmark regression model is developed as:

$$DepVar_i = \alpha + \beta d\_haven_i + \gamma controls_i + industryFE_i + provinceFE_i + \epsilon_i \quad (4)$$

In the OLS model, the dependent variable is adjusted Canadian taxable income\textsuperscript{17} scaled by total book value of Canadian assets. In the PROBIT model, the dependent variable is a dummy variable equal to one if the adjusted taxable income is positive and zero otherwise. The key explanatory variable is the haven dummy, $d\_haven_i$, which is equal to one if a Canadian corporation reports at least one haven non-resident with whom the corporation made non-arm’s length transactions and zero otherwise. Control variables include a natural log of total assets and its square. The quadratic asset term is used to capture the non-linear influence of total assets on taxable income. Control variables also include a natural log of number of non-residents and a public corporation dummy. The number of non-residents is included as a proxy of economies of scale. The public

\textsuperscript{17} Taxable income here is adjusted by adding back carried-forward losses. Losses from previous years can be carried forward for up to seven years or carried back for up to three years. If corporations claim losses from previous tax years, then their taxable income is reduced. By adjusting for carried-forward losses, I intend to distinguish between the income-reducing effect of income shifting and the income-reducing effect of claimed losses.
corporation dummy is equal to one if the corporation is a public corporation and zero if the corporation is a private corporation. Industry and province fixed effects are included to control for industrial difference in profitability and provincial difference in economic environment and tax rules. One hundred industry categories are defined using North American Industry Classification System (NAICS) three-digit codes. The 16 provincial and territorial jurisdictions from the income tax return data files are compiled into nine provincial and territorial groups. They are the Atlantic Provinces, Quebec, Ontario, the Prairie Provinces, Alberta, British Columbia, the territories, offshore regions, and multiple jurisdictions. \( \beta \) and \( \gamma \) are regression coefficients. Here, coefficient \( \beta \) is of primary interest, representing the income-shifting effect, while \( \alpha \) is the constant term and \( \varepsilon_i \) is a well-defined error term.

A corporation’s Canadian income is likely to be proportional to the size of its Canadian operations. Dividing the adjusted taxable income by total assets allows me to interpret variations in the resulting ratio as being due to income shifting. This procedure also reduces the potential of heteroscedasticity problems.

Using a haven dummy, I assume that only the presence of related non-residents in tax

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18 A public corporation is defined as: a resident corporation that has the ability to raise capital in the public capital market by selling its shares; or a corporation controlled by a public corporation. Private corporations are resident corporations that do not satisfy the conditions for being public corporations and are not controlled by a public corporation or corporations (see Boadway and Kitchen (1999), pp. 179).

19 The Atlantic Provinces are Newfoundland and Labrador, Prince Edward Island, Nova Scotia and New Brunswick. The Prairie Provinces are Manitoba and Saskatchewan. The territories are the Northwest Territories, Yukon and Nunavut. The offshore regions are the Nova Scotia Offshore and Newfoundland Offshore. Together, corporations in these 10 provinces and 3 territories comprise less than 6 percent of the working sample. The multi-jurisdiction group represents corporations that report income in more than one province or territory. Nearly 30 percent of the corporations in the working sample are self-reported multi-jurisdiction corporations.
haven countries actually matters with regard to income shifting. In some specifications, the share of haven non-residents out of total non-residents, with who Canadian corporations have non-arm’s length transactions, is used as the key explanatory variable to replace the haven dummy, in which case the control variable of the natural log of number of non-residents is dropped due to the redundancy of information. The share of haven non-residents is meant to capture the effect of the number of haven non-residents combined with the effect of the haven’s presence.

If the amount of income shifting depends on the size of the non-residents’ operation in tax haven countries, then the use of the haven dummy is not an appropriate way by which to capture the income-shifting effect and may indeed lead to noisy results. On the other hand, if income shifting requires only the presence of related non-residents in haven countries, then my method is preferable. Since detailed data on non-resident operations are not available, this point cannot be resolved here.

Previous studies, such as Harris et al. (1993) and Hoffman (2001), control for some other financial variables in their regressions. Hoffman (2001) includes capital consumption allowance, interest expenses, rental expenses, salary expenses, scientific research and experimental development expenditures, investment tax credits, total debt and use of loss carry-forwards. Meanwhile, Harris et al. (1993) includes research and development spending, advertising spending, depreciation and amortization, rental expenses, investment tax credits, interest expenses and number of employees. These variables may help to explain the changes in taxable income to a certain extent; however, they may also be correlated to income-shifting behaviour, which is captured by the
haven dummy (the key explanatory variable), if their changes are directly caused by income shifting. For example, if a Canadian corporation wants to shift more income to a non-resident in a tax haven country in the form of an interest payment, it will issue more the debt to the haven non-resident. As a result, we will observe higher interest expenses and lower taxable income. However, the changes in both variables are induced by income shifting. To avoid potential correlation among explanatory variables, these potential controls are excluded from the regression. The correlation between income shifting and some of these financial measurements are discussed further in Section 3.9.

3.4 Corporate taxation in Canada

Before discussing the data and empirical results, it is helpful to take a look at the tax system in Canada, focusing on taxation of foreign-source income. This section is intended to be general and by no means exhaustive.

3.4.1 Taxation of domestic-source income

For corporate taxation purposes, taxable income refers to income from business, property and net taxable capital gains. Resident Canadian corporations\textsuperscript{20}, owned by either Canadians or non-residents, are taxed on their worldwide income. In the case of non-resident corporations, only income earned inside Canada is taxable.

In Canada, the corporate income tax is imposed at both the federal and provincial levels. The basic federal rate in 2001 is 38 percent. It is reduced to 28 percent by an

\textsuperscript{20} A corporation is deemed to residentially Canadian if it is incorporated in Canada or has its central management and control in Canada.
abatement of 10 percentage points on a corporation’s taxable income earned in a province or territory. Corporations are also subject to a surtax of 4 percent on top of the net federal rate, which brings the effective federal rate to 29.12 percent. Provincial tax rates are added to the federal tax and vary from 9.04 to 17 percent in 2001. If a corporation operates in more than one province, then an allocation formula is used to allocate taxable income among provinces.\textsuperscript{21}

Preferential tax regimes are applied to some corporations. For example, Canadian-controlled private corporations (CCPCs) are eligible for a small business deduction on the first $200,000 of their active business income.\textsuperscript{22} In another example, manufacturing and processing income (M&P) is taxed at lower rates at both the federal and provincial levels.\textsuperscript{23}

3.4.2 Taxation on foreign-source income\textsuperscript{24}

Income earned by a Canadian resident corporation’s foreign operation is, in most cases, subject to corporate taxes in the foreign country where the income is earned. The income is also taxable in Canada. In order to prevent double taxation on the foreign income of Canadians, tax law permits Canadian taxpayers to claim foreign tax credit for income taxes (or profit taxes) paid to foreign governments. The foreign tax credits can be used to

\textsuperscript{21} The proportion of taxable income allocated to one province is the average of the proportion of sales in the province and the proportion of payroll paid in that province.

\textsuperscript{22} The small business deduction reduces CCPCs’ effective federal rate to 22.12 percent in 2001. Corporations with taxable capital greater than $15 million are not eligible for the small business deduction.

\textsuperscript{23} In 2001, the effective federal rate on M&P is 21.12 percent. The provincial rates for M&P range from 2.5 percent in the Yukon Territory to 17 percent in Manitoba and New Brunswick.

\textsuperscript{24} For a more detailed explanation, see ¶2246-¶2273 of Foreign Tax Credits in Preparing Your Corporate Tax Returns: Canada and Provinces, 21\textsuperscript{st} ed. 2001.
offset Canadian tax liabilities that would otherwise be due on the foreign income. The foreign tax credit calculations must be made separately for each foreign jurisdiction.

Since the foreign tax credit is intended to alleviate international double taxation—and not to subsidize Canadian corporations for their tax liabilities in foreign countries—the foreign tax credit is limited to Canadian tax liability that would be due on the same amount of domestic income. If the foreign taxes paid are higher than the foreign tax credit limit, then any excess becomes “unused foreign tax credit” and may be claimed in any of the three preceding or seven following years.25

Generally, Canadian tax liabilities on foreign-source income can be deferred until the income is repatriated. However, profits of unincorporated foreign businesses, such as branches of Canadian corporations in foreign countries, are taxed immediately upon being earned.

In order to prevent a taxpayer from being sheltered from Canadian taxes by diverting or accumulating income in a controlled foreign corporation (CFC), foreign accrual property income (FAPI) rules are imposed.26 FAPI refers to certain types of passive income, including net income from property, net income from non-active businesses and net taxable capital gains from dispositions of property other than excluded property.27 FAPI is deemed to be taxable income of the Canadian resident corporation (which

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25 The only limitation of claiming the “unused foreign tax credit” is that these credits must be utilized in the order in which they arise on a country-by-country basis.

26 For a more detailed explanation, see ¶2348 of Foreign Accrual Property Income in Preparing Your Corporate Tax Returns: Canada and Provinces, 21st ed. 2001.

27 The excluded property comprises property used by a foreign affiliate in an active business or shares of another foreign affiliate whose property is substantially excluded.
controls the CFC) where the FAPI is earned and, therefore, is subject to Canadian taxation regardless of whether or not such income is currently paid.

Dividends received by a Canadian corporation from a foreign affiliate\(^ {28}\) are exempt from Canadian taxation if the dividends are derived from active business profits earned in a country with whom Canada has entered into a tax treaty.

**3.4.3 Interest deduction and thin capitalization\(^ {29}\)**

A Canadian corporation financed by debt can deduct the full amount of nominal interest paid from its taxable income. Interest payments are deductible regardless of whether or not the lender of the money (or the recipient of the interest payment) is a Canadian resident. When a Canadian corporation borrows money from a foreign corporation, the Canadian government loses the same amount of tax base as the interest paid. Canada imposes a thin capitalization rule in order to limit the ability of non-residents to withdraw profits through deductible interest charges. The thin capitalization provision restricts the deductibility of interest that is paid or payable by a Canadian resident corporation to a specified non-resident on debt exceeding two times equity. A specified non-resident is a non-resident shareholder who, alone or together with other related parties, owns 25 percent or more of the any class of shares in the corporation.

\(^{28}\) A foreign affiliate is a non-resident corporation in which a Canadian corporation directly or indirectly owns at least one percent of any class of its shares and of which the Canadian corporation and related parties directly or indirectly own at least 10 percent.

\(^{29}\) For a more detailed explanation, see ¶688 of Thin Capitalization Interest Not Deductible in *Preparing Your Corporate Tax Returns: Canada and Provinces*, 21st ed. 2001.
3.4.4 Non-arm’s length transactions and transfer pricing rules\textsuperscript{30}

When prices are determined through market mechanisms between the two transaction parties who are independent and on equal footing, the prices are set on an arm’s length basis. However, there is no open market for competition among a great number of buyers and sellers in which to obtain arm’s length prices for transactions with related parties. Most transactions of goods, services, financial capital, and intangible assets among related parties are therefore non-arm’s length transactions.

Transfer pricing issues arise when prices are not charged on an arm’s length basis between the related parties. Transfer pricing may be harmful to high-tax countries because multinational corporations could manipulate transfer prices to shift income to countries with low tax rates. The lack of transparency in intra-firm transactions makes it hard for such behaviour to be caught by tax authorities.

Scrutiny of cross-border transactions between related parties has increased fairly recently. In 1995, the OECD issued the Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations, which emphasizes the dominant role of the arm’s length principle in treating intra-firm trade within a multinational group, stating that corporations should make their transactions with non-arm’s length parties on the same terms and conditions that would have prevailed if the parties had been dealing at arm’s length.

In 1987, the Canada Revenue Agency (CRA) adopted a number of acceptable

\textsuperscript{30} For a more detailed explanation, see ¶2721-¶2723 of Transfer Pricing in Preparing Your Corporate Tax Returns: Canada and Provinces, 21\textsuperscript{st} ed. 2001.
methods for pricing non-arm’s length transactions that would come to be recommended in the OECD 1995 Guidelines, e.g., comparable uncontrolled price, resale price and cost plus. Different methods may be preferred under different circumstances. The CRA also adopted the Advance Pricing Arrangement (APA) program to assist taxpayers in determining which transfer pricing method to use. Pricing strategies that are not in accordance with the APA are considered inappropriate. The non-arm’s length transactions in our data set may be a mixture of appropriately (legally) and inappropriately (illegally) priced transactions.

3.5 Data

A cross-sectional data set of Canadian corporations for the year 2001 is constructed for this study. The main data sources are the administrative data collected on annual T106 reports and corporate income tax returns; the former provides firm-level information regarding non-arm’s length transactions with non-residents and the latter provides general financial and taxation information. Data on country-level statutory and preferential tax rates are also collected from several sources and a list of tax havens is defined for Canadian businesses. In the remaining part of this section, the data sources are explained.

3.5.1 Data on non-arm’s length transactions with non-residents

The key data source for this study is the T106 data file, which provides information collected on annual returns of Form T106, “Information Return of Non-arm’s Length
Transactions with Non-residents”. The T106 data file is created by the CRA.\textsuperscript{31} Canadian residents, which include corporations, individuals, trusts and partnerships, are required to file for any year in which the filer engages in non-arm’s length transactions with a non-resident where the total fair market value of the transactions exceeds $1 million. This study explores the behaviour of corporations; therefore, only corporations that also file T2 income tax returns are kept in my data set. Form T106 can be filed together with annual T2 corporate income tax returns or separately.

Corporations file transaction information of non-residents, reporting each non-resident’s name, country of residency and type of relationship. There are three types of relationship that can exist between the Canadian reporting corporation and its non-resident: Either the Canadian corporation controls a non-resident, the Canadian corporation is controlled by a non-resident, or other.\textsuperscript{32} The questions of transaction value and the main transfer pricing methodologies used are presented in detail by breaking down the category of traded property and the transaction directions.

The observations in the T106 data file are non-residents, while the observations in the constructed data set are corporations. First, T106 data are aggregated to the corporation level and are then merged with the income tax return data by the Business Number. The main aggregated variables, based on the original T106 data, include haven dummy, number of non-residents, share of haven non-residents and relationship-type dummies.

\textsuperscript{31} The T106 data file is accessed through Finance Canada.

\textsuperscript{32} Generally, control is considered to be established when more than 50 percent of the voting shares of a corporation are directly or indirectly owned by an individual, a corporation or a related group. The concept of control used here is narrower in the sense that the cases of being owned by a related group are excluded.
The haven dummy is equal to one if at least one of the non-residents with whom the reporting corporation has non-arm’s length transactions resides in a tax haven country and zero otherwise. The share of haven non-residents is calculated by dividing the number of haven non-residents by the total number of non-residents. The type I (II) relationship dummy is equal to one if at least one of the non-residents with whom the reporting corporation has non-arm’s length transactions is controlled by (controls) the reporting corporation and zero otherwise.

While the ability to estimate the effect of the location of non-residents in non-arm’s length transactions enhances the power of our tests, T106 data has limitations that potentially limit the improvement in strength. First, although the questions of transactions are designed in detail by breaking down the category of traded property and the transaction directions, the response rates on break-down items of transaction value are poor. Therefore, the data on the break-down transaction value cannot be used for analysis. Second, Form T106 is designed to collect information of non-residents that have been involved in certain non-arm’s length transactions in a given taxation year. By no means would this information provide details regarding complete ownership structure, which would be a piece of useful information with regard to a firm’s characteristics and may influence Canadian corporations’ profitability and shifting strategies. Finally, T106 data does not provide financial information about non-residents. Therefore, it is not possible to test the effect of non-residents’ financial characteristics, such as operation size, on the income-shifting behaviour of Canadian corporations.
3.5.2 Data on financial and taxation information

Another main source of our data is the corporate tax return data files, which are also created by the CRA for Finance Canada. Tax return data files compile information from annual T2 corporate income tax returns and the supplementary schedules that accompany the tax returns.

Variables are extracted mainly from Corporate Income Tax Returns (Form T2), Balance Sheets (Schedule 100) and returns to Form of Corporation Loss Continuity and Application (Schedule 4). The variables extracted from Form T2 consist of firm characteristics, such as the North American Industry Classification System (NAICS) code, province of residency and corporation type, and numeric variables related to income tax, including net income, taxable dividends deducted, carried-forward losses, taxable income and total tax payable.

The Balance Sheet provides data on total assets, total liabilities, shareholders’ equity, debt, interest income, intra-firm trade, sales and R&D expenses. The loss balance at the beginning of the taxation year is retrieved from Schedule 4.

3.5.3 Foreign corporate income tax rates

The data on foreign corporate income tax rates are collected from different sources. The main source is the annual publication of *Worldwide Corporate Tax Guide* by Ernst & Young. Two pieces of information are collected for each country: the statutory and

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33 Corporation types fall into one of the following categories: Canadian-controlled private corporations, other private corporations, public corporations, corporations controlled by a public corporation or other corporations.
preferential rates. Since many countries’ corporate tax systems are complex, with different tax rates on different types of corporations, in different geographical regions or over different periods, I simplify the procedure for deciding which rate to use by applying the following rules.

If different corporate income tax rates are imposed, either on different income brackets or on different types of corporations, then the highest rate is taken as the statutory rate. If corporate income tax is also collected at sub-national level(s), then tax rates at sub-national level(s) are taken into account when calculating the statutory rate.\(^{34}\)

The surtax is accounted when calculating the statutory rate. If there are other taxes that share the same tax base with corporate income tax and that are applied to general corporations, then these taxes will be included in calculating the statutory tax rate. For example, as of January 1, 2001, the Social Contribution Tax (SCT) in Brazil is levied on the same tax bases as is the corporate income tax. The corporate income tax rate is 15 percent, the surtax is 10 percent and the SCT is levied at a rate of nine percent. The total effective tax rate on corporate profits is 34 percent.

If a preferential tax regime is provided and the special treatment can be interpreted into a rate, then the rate will be assessed as the preferential rate. For example, in 2001, the statutory tax rate in Panama is 30 percent on corporate income, although companies in the Colon Free Zone are not subject to income tax. The preferential rate in Panama is read as zero percent. If more than one preferential tax rate treatment is offered, then the

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\(^{34}\) When the combined tax rates of national and sub-national rates are not available in the Ernst & Young guide, *KPMG’s Corporate and Indirect Tax Rate Survey 2007* is used as a backup data source.
lowest rate is taken. A tax holiday provided over a certain period is not read as a zero percent preferential rate.

The preferential tax regimes provided to certain industries—such as manufacturing or agriculture—are not considered for a preferential tax rate.

The tax rates in the Ernst & Young guide are based on the effective rates on January 1 of each year. Taking 2001 as an example, the information in Ernst & Young 2001 Guide is effective beginning on January 1, 2001. However, the data in tax return data sets are grouped into different years according to the end of the corporation’s taxation year. Data on corporations with the taxation year-end being anywhere between January 1, 2001 and December 31, 2001 is included in the 2001 data set. Ideally, the tax rate should be taken or calculated for the same period over which the tax return data is collected. However, return filers have different taxation year-ends and their taxation years may be a different number of days, which fact makes matching periods of tax rates to periods of tax return files extremely difficult. To somewhat reduce the gap (while not closing it completely), the average of the 2001 and 2002 rates are used as the 2001 tax rate.

3.5.4 Tax havens

Generally speaking, tax havens refer to countries that apply zero or very low tax rates to corporate income. However, when it comes to which countries should appear on a list of tax havens, there is hardly a consensus within the literature. This study develops a list of 45 potentially useful tax havens for Canadian businesses.
The starting point is the OECD reports on Harmful Tax Competition. In 1998, the OECD establishes an international framework aimed at countering the spread of harmful preferential tax regimes by publishing its report, *Harmful Tax Competition: An Emerging Global Issue* (the 1998 Report). Following this report, several progress reports have been released. The 1998 Report suggests four key factors by which to identify tax havens:

a) No or only nominal taxes;
b) Lack of effective exchange of information;
c) Lack of transparency; and
d) No substantial activities.

I start with the countries that appear on the harmful tax competition list from the 2000 OECD progress report. In the tax haven list generated for this study, there are two OECD member countries with harmful tax competition, five uncooperative tax havens and 31 tax havens that are not OECD members. I add seven countries with either statutory or preferential tax rates of no higher than 10 percent in 2001. The preferential rate is normally lower than the statutory rate—favouring certain types of companies. Tax rules in different countries favour different types of companies, although these rules are essentially similar insofar as they all favour companies with the capability to receive a great amount of foreign income. Our tax haven list includes 45 countries (see Appendix A).

Data on population in each country is taken from the *World Development Indicators* published by the World Bank. Haven countries with a population of less than one million are defined to be small haven countries; otherwise, they are large havens.
3.6 Summary of statistics

This section provides a profile of the basic characteristics of the corporations in the working sample and shows sample evidence of income shifting.

First, the financial profile of corporations that file Form T106 relative to all T2 filers is provided in Table 3-1. Over 1.36 million Canadian corporations file income tax returns in 2001\textsuperscript{35}, while 11,425 corporations file T106 for their non-arm’s length transactions with non-residents. The corporations that file T106 account for less than 1 percent of all T2 filers; however, their asset share (34 percent), taxable income share (42 percent) and tax payable share (43 percent) all dramatically exceed their observation share, which thus reveals the significant influence of corporations involved in international non-arm’s length transactions on both the Canadian economy and government revenue.

In constructing the working sample from the corporations that file T106, I exclude professional corporations, tax-exempt corporations, non-residents of Canada and corporations in their first or final taxation year because their special characteristics may unduly influence their incentive to shift income. In order to limit the sample to large corporations, only those with total assets of $200,000 or more are kept. The working sample therefore contains 8,679 observations.

Table 3-2 summarizes the basic characteristics of the working sample. First, by corporation type, 81 percent are private corporations and 17 percent are public

\textsuperscript{35} These corporations’ taxation year-end is anywhere between January 1, 2001 and December 31, 2001.
In the working sample, almost 50 percent report zero taxable income. After adjusting taxable income by adding back the carried-forward losses, the percentage of corporations with zero taxable income drops by about 10 points. These corporations with zero taxable income are important to retain because they may show results of corporations’ income-shifting behaviour. Therefore, to keep the observations with zero adjusted taxable income, logarithm is no longer viewed as a proper transformation on adjusted taxable income; instead, adjusted taxable income scaled by total assets as the dependent variable in the regressions is used. Corporations with positive loss balances at the beginning of the taxation year may have different incentives to shift income than do those without such balances. In the working sample, 52 percent of corporations have positive loss balances at the beginning of the 2001 taxation year. Finally, the aggregated information with regard to the non-residents with whom Canadian corporations have non-arm’s length transactions may reveal information with regard to the incentive to shift income. 16 percent of the corporations report non-arm’s length transactions with at least one non-resident in a tax haven country, while the remaining 84 percent do not report any non-arm’s length transactions with a haven non-resident. The percentage of corporations that report transactions with at least one small haven non-resident is 11 percent. 29 percent report at least one non-resident that is controlled by the reporting corporation (Type I relationship); 48 percent of T106 filers report at least one non-resident that controls the reporting corporation (Type II relationship); and 55 percent report at least

36 The private corporation category combines two corporation types: Canadian-controlled private corporations (CCPCs) and other private corporations. The public corporation category also combines two corporation types: public corporations and corporations controlled by public corporations. Corporations that do not fall within either of the previous two categories are in the category of other corporations, which, for example, includes Crown corporations.
one non-resident that falls into a relationship other than Type I or Type II (Type III relationship).

The industry distribution and province distribution of the corporations in the working sample are provided in Table 3-3 and Table 3-4, respectively. There is a broad representation of industries in our sample. The 15 industry categories in Table 3-3 are defined based on two-digit NAICS codes that corporations report in their tax returns. However, there are some corporations that do not provide said information. These corporations fall into the last category of Unknown. The regional distribution of the working sample is not even. Corporations located in Quebec, Ontario and British Columbia account for almost 60 percent of the entire sample, which is in line with the provincial pattern of the Canadian economy. The category of Multiple Jurisdictions includes corporations operating businesses in more than one province, accounting for about 30 percent of the entire sample.

Table 3-5 reports the mean values of the main financial variables of the working sample and two subsamples: corporations that do not report non-arm’s length transactions with a haven non-resident and those that report transactions with at least one haven non-resident.

The average corporation from the working sample has $228 million total assets. For corporations that have non-arm’s length transactions with at least one haven non-resident,

37 One point worth noting regarding the Unknown category is that the corporations within it are not simply small outliers; rather, some of them have large asset sizes that are ranked in the top 1000 corporations among all T2 filers. Based on information from some public sources, some of the corporations operate business in multiple industries. Considering the important role that these corporations may play in international income shifting, the Unknown category is retained.
the average size of total assets is close to $900 million, which is about eight times larger than the average total assets of the corporations that do not have transactions with a haven non-resident ($99 million). Corporations involved in non-arm’s length transactions with at least one haven non-resident have a much larger asset size than those that do not. Therefore, it is important to scale the variables in dollar value by total assets in order to avoid the income-shifting analysis becoming biased by the operation size of corporations.

The average debt-to-assets ratio of corporations without haven non-residents in non-arm’s length transactions is 0.55. The ratio in firms with at least one haven non-resident in the transactions is 0.45; however, the difference between these two is not statistically significant. Net income reported in the T2 form is the base on which to calculate taxable income. There are some deductions and additions to be considered. Taxable dividends deducted and carried-forward losses are two of the deduction items. Corporations with haven non-residents in non-arm’s length transactions have a higher net income ratio, significantly more taxable dividends deducted relative to asset size and insignificantly fewer carried-forward losses claimed than do firms without haven non-residents in the transactions. Next, the ratio of taxable income scaled by total assets is significantly lower in corporations that have non-arm’s length transactions with haven non-residents (0.053) than in corporations without (0.074). The ratio of total tax payable is also lower in corporations with haven non-residents in the transactions than in those without (0.015 versus 0.020). The average ratio of taxable income adjusted for losses to total assets is 0.064 in corporations with haven non-residents in the transactions, which result is significantly lower than that in those without (0.092). Additionally, the dummy of
positive adjusted taxable income is checked. On average, 63 percent of the corporations in the working sample report positive adjusted taxable income. The probability for a corporation that has non-arm’s length transactions with haven non-residents to report a positive adjusted taxable income is significantly lower than it is for a corporation without haven non-residents in the transactions. The sample evidence from Table 3-5 is consistent with the hypothesis that corporations engaged in non-arm’s length transactions with at least one haven non-resident are more likely to be involved in international income shifting and to have lower taxable income.

Table 3-6 provides an indication of the distribution of adjusted taxable income, tax payable, number of non-residents, and the percentage of corporations with at least one haven non-resident in non-arm’s length transactions. The deciles are defined by asset value; the average asset value is included in the table. Adjusted taxable income and tax payable both increase by decile. However, it is interesting that the ratio of adjusted taxable income over total assets decreases by decile except from the second to third deciles. The number of non-residents consistently increases by decile. For the first decile, the average number of non-residents is 1.5, while it is 8.6 for the tenth decile. The percentage of corporations that have non-arm’s length transactions with at least one haven non-resident also increases by decile except from the third to fourth deciles. For the corporations in the first decile, this figure is 7.5 percent. The most significant raises occur between the last three deciles: from 19.1 to 24.9 to 37.7 percent, respectively.

Table 3-7 provides sample averages of several financial variables. Later, in Section 3.9, they will be tested as possible income-shifting channels. These results are the
average for all corporations with non-missing values. The average corporation in the working sample has debt in excess of $56 million and net equity of about $70 million. The average interest expenses are $2.4 million and the average interest income is $0.5 million. The average firm also spends $2.8 million on research/development and administrative issues. The average rental expenses are $0.4 million and the average salaries and wages are $2.4 million. The average firm’s intra-firm trade is $4.4 million. The average operating expenses are $21.7 million.

The above descriptive statistics show that there is sample evidence consistent with the hypothesis that corporations engaged in non-arm’s length transactions with at least one haven non-resident are more likely to be involved in international income shifting and to have lower taxable income. An econometric analysis is the next step.

### 3.7 Estimation results

In this section, different strategies are employed to examine the effect of having at least one haven non-resident perform non-arm’s length transactions on taxable income of Canadian corporations reported in Canada.

#### 3.7.1 Basic results

The objective of this subsection is to examine the evidence for income shifting using the benchmark model as described in equation (4). Hence:

\[
DepVar_i = \alpha + \beta d_{\text{haven}_i} + \gamma_0 \ln(NRnumber_i) + \gamma_1 \ln(assets_i) + \gamma_2 (\ln(assets_i))^2
\]
+ \textit{industry}FE_i + \textit{province}FE_i + \varepsilon_i

Again, the dependent variable is the taxable income adjusted for losses divided by domestic total assets in the OLS model and a dummy variable of positive adjusted taxable income in the PROBIT model. Control variables include natural log of number of non-residents, natural log of total assets and the latter’s square. In some specifications, the public corporation dummy is also included in order to capture the effect of different types of ownership on corporations’ profitability. The hypothesis is that if Canadian corporations move their pre-tax profits through non-arm’s length transactions with their related non-residents in tax havens, then the coefficients on the haven dummy is expected to be negative.

The estimation results of OLS regressions are reported in Table 3-8. The key explanatory variable for columns 1, 2 and 4 is a haven dummy, while for columns 3 and 5 it is a haven share. A haven share is defined as the share of the number of haven non-residents over the total number of non-residents in non-arm’s length transactions. Results in the first column show that the haven dummy has a significant negative effect on taxable income: adding a haven non-resident reduces the ratio of taxable income to total assets by 0.014. A one-percent increase in the number of non-residents increases the taxable income ratio by about 0.01. In the specifications with the interaction term of the haven dummy and the public corporation dummy, the coefficient on the haven dummy is negative and insignificant, while the coefficient on the interaction term is significantly negative, which finding suggests that—for a public Canadian corporation—adding a haven non-resident reduces the taxable income ratio by about 0.02. The joint effect of
having a haven non-resident is -0.026 (significant at the one-percent level). When using the haven share as the key explanatory variable, the results in column 3 suggest that a one percent increase in haven share reduces the income-to-asset ratio by 0.018. When the interaction term of the haven share and the public dummy is included, both the magnitude and the degree of significance of the coefficient on the haven share decreases. The joint effect of increasing the haven share by one percent is to reduce the taxable income ratio by 0.021.

Next, the estimation results of the PROBIT model are summarized in Table 3-9. The question asked here is whether corporations that reported transactions with a haven non-resident are less likely to report positive taxable income than are those without haven transactions. The coefficients on the haven dummy are significantly negative in most specifications. The results suggest that having non-arm’s length transactions with haven non-residents, or having a higher share of haven non-residents, correlates to a lower possibility of reporting positive taxable income, which finding is consistent with income shifting. The results indicate that tax planning is used for tax purposes by some corporations to the extreme extent in order to bring their taxable income down to zero, thereby making them free of taxes. The effect of the number of non-residents is significantly positive, which suggests that the scale effect of non-arm’s length transactions with non-residents is positive on the possibilities of reporting positive taxable income. A public corporation dummy has a consistent negative effect on the possibility of reporting positive taxable income. After controlling for a public corporation dummy, the magnitude and the degree of significance of the haven effect are reduced.
The results also show that the effect of the existence of a haven transaction through a public corporation dummy is significantly negative. In the specifications with the interaction term of a haven dummy and a public corporation dummy: the coefficients on the haven dummy become insignificant; the interaction term has a significant and negative coefficient; and the joint effect of the haven dummy is significantly negative. The similar pattern is observed in the results using the haven share.

Using the OLS estimation results, the fiscal impact of income shifting on tax bases can be calculated. Taking column 2 in Table 3-8, the coefficient on the haven dummy suggests that introducing a non-arm’s length transaction with a non-resident in a tax haven reduces the average Canadian corporation’s adjusted taxable income by 1.2 percent of its total assets. To gain a sense of the magnitude of this impact on Canadian taxable income, suppose that the haven effect were eliminated. Assuming that total assets of the affected corporations were unchanged, since the average such Canadian corporation in the sample has total assets of approximately $899 million, eliminating the haven effect is predicted to increase average adjusted taxable income of the affected corporations by $10.8 million. Multiplying this figure by the 1409 corporations in the sample with haven non-resident transactions, the total impact on the Canadian tax base is estimated to be $15.2 billion.

3.7.2 Small haven effect

Realizing that the 45 tax haven countries listed in Appendix A considerably differ from each other in terms of population, size, gross domestic product, etc., it is useful to
distinguish large tax havens from small ones. An interesting question to ask with regard to this distinction is whether the large and small tax havens play different roles in international income shifting. Some tax havens, such as Bermuda, are famous for their role in hosting offshore financial centres that control huge amounts of financial capital flows while conducting few business activities. The concern is that transactions with corporations in such haven countries are more likely to be made for tax-planning purposes. Tax havens are divided into two groups according to population size. From 1999 to 2004, Hungary, Ireland, Liberia, Malaysia, Mauritius, Panama, Singapore and the United Arab Emirates each had a population greater than one million. These countries are classified as large tax havens. The remaining haven countries are defined as small havens.

The following model is used to test haven effects, distinguishing small havens from large havens.

\[
 DepVar_i = \alpha + \beta_1 d_{smallhaven_i} + \beta_2 d_{largehaven_i} + \gamma_0 \ln(NRnumber_i) \\
+ \gamma_1 \ln(assets_i) + \gamma_2 \left(\ln(assets_i)\right)^2 + industryFE_i + provinceFE_i + \varepsilon_i \quad (5)
\]

In equation (5), the small haven dummy, \(d_{smallhaven_i}\), is equal to one if the Canadian corporation reports non-arm’s length transactions with at least one non-resident in a small haven; otherwise, it is equal to zero. The large haven dummy, \(d_{largehaven_i}\), is equal to one if the Canadian corporation reports non-arm’s length transactions with at least one non-resident in a large haven. Hines and Rice (1994) are the first to distinguish large versus small havens. Then define a large haven as having a population greater than one million.
non-resident in a large haven and none in a small haven; otherwise, it is equal to zero. The reference group refers to corporations that do not have transactions with any haven countries. The controls and fixed effects remain the same as in the benchmark model.

The estimation results are reported in Table 3-10. The results across different specifications are consistent with our prediction that transactions with small tax havens are more likely to be used for income shifting. Coefficients on the large haven dummy in all OLS specifications are not statistically different from zero, which means that having transactions with large havens does not affect taxable income reported in Canada. In comparison, the small haven dummy consistently shows a significant negative effect on the taxable income reported in Canada. In the specification in column 2, relative to not having non-arm’s length transactions with tax havens, adjusted taxable income scaled by total assets will be lowered by 0.017 if the corporation has transactions with small havens. Public corporations have lower taxable income ratios relative to non-public ones and the adjusted taxable income ratio increases in the number of reported non-residents. Specification 3 tests whether the small haven and large haven dummies have differing effects on taxable income in public corporations versus non-public ones. The large haven dummy does not show a significant effect in public corporations. Further, the combined effect of the large haven dummy is insignificant. The coefficient on the interaction term of the small haven dummy and the public dummy is -0.019. The combined effect of the small haven dummy is -0.03 (significant at the one-percent level). The results show a significant small haven effect and an insignificant large haven effect on taxable income. The PROBIT results have a similar pattern.
The estimates suggest that small and large haven countries play different roles with regard to Canadian corporations’ tax-planning schemes. This difference may be the result of either more income-shifting transactions targeting small havens or of more normal transactions (not for income-shifting purposes) taking place in large havens and thereby balancing out the income-shifting effect. For the first case, the difference is clearly not due to tax rate differentials because they all impose zero or very low rates. The causes may be due to other tax factors that are not reflected by tax rates (i.e., non-tax factors), such as legal system maturity, information security regulation, etc. For the second case, the results do not rule out the possibility that large havens are also used for shifting income. More detailed micro data are required to further detect the reasons for the different roles of small versus large havens.

3.7.3 Haven effect and relationship types

There are three types of relationship between the T106 filers and their related non-residents: the reporting corporation controlling the non-resident; the reporting corporation being controlled by the non-resident; and other. These three types of relationships will be referred to later as a Type I, Type II or Type III relationship.\(^3^9\) When foreign affiliates are not majority-controlled, the relationship between the foreign affiliates and their owners is loose. The management-associated shifting costs are supposedly higher between loosely connected related parties, which may result from longer decision procedures, special

\(^3^9\) One thing worth noting is that the controlling side mentioned here does not have to be the ultimate parent. This means that in the Type I case (where a Canadian corporation controls the non-residents), we cannot say the non-residents are Canadian-controlled because we do not know whether the Canadian corporation has a parent, and if it does, whether its ultimate parent is Canadian or foreign. The analysis for Type II cases is similar. Therefore, Type I and Type II relationship cases do not directly correspond to Canadian-controlled and foreign-controlled cases.
arrangements to reduce the risk of losing control over the shifted money, etc. Income shifting is expected to be safer and hence used more often by corporations in the Type I relationship and Type II relationship. This subsection tests whether income shifting is affected by a non-tax factor, i.e., a relationship between the two parties involved in a non-arm’s length transaction.

A PROBIT model incorporating the type of relationship is presented below.

\[
DepVar_i = \alpha + \beta_0 d_{\text{haven},i} + \beta_1 d_{\text{rltn},i} + \beta_2 d_{\text{haven},i} \times d_{\text{rltn},i} \\
+ \gamma_0 \ln(NRnumber_i) + \gamma_1 \ln(assets_i) + \gamma_2 (\ln(assets_i))^2 \\
+ industryFE_i + provinceFE_i + \varepsilon_i
\]  

The dependent variable is the dummy variable of positive taxable income. The explanatory variable \( d_{\text{rltn}} \) represents the relationship-related characteristic. In the following, two strategies are used. In the first strategy, \( d_{\text{rltn}} \) represents the Type I relationship dummy, which is equal to one if the Canadian reporting corporation reports non-arm’s length transactions with at least one Type I non-resident and is equal to zero otherwise. The interaction between the haven dummy and the Type I relationship dummy is introduced in order to investigate whether corporations with at least one Type I non-resident have a different shifting pattern than do other corporations.

The PROBIT results are shown in Panel A of Table 3-11. In most specifications, having at least one Type I non-resident in non-arm’s length transactions significantly decreases the possibility for a Canadian corporation to report positive adjusted taxable
income in Canada by three to six percent. When controlling for the existence of Type I non-residents, the marginal effect of a haven dummy ranges from -4 to -6 percent on adjusted taxable income. In the specifications with interaction terms between the haven dummy and the Type I relationship dummy, the degree of significance of the coefficients on the haven dummy is reduced; and, they all have the expected signs. The coefficients on the interaction term are negative, which suggests that the effect on taxable income of the haven dummy through the existence of Type I non-residents in non-arm’s length transactions is negative. In the specification without controlling for public corporation status, having at least one haven non-resident in the transactions through the existence of Type I non-residents reduces adjusted taxable income by six percent.

The second strategy focuses on the Type II relationship, where \(d_{rltn}\) represents the Type II relationship dummy, which is equal to one if the Canadian reporting corporation reports non-arm’s length transactions with at least one Type II non-resident and is equal to zero otherwise. This strategy is used to reveal the possible influence on income-shifting behaviour of having at least one Type II non-resident. The results are reported in Panel B of Table 3-11. In most specifications, the effect of having at least one Type II non-resident in non-arm’s length transactions on the possibility of reporting positive taxable income is insignificant and negative. The marginal effect of having at least one haven non-resident in the transactions is significantly negative, ranging from -6 to -10 percent. The haven effect through the existence of Type II non-residents in the transactions is positive, which is opposite of the effect found with the Type I relationship dummy. In the specification including the interaction term between the haven dummy and
the Type II relationship dummy, the possibility of reporting positive adjusted taxable income in Canada increases by six to eight percent.

The preceding results show that, when being examined separately, the effects of the haven dummy through the existence of the Type I and Type II non-residents in non-arm’s length transactions have opposite signs. However, it would be dangerous to conclude that the different shifting patterns are related to the type of relationship that a Canadian corporation has with its non-residents. One important piece of information missing in our data set is the nationality of the ultimate parents of the Canadian T106 filers. Therefore, we cannot know the tax rules of foreign income\(^{40}\) in the control countries, which information may have an influential impact on multinational enterprises’ income-shifting incentives and patterns. If Canadian T106 filers with parents from certain types of countries are more likely to have non-arm’s length transactions with Type I non-residents and the T106 filers with parents from other types of countries are more likely to report transactions with Type II non-residents, then the correlation shown here between the shifting pattern and the relationship type that a Canadian corporation has with its non-residents is biased due to the omitted variable(s). In other words, if we were to possess the information regarding the tax rules of foreign income in the countries of ultimate parentage and then control for this information in the regressions, then the aforementioned correlation may not hold.

\(^{40}\) Generally, the rules of taxing foreign income can be divided into three categories: credit system; exemption system; and a combination of the two. The credit system taxes corporations’ foreign income by offering credits equal to the foreign taxes paid on that income. The credits are limited to the total tax liabilities that corporations would have paid on the same amount of corporate income in the home countries. Under the exemption system, corporations’ foreign income is exempt from domestic corporate income taxes. Some countries combine the two systems by exempting income from certain countries and granting foreign tax credits to income from other countries.
3.7.4 Estimation results for the subsamples

This subsection estimates the benchmark model for several subsamples to search for evidence of income shifting in different corporations.

3.7.4.1 Corporations with zero versus positive loss opening balances

The benchmark model is estimated separately for corporations with zero loss opening balances\footnote{Loss opening balance refers to the loss balance at the beginning of a given taxation year. It is a stock variable. The difference in its values from the previous year reflects claims of carried-forward (or carried-back) losses and losses that happen in the previous taxation year.} and those with positive balances. Losses in a given taxation year can be carried forward for up to seven years or carried back for up to three years. Corporations with positive loss balances at the beginning of a taxation year can use these losses to reduce taxable income. The flexibility of using losses to reduce taxable income may affect a corporation’s incentive to shift income. We would expect to observe that the existence of haven non-residents has a stronger effect on taxable income in corporations with zero loss opening balances than in the corporations with positive balances.

The OLS and PROBIT results are reported in Table 3-12 and Table 3-13, respectively. Panels A and B in Table 3-12 show the results for corporations with positive and zero loss opening balances, respectively. In Panel A, three specifications consistently indicate that the effect of having non-arm’s length transactions with haven non-residents on the adjusted taxable incomes for corporations with positive loss opening balances is not statistically different from zero. In specification 3, the interaction term of the haven dummy with the public corporation dummy does not show any significant effect on
adjusted taxable income. As a comparison, results in Panel B indicate that the haven dummy has a significantly negative effect on adjusted taxable income. The results in specifications 1 and 2 imply that the adjusted taxable income ratio of corporations with haven non-residents in non-arm’s length transactions is 0.02 lower than that of corporations without haven non-residents in the transactions. In specification 3, the interaction term of the haven dummy with the public corporation dummy is included. Its coefficient is -0.035 (significant at the five percent level), suggesting that the effect of the haven dummy in public corporations is to reduce income-to-asset ratio by 0.035 relative to that in non-public corporations. The combined coefficient of the haven dummy and the interaction term is -0.05 (significant at the one percent level).

The PROBIT results shown in Table 3-13 indicate that the presence of haven non-residents significantly reduces the possibility of reporting positive adjusted taxable incomes by seven to nine percent in corporations with zero loss opening balances. However, the effect of the haven dummy is inconsistent across the three specifications reported in Panel A for corporations with positive loss opening balances. The haven dummy’s coefficient in the benchmark case in column 1 is significantly negative; however, its magnitude is lower than its counterpart for corporations with zero loss opening balances. In specification 3, as the coefficient on the interaction term shows, the haven dummy has significantly negative effect on taxable income for public corporations.

The difference between the effect of haven dummy in the corporations with positive loss opening balances and that in the corporations with zero balances is consistent with the analytical effect of losses on the incentives to shift income. Having non-arm’s
length transactions with haven non-residents significantly reduces Canadian reported taxable income of corporations with zero loss opening balances, but does not reduce that of corporations with positive balances. Further, the presence of non-arm’s length transactions with haven non-residents significantly reduces the possibility of reported positive adjusted taxable income in corporations with zero balances; however, the results are mixed for corporations with positive balances.

If the loss opening balance is exogenous to income-shifting decisions, then the results of this exercise strengthen the evidence of income shifting. However, the possibility that the loss opening balance is endogenous to income-shifting decisions cannot be ruled out. If the positive loss opening balances are the result of the income-shifting behaviour in the previous taxation year(s), then current taxable income and whether to have non-arm’s length transactions with haven non-residents in the current taxation year may both be related to previous income-shifting behaviour. A panel data set is required to sort out this problem.

3.7.4.2 Non-financial non-manufacturing, financial and manufacturing corporations

Income-shifting effect is examined the in three exclusive subsamples: non-financial non-manufacturing corporations; financial corporations; and manufacturing corporations. Manufacturing corporations face a lower corporate income tax rate than do other corporations in Canada. Accordingly, their incentive to engage in international income shifting may be low relative to other corporations. As financial corporations are structured and regulated differently from other corporations, their behaviour may also be
distinct with regard to income shifting.

The estimation results of the three subsamples are shown in Table 3-14. Columns 1 through 3 show the results for non-financial non-manufacturing corporations, columns 4 through 6 show the results for financial firms and columns 7 through 9 do so for manufacturing firms. In the results, the haven dummy shows a significantly negative effect on adjusted taxable income in all non-manufacturing corporations; it shows an insignificant effect in manufacturing corporations. For non-financial non-manufacturing firms, having non-arm’s length transactions with at least one haven non-resident significantly decreases the ratio of adjusted taxable income to total assets by 0.017 in the specification without controlling for a public corporation dummy. In the specification that incorporates a public corporation dummy, the coefficient on the haven dummy is still negative but becomes insignificant. In the third specification, the interaction between the haven dummy and the public corporation dummy is considered. The result shows that the haven dummy has a negative and insignificant impact on adjusted taxable income through public corporations. However, the estimate of the linear combination of the coefficient on the haven dummy and the coefficient on the interaction term is -0.024, which is statistically significant.

For financial corporations, having at least one haven non-resident with whom to do non-arm’s length transactions reduces their ratio of adjusted taxable income to total assets by 0.015 in the two specifications without the interaction of the haven dummy with the public corporation dummy. Controlling for the interaction term, the joint haven dummy effect is significant at -0.029.
Different from the results of non-financial non-manufacturing corporations and financial corporations, the effect of the haven dummy in manufacturing firms is not significantly different from zero. These results differ from the results in Grubert and Mutti (1991), Harris et al. (1993) and Huizinga and Laeven (2005), who all find significant evidence for income shifting in manufacturing corporations.

The preferential tax rate on manufacturing corporations in Canada could be an explanation for the difference between this and the aforementioned studies. Grubert and Mutti (1991) and Harris et al. (1993) examine U.S. manufacturing corporations, while Huizinga and Laeven (2005) use data from European corporations. Unlike the U.S. and most European industrialized countries, the Canadian government imposes a lower corporation tax rate on manufacturing and processing income (M&P). In the literature, Hoffman (2001) is the only study that examines income shifting in manufacturing corporations using Canadian data. His results are more comparable with mine since we both look at Canadian corporations. His results are mixed. In the results of his first empirical model, in which the key explanatory variable is the country dummy interacting with the tax differential variable, the results are mixed and there is no evidence that the income-shifting behaviour of manufacturing corporations is significantly different from that of non-manufacturing corporations. The results of his second empirical model, in which the key explanatory variable is a set of locational dummy variables, show that there is no evidence for income shifting in manufacturing corporations, while non-manufacturing corporations show support for income shifting. The results of my

42 In 2001, the federal corporate tax rate on M&P is 7 percent lower than the general rate, which is 28 percent. Some provinces and territories also impose a preferential rate on M&P.
approach with regard to manufacturing corporations are consistent with the results of the second empirical model in Hoffman (2001).

3.7.4.3 Public versus private corporations

The data set allows us to look at public and private corporations separately. There are 1440 public corporations and 7063 private corporations in the working sample.

The estimation results in Table 3-15 suggest that public corporations are more involved in income shifting than are the private corporations. Having non-arm’s length transactions with haven non-residents has a significantly negative impact on the adjusted taxable income ratio for public corporations. Depending on specifications, the coefficients on the haven dummy vary from -0.026 to -0.033. Contrary to the results of public corporations, the coefficients of the haven dummy are insignificant in all three specifications for the private corporations; however, the signs remain negative.

One interesting result is that the size of the haven effect on the adjusted taxable income ratio is noticeably larger for public corporations than it is for the entire working sample. In the case of the benchmark model, the coefficient on the haven dummy for public corporations is almost two times larger than the coefficient for the whole sample. These results suggest that income-shifting gains are larger for public corporations.

Hoffman (2001) offers different results from the above analysis of the haven effects in public versus private corporations. He finds that private corporations provide stronger evidence for income shifting than do public corporations with the use of two different
empirical models. The special tax regime favoring Canadian-controlled private corporations (CCPCs) may provide an explanation for this disparity. CCPCs receive a small business tax deduction that lowers the net federal tax rate to 12 percent on the first $200,000 of annual business income (compared to the general federal tax rate of 28 percent). It is interesting that all of the private corporations in the data sample that Hoffman (2001) presents have foreign parent corporations. Hence, they are not CCPCs and are therefore not eligible for the preferential tax rate extended to CCPCs. The working sample of my study includes 7063 private corporations, 2446 of which are CCPCs. Facing a lower rate in Canada, the CCPCs may have less incentive to shift income to other low-tax regions than do other private corporations. The difference in the results of private corporations between Hoffman (2001) and this study is consistent with the difference in incentives to shift income according to different tax regimes.

3.7.5 Economic issues

All of the evidence so far is indirect with regard to the “under-reporting” of taxable income for the corporations that have haven non-residents. Next, the question of whether or not there are other interpretations for the findings apart from that of income shifting will be addressed.

First, the results may be affected by transitory macroeconomic factors. If foreign countries in which the non-residents with whom Canadian corporations have non-arm’s length transactions reside experience temporary changes in economic performance and changes in exchange rates, then this might have a large impact on Canadian corporations’
profits. To test whether the results of 2001 are driven by transitory macroeconomic changes, we could run the same regression as in equation (4) using data one year (or two years) before and one year (or two years) after 2001. If a negative effect of the haven dummy is observed in other years as well, then we can conclude that the results are not driven by transitory macroeconomic factors. To complete this exercise, data are needed for the years prior to and following 2001.

Second, if both the dependent variable of taxable income and the haven dummy are related to an unobservable variable of corporation profitability, then the estimation results will be biased. The endogeneity issue will be discussed in the next section.

Third, if a corporation’s profitability related to the locations of the parent corporation and all the subsidiaries under the same multinational enterprise (MNE), then the locations of the parent and the subsidiaries should be controlled for in the estimating equation; otherwise, the results might be biased. The coefficient on the new location variable would reveal information regarding whether or not a corporation’s income is related to the locations of the other entities under the same MNE. Unfortunately, the required data are not available.

Finally, the results might be influenced by the scale economies embedded in multinationals. According to the international theory, having subsidiaries abroad brings multinationals access to larger markets, increases the returns on some intangible assets and, therefore, increases multinational profits. In my empirical specifications, only two variables—the number of non-residents with whom Canadian corporations report non-
arm’s length transactions and the industry dummy variables—might be related to the
economic scale. However, the number of non-residents is a poor measure because what
matters here is the magnitude of the intangibles of a MNE—not the number of entities
under the same MNE. The number of non-residents would only be a close substitute for
the number of entities. Therefore, the estimation results quite possibly capture scale
economies. However, the negative coefficient on the haven dummy is unambiguous
evidence of income shifting.

3.8 Endogeneity Issue

This section discusses the possibilities, consequences and possible solutions of the
endogeneity issue, though not directly testing it.

The econometric strategy for the above results is based on the assumption that the
location decision of a non-resident in a non-arm’s length transaction is exogenous and is
unrelated to income-shifting decisions. The assumption’s degree of strength depends on
the nature of non-arm’s length transactions (i.e., how easily the transactions may be
manipulated for income shifting purposes). However, it is a reasonable assumption that
the location decision of a non-resident in a non-arm’s length transaction is more likely to
be endogenous than is the investment location decision. If corporations with high
profitability are more likely to pick haven non-residents to make transactions in order to
shift income out of Canada (resulting in lower reported Canadian taxable income), then
our results would be underestimated.

The endogeneity problem would also be caused if the non-residents’ locations in
non-arm’s length transactions and Canadian reported taxable income are both related to an omitted variable of a corporation’s profitability. For example, immature corporations tend to have lower return rates than do the mature ones.⁴³ If, for some reason, immature corporations also tend to have non-arm’s length transactions with haven non-residents, then the causality would not be from the haven dummy to the taxable income; rather, it would be the firms’ maturity that causes both to change.

There are two ways to solve the endogeneity problem. First, a suitable proxy variable of the omitted variable could be found. For a discussion of corporation maturity, a good proxy variable is the corporation’s age. However, suitable proxy variables are unfortunately not always available. Second, the method of instrument variables (IV), or two stage least squares, could be used. Basically, we would need to develop a structural model of the joint decisions: which non-resident should be taken for the non-arm’s length transactions and how much income should be shifted. The model would then be estimated by a two stage least squares procedure. First, the haven dummy on independent variables and IVs is regressed; then, the predicted value of the haven dummy is used, which is meant to be purged of the unobserved correlation with corporation profitability in the equation of taxable income. The ideal instruments should have two characteristics: (1) it has no direct effect on the dependent variable; and (2) it must be directly correlated with the endogenous regressor. However, it should be noted that data difficulties may always be an obstacle when using this method.

⁴³ Grubert, Goodspeed, and Swenson (1993) detect the reasons for the low taxable income of foreign-controlled companies in the U.S. They find that younger companies have lower profits.
Two possible IVs will be discussed below; however, by no means, they are “ideal”. First, whether there is a controlled foreign affiliate (CFA) in a tax haven among the reported non-residents may be used as an IV for the existence of a haven non-resident; though, the information about whether or not a non-resident in non-arm’s length transactions is a CFA is not available in the current data set. If a Canadian corporation is going to make a transaction with a non-resident to shift income out of Canada and it has two haven non-residents to choose from, one being a CFA and the other a non-controlled foreign affiliate. As discussed in Section 3.7.3, due to the high management-associated shifting cost between loosely connected related parties, the Canadian corporation is expected to choose the haven CFA to make the transaction. Based on this analysis, we expect that the existence of transactions with a haven CFA is highly correlated with the existence of transactions with a haven non-resident. This could be empirically tested when data is available. On the other hand, the condition of exogeneity for an ideal IV might not be satisfied since the possibility cannot be completely ruled out that the existence of a CFA in a tax haven might be endogenous to corporations’ income-shifting strategies too. It is reasonable to assume that the foreign direct investment decisions should be less endogenous to a corporation’s annual income-reporting decision than its transaction decisions. Therefore, the dummy variable of whether there is at least one haven CFA in the reported non-residents might be a partial solution, but not a final solution, for IV.

The second idea is that, if a longitudinal data set is available, then the lagged value of the haven dummy may be used as an IV. Taking the lagged value of the endogenous
regressor as an IV is a commonly used strategy in addressing endogeneity issue in regressions of a panel database. First, it is assumed that the existence of transactions with a haven non-resident in the previous year is highly correlated with the existence of a haven non-resident in the current year. With the actual data set, this assumption cannot be tested. Second, the condition of exogeneity may be violated. If the income shifting (through transactions with haven non-residents) in the previous taxation year results in losses, then a corporation faces at least two choices to reduce its current-year taxable income: either claiming carried-forward losses or shifting income to low-tax countries. If the losses are carried-forward to reduce the current taxable income, then the IV is correlated to the dependent variable, and hence the exogeneity condition of IV is violated. However, this problem can be cleaned out by subtracting the claimed carried-forward losses from taxable income.

Restrained by data availability, the endogeneity problem is discussed without being actually fixed, which is left for future research.

3.9 Examinations on possible income-shifting channels

The preceding results are consistent with the hypothesis of income shifting, i.e., that non-arm’s length transactions with non-residents in tax havens shift profits out of Canada and reduce taxable income reported in Canada. In this section, the analytical focus shifts from taxable income to other financial measures in order to learn more about possible income-shifting channels. The financial measures to be examined include debt, interest expenses, R&D and administrative expenses, rental expenses, intra-firm sales and operating
expenses. In this section, I first look at the haven effect using the benchmark model in equation (4). Then I compare the haven effects in two groups: corporations with positive loss opening balances versus those with zero balances.

3.9.1 Haven effect

The estimation results of the benchmark model as specified in equation (4) using the aforementioned financial measures as the dependent variables, are reported in Table 3-16.44

Debt-shifting is one of the main shifting strategies that have been widely discussed. If a Canadian corporation wants to shift income out of Canada into a low-tax jurisdiction, then it may manipulate its financial structure by increasing the proportion of debt over equity since interest payments are deductible in Canada. As a result, the increase in reliance on debt should be observed. The empirical results of debt are shown in column 1 of Table 3-16. The dependent variable is debt-to-equity ratio. The results suggest that there is no significant effect of having at least one haven non-resident on Canadian corporations’ debts. The variable of debt used in these regressions measures debt to all parties—not just that between related multinationals. This may be one reason that the haven effect on the debt ratio is insignificant. If multinational corporations (MNCs) increase their internal financing in order to shift income to related parties in tax havens, meanwhile reducing their debt to other institutions, then we will not be able to observe higher debt ratios in the corporations that have non-arm’s length transactions with haven

44 The observations used for each specification are the observations between the 5th and 95th percentiles (inclusively) of the corresponding dependent variable. The same selection rule applies in the remaining exercises in this section.
non-residents. However, this idea cannot be tested with the current data because the current data do not allow me to distinguish the debt to related parties from the debt to other parties.

Columns 2 and 3 report the estimates using the ratio of interest expenses and interest income over total assets as the dependent variables. The analysis of interest expenses and interest income is related to the preceding analysis of debt. A MNC in a high-tax country is more likely to borrow money from (and less likely to lend money to) a foreign affiliate in a low-tax country in order to reduce its pre-tax profits reported in the high-tax country. The interest expenses (income) of the corporation should then be higher (lower) than those of corporations that do not have related parties in low-tax countries. The empirical results do not support debt shifting. The coefficient on interest expenses is significant. However, the sign is negative, and is hence the opposite of what is expected. The coefficient on interest income has the expected sign, though; further, it is insignificant and of small magnitude.

Under a multinational enterprise (MNE), R&D may be undertaken in one corporation with the products of such R&D being made available to all of the other corporations. The MNE may apply a transfer-pricing strategy to allocate the R&D expenses, hence minimizing the profits that would be subject to high tax rates and to minimize its global tax liabilities. If R&D is undertaken in a high-tax country, e.g., Canada, then the Canadian corporation would be underpaid; if the R&D is undertaken by other corporations in low-tax countries, then the Canadian corporation would overpay for what it purchases from the related parties. Empirically, the levels to which R&D activities
and R&D expenses are biased in high-tax countries are two different questions. Due to the data restriction, I cannot explore the former question. The dependent variable in column 4 is the sum of R&D and administrative expenses scaled by total assets; this is constructed to answer the second question. The results show that there is no significant income-shifting effect on R&D and administrative expenses in Canada.

The results of the ratio of rental expenses to total assets are shown in column 5. Rental expenses include expenses for real estate rentals and other rentals, such as equipment and machinery. The objective of this exercise is to examine whether there is an income-shifting effect on rental activities. The coefficient on the haven dummy is not statistically different from zero.

Column 6 reports the regression results of the ratio of intra-firm sales to total sales. Similar to R&D, a transfer pricing strategy may be used in the intra-firm transaction of goods and services. First, the corporations involved in income shifting may have more intra-firm sales than do those that are not thusly involved. On the other hand, a corporation in a high-tax country expects to be underpaid when it comes to intra-firm transactions in order to shift more profits out of the high-tax country. Therefore, it is not clear what income-shifting effect we should observe on intra-firm sales in a high-tax country. The estimation results suggest that there is no significant effect of having at least one haven non-resident.

Operating expenses are expenses incurred while carrying out a firm’s day-to-day activities. The aforementioned interest expenses, R&D and administrative expenses, and
rental expenses are the components of operating expenses. Therefore, following from the preceding analysis of these components, we would expect to see higher operating expenses in corporations that shift income out of Canada to haven non-residents. The empirical results in column 7 are consistent with this prediction. The results suggest that having at least one haven non-resident increases a Canadian corporation’s operating expenses scaled by total assets by 0.031.

Above all, I do not find strong evidence for possible income-shifting channels with the exception of operating expenses. Next, I will further search for evidence by examining the haven effect within different groups of corporations.

**3.9.2 Loss opening balance**

The model specified in equation (4) is regressed for each alternative financial variable—and separately in the corporations with positive loss opening balances and those with zero balances. Corporations with positive loss opening balances have the flexibility to carry forward losses in order to reduce their taxable income. Therefore, they may not have as strong an incentive to shift income to the related corporations in tax havens as do corporations with no losses to carry forward. The results for the corporations with positive and zero loss opening balances are reported in Panels A and B of Table 3-17, respectively.

As shown in column 1 of each panel, the haven dummy has a significant effect on debt–to-equity ratio in corporations both with and without losses to carry forward; however, their signs are opposite. Having non-arm’s length transactions with haven non-
residents reduces the debt-to-equity ratio of corporations with positive loss opening balances by 0.242, while the ratio increases by 0.232 for corporations with zero balances. These results are consistent with the hypothesis that corporations with zero losses to carry forward are more likely to shift income than are corporations with positive loss opening balances. By increasing their debt financing, the corporations have more interest payments to be deducted from their profits, which leaves them with lower taxable incomes.

The results in column 2 suggest that having haven non-residents in non-arm’s length transactions significantly reduces interest expenses scaled by total assets in corporations with positive loss opening balances, while an insignificant effect is found in corporations with zero loss opening balances. For both panels, column 3 shows that the haven dummy does not have a significant effect on interest income in either group of corporations.

The results in column 4 of the panels suggest that—among corporations with positive loss opening balances—when these corporations have non-arm’s length transactions with haven non-residents, they have lower ratios of R&D and administrative expenses over total assets than do those without such transactions; meanwhile, having haven non-residents does not have a significant effect on R&D and administrative expenses in corporations with zero loss opening balances. As shown in columns 5 and 6 of both panels, the effects of the haven dummy on rental expenses and intra-firm trade are not significantly different from zero in either group. In the case of operating expenses (shown in column 7 of both panels) the coefficients on haven dummy are positive but not significant in both corporation groups.
In this exercise, I test the possible income shifting channels separately for corporations with positive loss opening balances and those with zero balances. The results of debt-to-asset ratio, ratio of interest expenses to assets, and ratio of R&D to assets show support that there are different patterns of financial arrangements through these channels in order to shift income out of Canada to tax havens between the corporations with zero versus positive loss opening balances, but this is not the case with corporations with positive balances. The results are consistent with the difference in shifting incentive between the two groups of corporations due to their different status of loss opening balances.

3.10 Replication of Harris et al. (1993)

This section replicates Harris et al. (1993) model, which uses a different econometric methodology, looking for evidence of income shifting on tax liability. In Harris et al. (1993), the non-U.S. world is divided into 13 regions based on their geographical locations and tax rates relative to the U.S., and the coefficients on corresponding location dummies are estimated. The coefficient on a dummy of a high-tax location relative to the U.S. will supposedly be positive; the opposite sign is expected for the coefficient on a low-tax location dummy. In this study, Harris et al.’s model is employed; though, since Canadian data are used, the questions to ask are different: first, whether there is a negative relationship between having non-arm’s length non-residents in low-tax locations and lower Canadian tax liabilities, which, if found, would be proof of the haven effect displayed in the preceding results; and, second, whether there is evidence for income shifting in the opposite direction from high-tax regions into Canada.
Following Harris et al. (1993), the world is divided into regions with a few adjustments. In my exercise, South Africa is not treated separately from the whole Africa. Asia, (excluding the Four Dragons and Japan), Greater Australia (excluding Australia and New Zealand) and Antarctica are grouped into one region. In this exercise, countries categorized under “tax havens” differ from those in Harris et al. (1993) due to the different definitions of tax haven. The same 13 regions defined in Harris et al. (1993) are kept; however, the countries are grouped in corresponding regions based on their geographical locations and relative tax rates compared to Canada in this exercise.

The benchmark model in Harris et al. (1993) is

\[
\left( \frac{T_U}{S_U} \right)_{ft} = g^H d^H_{ft} + g^L d^L_{ft} + \varepsilon_{ft}
\]

For this replication exercise, the dependent variable is the tax liability in Canada, \(T_U\), scaled by total assets, \(S_U\). \(f\) and \(t\) are firm and time subscripts, respectively; \(d^H_{ft}\) and \(d^L_{ft}\) are vectors of dummy variables indicating firm \(f\) ’s presence in various high- and low-tax regions, respectively. \(\varepsilon_{ft}\) is the error term following normal distribution.

In Harris et al. (1993), seven other independent variables are incorporated in certain specifications. As discussed in section 3.3 of Model Development, these variables may be correlated to income-shifting behaviour. I replicate their benchmark model without incorporating these control variables.

Harris et al. (1993) uses a data set of manufacturing public corporations. To make
the results from my replication exercise comparable to those from Harris et al. (1993), regressions are run on selected samples of public corporations.

The first column in Table 3-18 copies the results in Harris et al. (1993) from column 2 of Table 8.4. The numbers in brackets are t-ratios. The dependent variable is the U.S. federal tax per dollar of U.S. assets. The number of valid observations of the 200 corporations over the five sample years (1984-1988) is 475. In their results, the dummy variables for the high-tax regions—Japan, high-tax Europe and South Africa—all have significant positive coefficients, while the coefficients on the dummy variables for the three low-tax regions—the Four Dragons, Ireland and tax havens—are significantly negative.

The replication results are summarized in columns 2 through 5. The estimates on low-tax Europe and tax havens have right signs and are significant in all four reported specifications. The results suggest that having non-arm’s length transactions with a non-resident in the low-tax Europe region or in a tax haven will decrease the tax-to-asset ratio by about 0.01. The coefficients on Ireland have the expected negative sign; and, they are insignificant in three out of the four reported specifications. The effect of having non-arm’s length transactions with an Ireland non-resident on the tax-to-asset ratio is ranged from -0.006 to -0.014. The exception is the specification in column 4, which controls for both the industry and province fixed effects of public corporations. The U.S. shows a positive effect in public manufacturing corporations, which finding is not consistent with
the prediction based on the relative position of the Canadian tax rate in 2001. The replication results show empirical evidence for income shifting in Canadian corporations to tax havens and to low-tax Europe.

Different from the results in Harris et al. (1993), the dummy variables for the two high-tax regions—Japan and high-tax Europe—do not have significant coefficients. The replication results do not show any evidence for income being shifted into Canada from high-tax regions.

3.11 Model improvements

The empirical model employed has been simplified due to data limitations. There are some further improvements could be made on the model if the data allow.

First, the data set used does not provide information with regard to a complete structure of the multinational enterprise (MNE) to which the Canadian corporations in our data set belong. Only the related non-residents that have non-arm’s length transactions in 2001 with Canadian corporations appear in our data set. The corporations that do not make transactions in the taxation year are not observed in our data set. This limitation is inherent to this data set. Therefore, information regarding ownership structure has to be obtained from new sources.

With the information of ownership structure, we have several options. First, the country of residence of the parent company may have an influence on the income-shifting

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45 In my data set, the average statutory corporate tax rate between 2001 and 2002 is 39.65 percent in the U.S. and 41.41 percent in Canada.
strategies among the entities in a MNE—and hence on the profits of the entities. Different countries employ different tax rules on foreign income to avoid double taxation. The various tax rules basically fall into three categories: credit system; exemption system; and a combination of the two (see footnote 40). If there are two otherwise identical corporations except that one has a parent in a country with the credit system, and the other has a parent in a country with the exemption system, we would expect the latter corporation to be involved in more income shifting (directly or indirectly) to the parent company. The incentive to shift income back to the parent company in a country with the exemption system should be higher because the income shifted to the parent may be exempted from domestic taxes. Secondly, the locations of the other entities may affect the profitability of the corporations in the study. For example, if a Canadian corporation has a foreign affiliate that has access to a rich human resource and there are positive externalities to the Canadian corporation, then the Canadian corporation should have higher profits. Therefore, the ownership structure information should be controlled for in the estimating model.

Second, we do not have financial information of the non-residents with whom Canadian corporations have non-arm’s length transactions. My empirical strategy only distinguishes non-residents in tax havens from those in non-tax-haven countries—assuming their income-shifting incentive is not influenced by their operation size or profitability. This assumption is merely a simplification of the real world. If the financial situation of the non-residents is relevant to the income-shifting potential of the Canadian corporations, then the variable measuring their financial situation should be incorporated
Third, quality data on neither domestic nor foreign investment is available. As analyzed in Chapter 2, the income-shifting decisions and investment decisions made by multinational corporations are interactive. Focusing on any one of the two while ignoring the other will lead to biased results, which will in turn mislead tax policies. To explore how the two types of activities interact, it is important to observe investment by location. The aggregated data on multinationals’ global investments is not useful here.

Perhaps due to the data difficulty, there are very few empirical studies that take into account the interaction between investment and income-shifting decisions. Grubert and Slemrod (1998) and Desai, Foley and Hines (2004) are two pioneer studies. Grubert and Slemrod (1998) find that the income-shifting advantages are the predominant reason for U.S. corporations to decide whether or not to invest in Puerto Rico. Desai et al. (2004) show evidence that an increasing likelihood of establishing a tax haven affiliate is associated with the growth of sales and investment by non-haven affiliates. More empirical work based on quality data is needed in order to help us understand the underlying relationship between income shifting and investment decisions. This will be an interesting area for future research.

3.12 Conclusion

Using unique firm-level cross-sectional data of 2001 on Canadian corporations’ non-arm’s length transactions with non-residents, this paper investigates international income-shifting behaviour in Canadian corporations. Canadian adjusted taxable income
scaled by total assets is regressed on a haven dummy, capturing the existence of a haven non-resident with whom a Canadian corporation has non-arm’s length transactions. The haven dummy represents the potential opportunities to shift income out of Canada to low-tax regions. The results show that having non-arm’s length transactions with a haven non-resident has a negative effect on Canadian corporations’ income-to-asset ratio. For the benchmark specification, the reduction effect on the income-to-asset ratio is 0.012. The result implies about an $11 million gain in taxable income at the level of an average corporation that has haven non-residents if the haven connections in the non-arm’s length transactions are eliminated.

Other main findings include: 1) having non-arm’s length transactions with small haven non-residents shows a significantly negative effect on taxable income, while having transactions with large tax havens does not show any reduction effect on taxable income; 2) Canadian corporations with at least one controlled non-resident in non-arm’s length transactions are more likely to report lower taxable income in Canada than are those without at least one such resident; and 3) estimating the model for several subsamples yields findings of, first, the haven dummy has a stronger effect in corporations with zero loss opening balances than in those with positive balances; second, no haven effect in manufacturing corporations, while negative haven effects are found in non-manufacturing corporations; third, the haven dummy has a significant negative effect on taxable income in public corporations, while there is no significant effect in private corporations.

The cross-sectional analysis and data limitations limit the explanatory power of
the results. The possibility that the results are driven by transitory macroeconomic factors and multinational enterprise characteristics (e.g., the locations of the parent corporations and subsidiaries) cannot be ruled out due to the data limitations. The endogeneity problem—which stems from the possibility that the dependent variable and whether to have a haven non-resident are both related to an unobservable variable—is discussed without being actually tested. Finally, even though the influence of scale economies on the results cannot be ruled out, the significant negative coefficient on the haven dummy is unambiguous evidence for income shifting. Therefore, it is safe to say that the estimation results provide (at least to some extent) evidence of income shifting in Canadian corporations.

Possible income-shifting channels are also examined. The results show that having a haven non-resident is correlated with a higher debt-to-equity ratio and higher operating expenses, while no effect is observed on R&D and intra-firm sales.

The results of the replication of Harris et al. (1993) show evidence for income shifting in Canadian corporations to tax havens and to low-tax Europe, while there is no evidence for income shifting from high-tax regions to Canada.

The data collected from Form T106 is unique for an examination of income shifting since it provides information about related parties in cross-border non-arm’s length transactions—the area in which the transfer pricing strategy is mainly applied. However, the restrictions of this data are also significant. This data records non-residents that make non-arm’s length transactions with Canadian corporations over the study’s time period.
The other related corporations under the same MNE with the Canadian corporation are not observable in this data because no transaction is carried out with them. As a result, this data does not provide enough information in order to construct a complete ownership structure of a MNE. Due to this restriction, we are not able to identify the ultimate parents. Therefore, any idea relying on identifying the country of control, such as the effect of the country of control on income-shifting behaviour, is not feasible.

This data also does not provide non-residents’ financial and taxation information. The size of the foreign operations may affect their potential to shift income in or out and their income-shifting costs. Information on the profitability and tax liability of those non-residents is also important in order to analyze the impact of Canadian corporations’ income-shifting behaviour. Finally, without the data on investment by location, we are not able to detect the interaction between income shifting and investment decisions. These interesting topics are left for future research.
3.13 Appendix: Tax havens

The following table lists tax havens defined in this study. In the columns 3 through 5, I show the information of the two components of the tax haven definition. In column 3, the OECD tax havens are labeled by “unco”, “outside”, or “harmful”, which indicate, respectively, countries being uncooperative, non-OECD tax haven countries, and OECD countries with harmful tax competitions in OECD 2000 report. Columns 4 and 5 show the statutory tax rates in 2001 and the preferential tax rates over the 2000-2004 period. For comparison, in columns 7 through 9, I also include tax havens from other 3 references: Hines and Rice (1994), Michael Hoffman (2001), and Diamond and Diamond (2002).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-treaty countries (36)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Andorra</td>
<td>unco</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Anguilla</td>
<td>outside</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Antigua and Barbuda</td>
<td>outside</td>
<td>40.00%</td>
<td>0.00%</td>
<td>S</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>4</td>
<td>Aruba</td>
<td>outside</td>
<td>39.00%</td>
<td>0.00%</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Bahamas</td>
<td>outside</td>
<td>0.00%</td>
<td>0.00%</td>
<td>S</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>6</td>
<td>Bahrain</td>
<td>outside</td>
<td>0.00%</td>
<td>0.00%</td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>7</td>
<td>Belize</td>
<td>outside</td>
<td></td>
<td></td>
<td>S</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>8</td>
<td>Bermuda</td>
<td>outside</td>
<td>0.00%</td>
<td>0.00%</td>
<td>S</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>9</td>
<td>British Virgin Islands</td>
<td>outside</td>
<td>15.00%</td>
<td>0.00%</td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>10</td>
<td>Cayman Islands,</td>
<td>outside</td>
<td>0.00%</td>
<td>0.00%</td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>11</td>
<td>Channel Islands, Guernsey</td>
<td>outside</td>
<td>20.00%</td>
<td>0.00%</td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>12</td>
<td>Channel Islands, Jersey</td>
<td>outside</td>
<td>20.00%</td>
<td>0.00%</td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>13</td>
<td>Cook Islands</td>
<td>outside</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>14</td>
<td>Dominica</td>
<td>outside</td>
<td></td>
<td></td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>15</td>
<td>Gibraltar</td>
<td>outside</td>
<td>35.00%</td>
<td>0.00%</td>
<td>S</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>16</td>
<td>Grenada</td>
<td>outside</td>
<td></td>
<td></td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>17</td>
<td>Isle of Man</td>
<td>outside</td>
<td>15.00%</td>
<td>0.00%</td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>18</td>
<td>Liberia</td>
<td>unco</td>
<td></td>
<td></td>
<td>L</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>19</td>
<td>Liechtenstein</td>
<td>unco</td>
<td>20.00%</td>
<td>0.00%</td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>20</td>
<td>Macau</td>
<td></td>
<td>15.00%</td>
<td>0.00%</td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>21</td>
<td>Marshall Islands</td>
<td>unco</td>
<td></td>
<td></td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>22</td>
<td>Mauritius</td>
<td>outside</td>
<td>25.00%</td>
<td>15.00%</td>
<td>L</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>23</td>
<td>Monaco</td>
<td>unco</td>
<td>33.33%</td>
<td>10.00%</td>
<td>S</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Country</td>
<td>Outside</td>
<td>Treaty</td>
<td>Treaty countries (9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>--------------------------</td>
<td>----------</td>
<td>--------</td>
<td>---------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Montserrat</td>
<td>outside</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Nauru</td>
<td>outside</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Netherlands Antilles</td>
<td>outside</td>
<td>S</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Niue</td>
<td>outside</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Panama</td>
<td>outside</td>
<td>L</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>St. Kitts and Nevis</td>
<td>outside</td>
<td>S</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>St Lucia</td>
<td>outside</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>St Vincent and the</td>
<td>Grenadines outside</td>
<td>S</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Seychelles</td>
<td>outside</td>
<td>S</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Turks and Caicos</td>
<td>outside</td>
<td>0.00 %</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>United Arab Emirates</td>
<td></td>
<td>0.00 %</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Vanuatu</td>
<td>outside</td>
<td>S</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Virgin Islands (U.S.)</td>
<td>outside</td>
<td>38.50 %</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Barbados</td>
<td></td>
<td>37.50 %</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Cyprus</td>
<td>outside</td>
<td>28.00 %</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Hungary</td>
<td></td>
<td>28.00 %</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Iceland</td>
<td></td>
<td>18.00 %</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Ireland</td>
<td>harmful</td>
<td>16.00 %</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Luxembourg</td>
<td>harmful</td>
<td>30.38 %</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Malaysia</td>
<td></td>
<td>28.00 %</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Malta</td>
<td>outside</td>
<td>35.00 %</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Singapore</td>
<td></td>
<td>24.50 %</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

1. In the OECD haven list in column 3, ‘unco’ stands for unco-operative tax havens; ‘harmful’ for identified countries with harmful tax competition; and ‘outside’ are the tax haven countries outside OECD.
2. In column 6, “S” stands for “small haven” while “L” stands for “large haven”. Following Hines and Rice (1994), small havens are the countries that have population less than one million.
3. In Hines and Rice (1994), additional tax havens include Jordan and Lebanon.
4. In Hoffman (2001), additional tax havens include Djibouti, Lebanon, and Western Samoa.
Table 3-1 Financial profile of corporations filed T106 relative to corporations filed T2

<table>
<thead>
<tr>
<th></th>
<th>Corporation filed T2</th>
<th>Corporations filed T106</th>
<th>Percentage ((2)/(1))*100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total assets</td>
<td>$9438.39</td>
<td>$3183.65</td>
<td>34 %</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$124.71</td>
<td>$52.93</td>
<td>42 %</td>
</tr>
<tr>
<td>Tax payable</td>
<td>$32.42</td>
<td>$14.09</td>
<td>43 %</td>
</tr>
<tr>
<td>Observation</td>
<td>1,363,947</td>
<td>11,425</td>
<td>0.84 %</td>
</tr>
</tbody>
</table>

Note: Form T106 collects information about non-arm’s length transactions with non-residents. Form T2 is used for corporate income tax return. Corporations filed T106 are a subsample of T2 filers. Dollar amounts are in billions.
<table>
<thead>
<tr>
<th>Corporation characteristics</th>
<th>Percentage of corporations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private corporation</td>
<td>81 %</td>
</tr>
<tr>
<td>Public corporation</td>
<td>17 %</td>
</tr>
<tr>
<td>Other corporation</td>
<td>2 %</td>
</tr>
<tr>
<td>Corporations with positive taxable income</td>
<td>52 %</td>
</tr>
<tr>
<td>Corporations with positive adjusted taxable income</td>
<td>63 %</td>
</tr>
<tr>
<td>Corporations with positive loss opening balance</td>
<td>52 %</td>
</tr>
<tr>
<td>Corporations with at least one haven non-resident in non-arm’s length transactions</td>
<td>16 %</td>
</tr>
<tr>
<td>Corporations with at least one small haven non-resident in non-arm’s length transactions</td>
<td>11 %</td>
</tr>
<tr>
<td>Corporations with at least one Type I non-resident in non-arm’s length transactions</td>
<td>29 %</td>
</tr>
<tr>
<td>Corporations with at least one Type II non-resident in non-arm’s length transactions</td>
<td>48 %</td>
</tr>
<tr>
<td>Corporations with at least one Type III non-resident in non-arm’s length transactions</td>
<td>55 %</td>
</tr>
</tbody>
</table>

**Note:**
Adjusted taxable income is taxable income adjusted for carried-forward losses. Loss opening balance is the balance of corporation losses at the beginning of taxation year. A Canadian corporation has Type I relationship with its non-resident if it controls the non-resident; Type II relationship if it is controlled by the non-resident; and Type III relationship if it is in neither of the above two cases.
Table 3-3 Distribution of corporations across industries

<table>
<thead>
<tr>
<th>Industry</th>
<th>Percentage of corporations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Agriculture, Forestry, Fishing and Hunting</td>
<td>0.8%</td>
</tr>
<tr>
<td>2 Mining and Oil and Gas Extraction</td>
<td>3.5%</td>
</tr>
<tr>
<td>3 Utilities</td>
<td>0.5%</td>
</tr>
<tr>
<td>4 construction</td>
<td>2.4%</td>
</tr>
<tr>
<td>5 Manufacturing</td>
<td>25.3%</td>
</tr>
<tr>
<td>6 Wholesale Trade</td>
<td>19.9%</td>
</tr>
<tr>
<td>7 Retail Trade</td>
<td>2.5%</td>
</tr>
<tr>
<td>8 Transportation and Warehousing</td>
<td>2.7%</td>
</tr>
<tr>
<td>9 Information and Cultural Industries</td>
<td>3.3%</td>
</tr>
<tr>
<td>10 Finance and Insurance</td>
<td>7.9%</td>
</tr>
<tr>
<td>11 Real Estate and Rental and Leasing</td>
<td>5.3%</td>
</tr>
<tr>
<td>12 Professional, Scientific and Technical Services</td>
<td>9.5%</td>
</tr>
<tr>
<td>13 Management of Companies and Enterprises</td>
<td>9.1%</td>
</tr>
<tr>
<td>14 Other Services</td>
<td>6.1%</td>
</tr>
<tr>
<td>15 Unknown</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

Note:
Industries are defined according to North American Industry Classification System (NAICS) two-digit codes with the exception of the Other Services, which consists of seven NAICS two-digit industries, for example, health care and social assistance, accommodation and food services, and so on.
The corporations in the last category of Unknown did not specify their industries in their corporate income tax returns. Among them, there are some corporations operating businesses in multiple industries.
<table>
<thead>
<tr>
<th>Provinces and Regions</th>
<th>Percentage of corporations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Atlantic Provinces</td>
<td>2.7%</td>
</tr>
<tr>
<td>2 Quebec</td>
<td>10.6%</td>
</tr>
<tr>
<td>3 Ontario</td>
<td>36.8%</td>
</tr>
<tr>
<td>4 Prairie Provinces</td>
<td>1.6%</td>
</tr>
<tr>
<td>5 Alberta</td>
<td>6.0%</td>
</tr>
<tr>
<td>6 British Columbia</td>
<td>11.8%</td>
</tr>
<tr>
<td>7 Territories</td>
<td>0.2%</td>
</tr>
<tr>
<td>8 Multiple Jurisdictions</td>
<td>29.2%</td>
</tr>
<tr>
<td>9 Nova Scotia and Newfoundland Offshores</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

Note:
Atlantic Provinces include Newfoundland, Prince Edward Island, Nova Scotia, and New Brunswick. Prairie Provinces include Manitoba and Saskatchewan. Territories include Northwest Territories and Yukon Territories. Multiple Jurisdictions refer to corporations operating businesses in more than one jurisdiction.
Table 3-5 Statistics of the main financial variables for corporations with haven non-residents versus corporation without haven non-residents in non-arm’s length transactions

<table>
<thead>
<tr>
<th></th>
<th>Whole sample</th>
<th>Corporations without haven non-residents in non-arm’s length transactions</th>
<th>Corporations with haven non-residents in non-arm’s length transactions †</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average total assets (millions)</td>
<td>228</td>
<td>99</td>
<td>899</td>
</tr>
<tr>
<td>Debt/assets</td>
<td>0.535</td>
<td>0.55</td>
<td>0.447</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(0.075)</td>
<td></td>
</tr>
<tr>
<td>Net income/assets</td>
<td>0.024</td>
<td>0.016</td>
<td>0.064</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.048)</td>
<td></td>
</tr>
<tr>
<td>Taxable dividends deducted</td>
<td>0.024</td>
<td>0.020</td>
<td>0.039*</td>
</tr>
<tr>
<td>/assets</td>
<td>(0.004)</td>
<td>(0.009)</td>
<td></td>
</tr>
<tr>
<td>Carried-forward losses/assets</td>
<td>0.017</td>
<td>0.018</td>
<td>0.011</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.009)</td>
<td></td>
</tr>
<tr>
<td>Taxable income/assets</td>
<td>0.071</td>
<td>0.074</td>
<td>0.053*</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.008)</td>
<td></td>
</tr>
<tr>
<td>Adjusted taxable income/assets</td>
<td>0.087</td>
<td>0.092</td>
<td>0.064*</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.014)</td>
<td></td>
</tr>
<tr>
<td>Total tax payable/assets</td>
<td>0.019</td>
<td>0.020</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.003)</td>
<td></td>
</tr>
<tr>
<td>Prob(Adjusted taxable income&gt;0)</td>
<td>0.631</td>
<td>0.641</td>
<td>0.581*</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.014)</td>
<td></td>
</tr>
<tr>
<td>Observation</td>
<td>8679</td>
<td>7270</td>
<td>1409</td>
</tr>
</tbody>
</table>

**Note:**

Adjusted taxable income is taxable income adjusted for carried-forward losses.

†: Mean value of the main financial variables in subsamples and standard errors in parentheses.

*, **: Significantly different from the average of corporations without haven non-residents in non-arm’s length transactions at 5% level, and 1% level, respectively.
Table 3-6 Distribution of financial statistics and corporation characteristics for the whole sample

<table>
<thead>
<tr>
<th>Decile</th>
<th>Total assets ($millions)</th>
<th>Adjusted taxable income ($thousands)</th>
<th>Tax payable ($thousands)</th>
<th>Ratio of adjusted taxable income over total assets</th>
<th>Number of non-residents</th>
<th>Percentage of corporations with at least one haven non-resident in non-arm’s length transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.6</td>
<td>75.4</td>
<td>14.6</td>
<td>0.187</td>
<td>1.50</td>
<td>7.5%</td>
</tr>
<tr>
<td>2</td>
<td>1.5</td>
<td>138.6</td>
<td>29.5</td>
<td>0.089</td>
<td>1.84</td>
<td>9.8%</td>
</tr>
<tr>
<td>3</td>
<td>3.0</td>
<td>290.5</td>
<td>73.6</td>
<td>0.096</td>
<td>2.07</td>
<td>10.1%</td>
</tr>
<tr>
<td>4</td>
<td>5.3</td>
<td>465.5</td>
<td>96.9</td>
<td>0.088</td>
<td>2.63</td>
<td>9.8%</td>
</tr>
<tr>
<td>5</td>
<td>8.4</td>
<td>723.4</td>
<td>169.0</td>
<td>0.087</td>
<td>2.88</td>
<td>13.5%</td>
</tr>
<tr>
<td>6</td>
<td>13.3</td>
<td>1076.6</td>
<td>234.7</td>
<td>0.081</td>
<td>3.00</td>
<td>14.2%</td>
</tr>
<tr>
<td>7</td>
<td>22.1</td>
<td>1771.1</td>
<td>424.8</td>
<td>0.080</td>
<td>3.58</td>
<td>15.8%</td>
</tr>
<tr>
<td>8</td>
<td>40.1</td>
<td>2581.5</td>
<td>642.3</td>
<td>0.065</td>
<td>3.90</td>
<td>19.1%</td>
</tr>
<tr>
<td>9</td>
<td>93.6</td>
<td>5673.6</td>
<td>1295.2</td>
<td>0.060</td>
<td>4.95</td>
<td>24.9%</td>
</tr>
<tr>
<td>10</td>
<td>210.0</td>
<td>33800.0</td>
<td>8158.5</td>
<td>0.042</td>
<td>8.62</td>
<td>37.7%</td>
</tr>
</tbody>
</table>

Note:  
Deciles are determined by total assets. Values represent the average value for the decile.  
Adjusted taxable income is taxable income adjusted for carried-forward losses.
Table 3-7 Sample averages of other financial variables

<table>
<thead>
<tr>
<th>Financial variable</th>
<th>Observations</th>
<th>Sample average ($Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt</td>
<td>8679</td>
<td>56.4</td>
</tr>
<tr>
<td>Long-term debt</td>
<td>8679</td>
<td>33.0</td>
</tr>
<tr>
<td>Net equity</td>
<td>8679</td>
<td>69.6</td>
</tr>
<tr>
<td>Interest expenses</td>
<td>8647</td>
<td>2.4</td>
</tr>
<tr>
<td>Interest income</td>
<td>8647</td>
<td>0.5</td>
</tr>
<tr>
<td>R&amp;D and administrative expenses</td>
<td>8647</td>
<td>2.8</td>
</tr>
<tr>
<td>Rental expenses</td>
<td>8647</td>
<td>0.4</td>
</tr>
<tr>
<td>Salaries and wages</td>
<td>8647</td>
<td>2.4</td>
</tr>
<tr>
<td>Intra-firm sales</td>
<td>8647</td>
<td>4.4</td>
</tr>
<tr>
<td>Operating expenses</td>
<td>8647</td>
<td>21.7</td>
</tr>
</tbody>
</table>

Note:
The sample averages are average of all corporations with non-missing values, including zeros.
Table 3-8 OLS estimation of haven effect

<table>
<thead>
<tr>
<th>Key Explanatory Variable</th>
<th>Haven dummy</th>
<th>Haven dummy</th>
<th>Haven share</th>
<th>Haven dummy</th>
<th>Haven share</th>
</tr>
</thead>
<tbody>
<tr>
<td>β₁ : Key Explanatory</td>
<td>-0.014***</td>
<td>-0.012**</td>
<td>-0.018***</td>
<td>-0.007</td>
<td>-0.016*</td>
</tr>
<tr>
<td>Variable</td>
<td>(-2.90)</td>
<td>(-2.55)</td>
<td>(-2.68)</td>
<td>(-1.25)</td>
<td>(-1.85)</td>
</tr>
<tr>
<td>β₂ : Public corp dummy</td>
<td>-0.018***</td>
<td>-0.019***</td>
<td>-0.014*</td>
<td>-0.018*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-2.99)</td>
<td>(-3.02)</td>
<td>(-1.92)</td>
<td>(-2.52)</td>
<td></td>
</tr>
<tr>
<td>β₃ : Key Explanatory</td>
<td></td>
<td></td>
<td>-0.019**</td>
<td>-0.004</td>
<td></td>
</tr>
<tr>
<td>Variable×Public corp</td>
<td></td>
<td></td>
<td>(-2.18)</td>
<td>(-0.28)</td>
<td></td>
</tr>
<tr>
<td>dummy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>0.009**</td>
<td>0.008**</td>
<td>0.008**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.12)</td>
<td>(2.04)</td>
<td>(2.04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln(assets)</td>
<td>-0.15*</td>
<td>-0.15*</td>
<td>-0.15*</td>
<td>-0.15*</td>
<td>-0.15*</td>
</tr>
<tr>
<td></td>
<td>(-1.82)</td>
<td>(-1.83)</td>
<td>(-1.83)</td>
<td>(-1.86)</td>
<td>(-1.84)</td>
</tr>
<tr>
<td>(ln(assets))^2</td>
<td>0.004*</td>
<td>0.004*</td>
<td>0.004*</td>
<td>0.004*</td>
<td>0.004*</td>
</tr>
<tr>
<td></td>
<td>(1.68)</td>
<td>(1.71)</td>
<td>(1.73)</td>
<td>(1.74)</td>
<td>(1.74)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.44**</td>
<td>1.45**</td>
<td>1.44*</td>
<td>1.47***</td>
<td>1.44**</td>
</tr>
<tr>
<td></td>
<td>(1.96)</td>
<td>(1.97)</td>
<td>(1.95)</td>
<td>(2.00)</td>
<td>(1.96)</td>
</tr>
<tr>
<td>β₁ + β₃</td>
<td></td>
<td></td>
<td>-0.026***</td>
<td>-0.021**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-3.68)</td>
<td>(-2.08)</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.016</td>
<td>0.016</td>
<td>0.016</td>
<td>0.016</td>
<td>0.016</td>
</tr>
<tr>
<td>Obs.</td>
<td>8679</td>
<td>8679</td>
<td>8679</td>
<td>8679</td>
<td>8679</td>
</tr>
</tbody>
</table>

Note:
Dependent variable is the ratio of adjusted taxable income over total assets. Adjusted taxable income is taxable income adjusted for carried-forward losses. Haven dummy is set to equal one if a Canadian corporation reported at least one haven non-resident with whom the Canadian corporation made non-arm’s length transactions; and zero otherwise. Haven share is defined to be the ratio of haven non-resident number to all non-resident number. Public corporation dummy is equal to one if a Canadian corporation is a public corporation; and zero otherwise. NRnumber is the number of non-residents a Canadian corporation reported. Industry and province fixed effects are controlled for in each specification.

t-statistics are in parentheses.

*, **, ***: Significant at 10%, 5 %, and 1% levels.
Table 3-9 PROBIT estimation of haven effect

<table>
<thead>
<tr>
<th>Key Explanatory Variable</th>
<th>Haven dummy</th>
<th>Haven dummy</th>
<th>Haven share</th>
<th>Haven dummy</th>
<th>Haven share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>Key Explanatory Variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public corp dummy</td>
<td>-0.071***</td>
<td>-0.053***</td>
<td>-0.084***</td>
<td>-0.030</td>
<td>-0.047**</td>
</tr>
<tr>
<td></td>
<td>(-4.41)</td>
<td>(-3.28)</td>
<td>(-3.40)</td>
<td>(-1.62)</td>
<td>(-1.64)</td>
</tr>
<tr>
<td>Public corp dummy</td>
<td>-0.193***</td>
<td>-0.193***</td>
<td>-0.172***</td>
<td>-0.176***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-12.0)</td>
<td>(-12.02)</td>
<td>(-9.51)</td>
<td>(-10.20)</td>
<td></td>
</tr>
<tr>
<td>Key Explanatory Variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable × Public corp dummy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>0.030***</td>
<td>0.029***</td>
<td>0.029***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(4.00)</td>
<td>(3.74)</td>
<td>(3.77)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln(assets)</td>
<td>0.083***</td>
<td>0.061**</td>
<td>0.064**</td>
<td>0.052*</td>
<td>0.060*</td>
</tr>
<tr>
<td></td>
<td>(2.72)</td>
<td>(1.98)</td>
<td>(2.06)</td>
<td>(1.65)</td>
<td>(1.91)</td>
</tr>
<tr>
<td>(ln(assets))^2</td>
<td>-0.002**</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(-2.30)</td>
<td>(-1.20)</td>
<td>(-1.18)</td>
<td>(-0.86)</td>
<td>(-1.01)</td>
</tr>
<tr>
<td>Pseudo R^2</td>
<td>0.059</td>
<td>0.071</td>
<td>0.071</td>
<td>0.072</td>
<td>0.071</td>
</tr>
<tr>
<td>Obs.</td>
<td>8655</td>
<td>8655</td>
<td>8655</td>
<td>8655</td>
<td>8655</td>
</tr>
</tbody>
</table>

Note:
Dependant variable is income dummy, which is equal to one if adjusted taxable income is positive and zero otherwise. Adjusted taxable income is taxable income adjusted for carried-forward losses. Haven dummy is set to equal one if a Canadian corporation reported at least one haven non-resident with whom the Canadian corporation made non-arm’s length transactions; and zero otherwise. Haven share is defined to be the ratio of haven non-resident number to all non-resident number. Public corporation dummy is equal to one if a Canadian corporation is a public corporation; and zero otherwise. \( NRnumber \) is the number of non-residents a Canadian corporation reported. Industry and province fixed effects are controlled for in each specification. Marginal effects are reported and z-statistics are in parentheses. The results for the constant term are suppressed. *, **, ***: Significant at 10%, 5 %, and 1% levels.
### Table 3-10 OLS and PROBIT estimation results of small haven effect

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>PROBIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>$\beta_{11}$ : small haven dummy</td>
<td>-0.019***</td>
<td>-0.017***</td>
</tr>
<tr>
<td></td>
<td>(-3.27)</td>
<td>(-2.91)</td>
</tr>
<tr>
<td>$\beta_{12}$ : large haven dummy</td>
<td>-0.004</td>
<td>-0.004</td>
</tr>
<tr>
<td></td>
<td>(-0.63)</td>
<td>(-0.53)</td>
</tr>
<tr>
<td>$\beta_{2}^{2}$ : Public corp dummy</td>
<td>-0.018***</td>
<td>-0.014*</td>
</tr>
<tr>
<td></td>
<td>(-2.94)</td>
<td>(-1.94)</td>
</tr>
<tr>
<td>$\beta_{31}$ : small haven dummy</td>
<td>-0.019**</td>
<td>-0.096**</td>
</tr>
<tr>
<td>*Public corp dummy</td>
<td>(-1.99)</td>
<td>(-2.47)</td>
</tr>
<tr>
<td>$\beta_{32}$ : large haven dummy</td>
<td>-0.012</td>
<td>-0.051</td>
</tr>
<tr>
<td>×Public corp dummy</td>
<td>(-0.75)</td>
<td>(-0.89)</td>
</tr>
<tr>
<td>$\ln(NRnumber)$</td>
<td>0.008**</td>
<td>0.008*</td>
</tr>
<tr>
<td></td>
<td>(2.00)</td>
<td>(1.94)</td>
</tr>
<tr>
<td></td>
<td>0.028***</td>
<td>0.029***</td>
</tr>
<tr>
<td></td>
<td>(3.64)</td>
<td>(3.74)</td>
</tr>
<tr>
<td>$\beta_{11} + \beta_{31}$</td>
<td>-0.030***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-4.37)</td>
<td></td>
</tr>
<tr>
<td>$\beta_{12} + \beta_{32}$</td>
<td>-0.014</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.97)</td>
<td></td>
</tr>
<tr>
<td>$R^2$ or Pseudo $R^2$</td>
<td>0.016</td>
<td>0.016</td>
</tr>
<tr>
<td></td>
<td>0.072</td>
<td>0.072</td>
</tr>
<tr>
<td>Obs.</td>
<td>8679</td>
<td>8679</td>
</tr>
</tbody>
</table>

**Note:**
In OLS specifications, dependent variable is the ratio of adjusted taxable income over total assets. In PROBIT specifications, dependent variable is income dummy, which is equal to one if adjusted taxable income is positive and zero otherwise. Adjusted taxable income is taxable income adjusted for carried-forward losses. Small haven dummy is set to equal one if a Canadian corporation reported at least one dot haven non-resident with whom the Canadian corporations made non-arm’s length transactions; and zero otherwise. Large haven dummy is set to equal one if a Canadian corporation reported none dot haven non-residents and at least one big haven non-resident; and zero otherwise. Public corporation dummy is equal to one if a Canadian corporation is a public corporation; and zero otherwise. $NRnumber$ is the number of non-residents a Canadian corporation reported. Industry and province fixed effects are controlled for in each specification. Marginal effects of PROBIT estimation are reported. t-statistics for OLS and z-statistics for PROBIT are in parentheses. The results of natural log of total assets and its square and the constant term are suppressed. *, **, ***: Significant at 10%, 5 %, and 1% levels.
Table 3-11 PROBIT estimation of haven effect with interaction with relationship type dummy

Panel A: Type I relationship

<table>
<thead>
<tr>
<th>Specifications</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haven dummy</td>
<td>-0.063***</td>
<td>-0.035*</td>
<td>-0.049***</td>
<td>-0.035*</td>
</tr>
<tr>
<td></td>
<td>(-3.86)</td>
<td>(-1.71)</td>
<td>(-3.03)</td>
<td>(-1.70)</td>
</tr>
<tr>
<td>type I relationship dummy</td>
<td>-0.060***</td>
<td>-0.048***</td>
<td>-0.032**</td>
<td>-0.026*</td>
</tr>
<tr>
<td></td>
<td>(-4.73)</td>
<td>(-3.46)</td>
<td>(-2.51)</td>
<td>(-1.88)</td>
</tr>
<tr>
<td>haven dummy × Type I relationship dummy</td>
<td>-0.062**</td>
<td>-0.033</td>
<td>-0.033</td>
<td>(-0.99)</td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>0.030***</td>
<td>0.029***</td>
<td>0.028***</td>
<td>0.028***</td>
</tr>
<tr>
<td></td>
<td>(3.90)</td>
<td>(3.87)</td>
<td>(3.70)</td>
<td>(3.69)</td>
</tr>
<tr>
<td>Pseudo $R^2$</td>
<td>0.061</td>
<td>0.061</td>
<td>0.072</td>
<td>0.072</td>
</tr>
<tr>
<td>Public corp. dummy</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Obs.</td>
<td>8655</td>
<td>8655</td>
<td>8655</td>
<td>8655</td>
</tr>
</tbody>
</table>

Panel B: Type II relationship

<table>
<thead>
<tr>
<th>Specifications</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haven dummy</td>
<td>-0.071***</td>
<td>-0.104***</td>
<td>-0.056***</td>
<td>-0.078***</td>
</tr>
<tr>
<td></td>
<td>(-4.34)</td>
<td>(-5.18)</td>
<td>(-3.42)</td>
<td>(-3.88)</td>
</tr>
<tr>
<td>type II relationship dummy</td>
<td>0.005</td>
<td>-0.008</td>
<td>-0.020*</td>
<td>-0.028**</td>
</tr>
<tr>
<td></td>
<td>(0.42)</td>
<td>(-0.64)</td>
<td>(-1.72)</td>
<td>(-2.25)</td>
</tr>
<tr>
<td>haven dummy × Type II relationship dummy</td>
<td>0.083***</td>
<td>0.056*</td>
<td>0.056*</td>
<td>(1.89)</td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>0.030***</td>
<td>0.029***</td>
<td>0.030***</td>
<td>0.029***</td>
</tr>
<tr>
<td></td>
<td>(3.95)</td>
<td>(3.78)</td>
<td>(3.86)</td>
<td>(3.74)</td>
</tr>
<tr>
<td>Pseudo $R^2$</td>
<td>0.059</td>
<td>0.060</td>
<td>0.072</td>
<td>0.072</td>
</tr>
<tr>
<td>Public corp. dummy</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Obs.</td>
<td>8655</td>
<td>8655</td>
<td>8655</td>
<td>8655</td>
</tr>
</tbody>
</table>

Note:
Dependant variable is income dummy, which is equal to one if adjusted taxable income is positive and zero otherwise. Adjusted taxable income is taxable income adjusted for carried-forward losses. Haven dummy is set to equal one if a Canadian corporation reported at least one haven non-resident with whom the Canadian corporation made non-arm’s length transactions; and zero otherwise. Type I relationship dummy is set to equal to one if at least one non-resident is controlled by the Canadian corporation; and zero otherwise. Type II relationship dummy is set to equal to one if at least one non-resident controls the Canadian corporation; and zero otherwise. NRnumber is the number of non-residents a Canadian corporation reported. Public corporation dummy is equal to one if a Canadian corporation is a public corporation; and zero otherwise. Industry and province fixed effects are controlled for in each specification.
Marginal effects are reported and z-statistics are in parentheses. The results of natural log of total assets and its square and the constant term are suppressed.
*, **, ***: Significant at 10%, 5 %, and 1% levels.
### Table 3-12 OLS estimation of haven effect by loss opening balance

#### Panel A: Loss opening balance > 0

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_1$: Haven dummy</td>
<td>-0.006 (-.080)</td>
<td>-0.004 (-0.57)</td>
<td>0.0005 (0.05)</td>
</tr>
<tr>
<td>$\beta_2$: Public corp dummy</td>
<td>-0.014* (-1.83)</td>
<td>-0.011 (-1.09)</td>
<td></td>
</tr>
<tr>
<td>$\beta_3$: Haven dummy × Public corp dummy</td>
<td></td>
<td>-0.014 (-0.98)</td>
<td></td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>0.007 (0.87)</td>
<td>0.007 (0.85)</td>
<td>0.007 (0.85)</td>
</tr>
<tr>
<td>ln(assets)</td>
<td>-0.238 (-1.59)</td>
<td>-0.239 (-1.59)</td>
<td>-0.240 (-1.61)</td>
</tr>
<tr>
<td>(ln(assets))^2</td>
<td>0.006 (1.53)</td>
<td>0.006 (1.53)</td>
<td>0.006 (1.55)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.173* (1.65)</td>
<td>2.178* (1.65)</td>
<td>2.186* (1.66)</td>
</tr>
<tr>
<td>$\beta_1 + \beta_3$</td>
<td></td>
<td>-0.013 (-1.19)</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.015</td>
<td>0.016</td>
<td>0.016</td>
</tr>
<tr>
<td>Obs.</td>
<td>4537</td>
<td>4537</td>
<td>4537</td>
</tr>
</tbody>
</table>

#### Panel B: Loss opening balance = 0

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_1$: Haven dummy</td>
<td>-0.020*** (-3.05)</td>
<td>-0.020*** (-2.96)</td>
<td>-0.014* (-1.90)</td>
</tr>
<tr>
<td>$\beta_2$: Public corp dummy</td>
<td>-0.009 (-1.19)</td>
<td>-0.002 (-1.18)</td>
<td></td>
</tr>
<tr>
<td>$\beta_3$: Haven dummy × Public corp dummy</td>
<td></td>
<td>-0.035** (-2.53)</td>
<td></td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>0.009** (2.55)</td>
<td>0.008** (2.49)</td>
<td>0.008** (2.48)</td>
</tr>
<tr>
<td>ln(assets)</td>
<td>-0.060* (-1.81)</td>
<td>-0.061* (-1.86)</td>
<td>-0.066** (-1.97)</td>
</tr>
<tr>
<td>(ln(assets))^2</td>
<td>0.001 (1.44)</td>
<td>0.001 (1.50)</td>
<td>0.002 (1.63)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.646** (2.24)</td>
<td>0.657** (2.28)</td>
<td>0.690** (2.37)</td>
</tr>
<tr>
<td>$\beta_1 + \beta_3$</td>
<td></td>
<td>-0.049*** (-3.99)</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.063</td>
<td>0.064</td>
<td>0.064</td>
</tr>
<tr>
<td>Obs.</td>
<td>4142</td>
<td>4142</td>
<td>4142</td>
</tr>
</tbody>
</table>

**Note:**
Dependent variable is the ratio of adjusted taxable income over total assets. Adjusted taxable income is taxable income adjusted for carried-forward losses. Haven dummy is set to equal one if a Canadian corporation reported at least one haven non-resident with whom the Canadian corporation made non-arm’s length transactions; and zero otherwise. Public corporation dummy is equal to one if a Canadian corporation is a public corporation; and zero otherwise. NRnumber is the number of non-residents a Canadian corporation reported. Industry and province fixed effects are controlled for in each specification. t-statistics are in parentheses.

*, **, ***: Significant at 10%, 5 %, and 1% levels.
### Table 3-13 PROBIT estimation of haven effect by loss opening balance

#### Panel A: Loss opening balance > 0

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haven dummy</td>
<td>-0.053**</td>
<td>-0.030</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(-2.39)</td>
<td>(-1.35)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>Public corp dummy</td>
<td>-0.202***</td>
<td>-0.177***</td>
<td>-0.099**</td>
</tr>
<tr>
<td></td>
<td>(-9.62)</td>
<td>(-7.49)</td>
<td>(-2.27)</td>
</tr>
<tr>
<td>Haven dummy * Public corp dummy</td>
<td>0.002</td>
<td>0.002</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.08)</td>
<td>(0.08)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>0.049***</td>
<td>0.049***</td>
<td>0.049***</td>
</tr>
<tr>
<td></td>
<td>(4.52)</td>
<td>(4.40)</td>
<td>(4.44)</td>
</tr>
<tr>
<td>ln(assets)</td>
<td>0.011</td>
<td>-0.007</td>
<td>-0.017</td>
</tr>
<tr>
<td></td>
<td>(0.25)</td>
<td>(-0.16)</td>
<td>(-0.39)</td>
</tr>
<tr>
<td>(ln(assets))²</td>
<td>0.0001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.79)</td>
<td>(1.02)</td>
</tr>
<tr>
<td>ln(assets)²</td>
<td>0.011</td>
<td>0.009</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>(1.11)</td>
<td>(0.90)</td>
<td>(0.90)</td>
</tr>
<tr>
<td>ln(assets)³</td>
<td>0.149***</td>
<td>0.131***</td>
<td>0.122***</td>
</tr>
<tr>
<td></td>
<td>(3.58)</td>
<td>(3.10)</td>
<td>(2.83)</td>
</tr>
<tr>
<td>Pseudo $R^2$</td>
<td>0.060</td>
<td>0.074</td>
<td>0.075</td>
</tr>
<tr>
<td>Obs.</td>
<td>4498</td>
<td>4498</td>
<td>4498</td>
</tr>
</tbody>
</table>

#### Panel B: Loss opening balance = 0

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haven dummy</td>
<td>-0.086***</td>
<td>-0.079***</td>
<td>-0.066***</td>
</tr>
<tr>
<td></td>
<td>(-3.72)</td>
<td>(-3.42)</td>
<td>(-2.64)</td>
</tr>
<tr>
<td>Public corp dummy</td>
<td>-0.118***</td>
<td>-0.102***</td>
<td>-0.070</td>
</tr>
<tr>
<td></td>
<td>(-4.73)</td>
<td>(-3.68)</td>
<td>(-1.25)</td>
</tr>
<tr>
<td>Haven dummy * Public corp dummy</td>
<td>-0.070</td>
<td>-0.070</td>
<td>-0.070</td>
</tr>
<tr>
<td></td>
<td>(-1.25)</td>
<td>(-1.25)</td>
<td>(-1.25)</td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>0.011</td>
<td>0.009</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>(1.11)</td>
<td>(0.90)</td>
<td>(0.90)</td>
</tr>
<tr>
<td>ln(assets)</td>
<td>0.149***</td>
<td>0.131***</td>
<td>0.122***</td>
</tr>
<tr>
<td></td>
<td>(3.58)</td>
<td>(3.10)</td>
<td>(2.83)</td>
</tr>
<tr>
<td>(ln(assets))²</td>
<td>-0.004***</td>
<td>-0.003***</td>
<td>-0.003**</td>
</tr>
<tr>
<td></td>
<td>(-3.18)</td>
<td>(-2.56)</td>
<td>(-2.29)</td>
</tr>
<tr>
<td>ln(assets)²</td>
<td>0.069</td>
<td>0.073</td>
<td>0.073</td>
</tr>
<tr>
<td>Pseudo $R^2$</td>
<td>4115</td>
<td>4115</td>
<td>4115</td>
</tr>
<tr>
<td>Obs.</td>
<td>4115</td>
<td>4115</td>
<td>4115</td>
</tr>
</tbody>
</table>

**Note:**
Dependent variable is income dummy, which is equal to one if adjusted taxable income is positive and zero otherwise. Adjusted taxable income is taxable income adjusted for carried-forward losses. Haven dummy is set to equal one if a Canadian corporation reported at least one haven non-resident with whom the Canadian corporation made non-arm’s length transactions; and zero otherwise. Public corporation dummy is equal to one if a Canadian corporation is a public corporation; and zero otherwise. $NRnumber$ is the number of non-residents a Canadian corporation reported. Industry and province fixed effects are controlled for in each specification. Marginal effects are reported and z-statistics are in parentheses.

*, **, ***: Significant at 10%, 5%, and 1% levels.
Table 3-14 OLS estimation of haven effect for non-financial non-manufacturing, financial, and manufacturing corporations

<table>
<thead>
<tr>
<th></th>
<th>Non-financial non-manufacturing corporations</th>
<th>Financial corporations</th>
<th>Manufacturing corporations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>$\beta_1$ : Haven dummy</td>
<td>-0.017**</td>
<td>-0.015*</td>
<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>(-2.07)</td>
<td>(-1.86)</td>
<td>(-1.16)</td>
</tr>
<tr>
<td>$\beta_2$ : Public corp dummy</td>
<td>-0.023*</td>
<td>-0.020</td>
<td>-0.005</td>
</tr>
<tr>
<td></td>
<td>(-1.93)</td>
<td>(-1.47)</td>
<td>(-0.72)</td>
</tr>
<tr>
<td>$\beta_3$ : Haven dummy</td>
<td>-0.013</td>
<td>-0.021*</td>
<td>-0.027</td>
</tr>
<tr>
<td>Public corp dummy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.83)</td>
<td>(-1.65)</td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>0.007</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(1.24)</td>
<td>(1.15)</td>
<td>(1.15)</td>
</tr>
<tr>
<td>$\beta_1 + \beta_3$</td>
<td>-0.024**</td>
<td>-0.029***</td>
<td>-0.026*</td>
</tr>
<tr>
<td></td>
<td>(-2.01)</td>
<td>(-3.01)</td>
<td>(-1.74)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.016</td>
<td>0.016</td>
<td>0.016</td>
</tr>
<tr>
<td>Obs.</td>
<td>5002</td>
<td>5002</td>
<td>5002</td>
</tr>
</tbody>
</table>

Note: Dependent variable is the ratio of adjusted taxable income over total assets. Adjusted taxable income is taxable income adjusted for carried-forward losses. Haven dummy is set to equal one if a Canadian corporation reported at least one haven non-resident with whom the Canadian corporation made non-arm’s length transactions; and zero otherwise. Public corporation dummy is equal to one if a Canadian corporation is a public corporation; and zero otherwise. NRnumber is the number of non-residents a Canadian corporation reported. Industry and province fixed effects are controlled for in each specification. t-statistics are in parentheses. The results of natural log of total assets and its square and the constant term are suppressed.

*, **, ***: Significant at 10%, 5%, and 1% levels.
### Table 3-15 OLS estimation of haven effect for public and private corporations

<table>
<thead>
<tr>
<th></th>
<th>Public corporations</th>
<th>Private corporations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Haven dummy</td>
<td>-0.026***</td>
<td>-0.033***</td>
</tr>
<tr>
<td></td>
<td>(-2.76)</td>
<td>(-4.00)</td>
</tr>
<tr>
<td>Financial corp. dummy</td>
<td></td>
<td>-0.018***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.58)</td>
</tr>
<tr>
<td>Manufacturing corp. dummy</td>
<td>0.005</td>
<td>0.008</td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>0.012*</td>
<td>0.015**</td>
</tr>
<tr>
<td></td>
<td>(1.92)</td>
<td>(2.54)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.128</td>
<td>0.080</td>
</tr>
<tr>
<td>Obs.</td>
<td>1440</td>
<td>1440</td>
</tr>
</tbody>
</table>

**Note:**
Dependent variable is the ratio of adjusted taxable income over total assets. Adjusted taxable income is taxable income adjusted for carried-forward losses. Haven dummy is set to equal one if a Canadian corporation reported at least one haven non-resident with whom the Canadian corporation made non-arm’s length transactions; and zero otherwise. Financial corporation dummy is equal to one if a Canadian corporation is in financial industry; and zero otherwise. Manufacturing corporation dummy is equal to one if a Canadian corporation is in manufacturing industry; and zero otherwise. NRnumber is the number of non-residents a Canadian corporation reported. t-statistics are in parentheses. The results of natural log of total assets and its square and the constant term are suppressed.

*, **, ***: Significant at 10%, 5 %, and 1% levels.
Table 3-16 OLS estimation of haven effect on alternative financial variables

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Debt / Net Equity</th>
<th>Interest expenses / Assets</th>
<th>Interest income / Assets</th>
<th>R&amp;D / Assets</th>
<th>Rental / Assets</th>
<th>Intra-firm trade / Sales</th>
<th>Operating expenses / Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
</tr>
<tr>
<td>$\beta_1$ : Haven dummy</td>
<td>-0.036 (-0.46)</td>
<td>-0.002*** (-3.90)</td>
<td>-0.0001 (-1.46)</td>
<td>-0.004 (-1.59)</td>
<td>-0.0001 (-0.13)</td>
<td>0.004 (1.62)</td>
<td>0.031** (2.13)</td>
</tr>
<tr>
<td>$\beta_2$ : Public dummy</td>
<td>-0.503*** (-7.42)</td>
<td>-0.003*** (-5.72)</td>
<td>-0.0001 (-1.64)</td>
<td>0.004 (1.60)</td>
<td>-0.002*** (-3.59)</td>
<td>-0.002 (-0.67)</td>
<td>0.079*** (4.96)</td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>-0.114*** (-3.39)</td>
<td>-0.0003 (-1.21)</td>
<td>0.000 (0.47)</td>
<td>0.007*** (5.05)</td>
<td>-0.001*** (-4.34)</td>
<td>0.002*** (2.32)</td>
<td>-0.010* (-1.91)</td>
</tr>
<tr>
<td>ln(assets)</td>
<td>0.546*** (3.58)</td>
<td>0.002 (1.49)</td>
<td>-0.0001 (-0.95)</td>
<td>0.048*** (12.03)</td>
<td>-0.007*** (-7.54)</td>
<td>-0.001 (-0.27)</td>
<td>-0.163*** (-4.78)</td>
</tr>
<tr>
<td>(ln(assets))^2</td>
<td>-0.010*** (-2.34)</td>
<td>-0.000 (-0.36)</td>
<td>0.000 (1.18)</td>
<td>-0.001*** (-12.53)</td>
<td>0.0002*** (6.51)</td>
<td>0.000 (0.40)</td>
<td>0.004*** (4.15)</td>
</tr>
<tr>
<td>Constant</td>
<td>-5.638*** (-4.29)</td>
<td>-0.014 (-1.54)</td>
<td>0.001 (1.11)</td>
<td>-0.396*** (-11.44)</td>
<td>0.073*** (8.31)</td>
<td>-0.003 (-0.10)</td>
<td>1.880*** (6.40)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.051</td>
<td>0.079</td>
<td>0.017</td>
<td>0.087</td>
<td>0.110</td>
<td>0.035</td>
<td>0.307</td>
</tr>
<tr>
<td>Obs.</td>
<td>7799</td>
<td>8038</td>
<td>8213</td>
<td>8110</td>
<td>8204</td>
<td>6028</td>
<td>5713</td>
</tr>
</tbody>
</table>

Note:
Haven dummy is set to equal one if a Canadian corporation reported at least one haven non-resident with whom the Canadian corporation made non-arm’s length transactions; and zero otherwise. Public corporation dummy is equal to one if a Canadian corporation is a public corporation; and zero otherwise. NRnumber is the number of non-residents a Canadian corporation reported. Industry and province fixed effects are controlled for in each specification.
The observations used for each specification are the observations between the 5th and 95th percentiles inclusively of the corresponding dependent variable.
t-statistics are in parentheses.
*, **, ***: Significant at 10%, 5 %, and 1% levels.
Table 3-17 OLS estimation of haven effect on alternative financial variables by loss opening balance

### Panel A: Loss opening balance>0

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Debt / Net Equity</th>
<th>Interest expenses / Assets</th>
<th>Interest income / Assets</th>
<th>R&amp;D / Assets</th>
<th>Rental / Assets</th>
<th>Intra-firm trade / Sales</th>
<th>Operating expenses / Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_1$ : Haven dummy</td>
<td>-0.242** (-2.32)</td>
<td>-0.003*** (-4.08)</td>
<td>-0.0001 (-1.01)</td>
<td>-0.007** (-2.18)</td>
<td>-0.0002 (-0.39)</td>
<td>0.005 (1.36)</td>
<td>0.041* (1.79)</td>
</tr>
<tr>
<td>$\beta_2$ : Public dummy</td>
<td>-0.324*** (-3.52)</td>
<td>-0.003*** (-4.49)</td>
<td>-0.0001 (-1.19)</td>
<td>0.005 (1.58)</td>
<td>-0.002*** (-4.28)</td>
<td>-0.003 (0.98)</td>
<td>0.097*** (4.36)</td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>-0.107** (-2.07)</td>
<td>-0.0003 (-0.87)</td>
<td>0.000 (0.29)</td>
<td>0.003* (1.90)</td>
<td>-0.001*** (-2.98)</td>
<td>0.002 (1.23)</td>
<td>-0.019** (-2.25)</td>
</tr>
<tr>
<td>ln(assets)</td>
<td>0.671*** (3.18)</td>
<td>0.003*** (2.33)</td>
<td>-0.0001 (-0.53)</td>
<td>0.047*** (8.79)</td>
<td>-0.005*** (-3.85)</td>
<td>0.0004 (0.08)</td>
<td>-0.073 (-1.51)</td>
</tr>
<tr>
<td>(ln(assets))^2</td>
<td>-0.012** (-2.00)</td>
<td>-0.000 (-1.39)</td>
<td>0.000 (0.70)</td>
<td>-0.001*** (-9.15)</td>
<td>0.0001*** (3.20)</td>
<td>-0.000 (-0.07)</td>
<td>0.002 (1.14)</td>
</tr>
<tr>
<td>Constant</td>
<td>-6.999*** (-3.82)</td>
<td>-0.030** (-2.49)</td>
<td>0.001 (0.83)</td>
<td>-0.383*** (-8.36)</td>
<td>0.047*** (4.41)</td>
<td>-0.014 (0.08)</td>
<td>1.141*** (2.60)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.079</td>
<td>0.079</td>
<td>0.026</td>
<td>0.108</td>
<td>0.112</td>
<td>0.045</td>
<td>0.312</td>
</tr>
<tr>
<td>Obs.</td>
<td>4002</td>
<td>4142</td>
<td>4307</td>
<td>4211</td>
<td>4310</td>
<td>2940</td>
<td>2711</td>
</tr>
</tbody>
</table>

### Panel B: Loss opening balance=0

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Debt / Net Equity</th>
<th>Interest expenses / Assets</th>
<th>Interest income / Assets</th>
<th>R&amp;D / Assets</th>
<th>Rental / Assets</th>
<th>Intra-firm trade / Sales</th>
<th>Operating expenses / Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_1$ : Haven dummy</td>
<td>0.232*** (2.07)</td>
<td>-0.001 (-1.28)</td>
<td>-0.0001 (-1.17)</td>
<td>0.001 (0.25)</td>
<td>-0.0001 (-0.16)</td>
<td>0.003 (0.86)</td>
<td>0.021 (1.15)</td>
</tr>
<tr>
<td>$\beta_2$ : Public dummy</td>
<td>-0.608*** (-5.93)</td>
<td>-0.003*** (-3.87)</td>
<td>-0.0001 (-0.73)</td>
<td>0.001 (0.31)</td>
<td>-0.002 (0.27)</td>
<td>0.001 (0.36)</td>
<td>0.032 (1.57)</td>
</tr>
<tr>
<td>ln(NRnumber)</td>
<td>-0.116*** (-2.69)</td>
<td>-0.0004 (-1.03)</td>
<td>0.000 (0.43)</td>
<td>0.010*** (5.30)</td>
<td>-0.001*** (-2.89)</td>
<td>0.003** (2.16)</td>
<td>-0.001 (-0.17)</td>
</tr>
<tr>
<td>ln(assets)</td>
<td>0.470** (2.14)</td>
<td>0.001 (0.35)</td>
<td>-0.0001 (-0.73)</td>
<td>0.048*** (7.73)</td>
<td>-0.010*** (-6.28)</td>
<td>-0.006 (-0.83)</td>
<td>-0.258*** (-5.39)</td>
</tr>
<tr>
<td>(ln(assets))^2</td>
<td>-0.010 (-1.62)</td>
<td>0.000 (0.23)</td>
<td>0.000 (0.91)</td>
<td>-0.001*** (-8.08)</td>
<td>0.0003*** (5.50)</td>
<td>0.0002 (0.99)</td>
<td>0.007*** (4.76)</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.578** (-2.43)</td>
<td>-0.003 (-0.21)</td>
<td>0.001 (0.62)</td>
<td>-0.394*** (-7.28)</td>
<td>0.101*** (6.80)</td>
<td>0.032 (0.56)</td>
<td>2.680*** (6.64)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.064</td>
<td>0.089</td>
<td>0.030</td>
<td>0.092</td>
<td>0.133</td>
<td>0.052</td>
<td>0.323</td>
</tr>
<tr>
<td>Obs.</td>
<td>3797</td>
<td>3914</td>
<td>3906</td>
<td>3899</td>
<td>3894</td>
<td>3088</td>
<td>3002</td>
</tr>
</tbody>
</table>

**Note:**
Haven dummy is set to equal one if a Canadian corporation reported at least one haven non-resident with whom the Canadian corporation made non-arm’s length transactions; and zero otherwise. Public corporation dummy is equal to one if a Canadian corporation is a public corporation; and zero otherwise. \( NRnumber \) is the number of non-residents a Canadian corporation reported. Industry and province fixed effects are controlled for in each specification. The observations used for each specification are the observations between the 5th and 95th percentiles inclusively of the corresponding dependent variable. t-statistics are in parentheses.

*, **, ***: Significant at 10%, 5 %, and 1% levels.
Table 3-18 Replication results of Harris et al. (1993)

<table>
<thead>
<tr>
<th></th>
<th>Harris et al. (1993)</th>
<th>Replication results</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Canada</td>
<td>-0.0147 (1.53)</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>0.0003 (0.08)</td>
<td>0.0105*** (3.76)</td>
</tr>
<tr>
<td>Japan</td>
<td>0.0152** (2.21)</td>
<td>0.0005 (0.09)</td>
</tr>
<tr>
<td>Dragon</td>
<td>-0.0139** (1.78)</td>
<td>0.0019 (0.49)</td>
</tr>
<tr>
<td>Asia</td>
<td>-0.005 (0.05)</td>
<td>-0.0046 (-1.51)</td>
</tr>
<tr>
<td>LT Eur.</td>
<td>0.0094 (1.23)</td>
<td>-0.0067*** (-3.06)</td>
</tr>
<tr>
<td>HT Eur.</td>
<td>0.0130* (1.44)</td>
<td>-0.0043 (-1.44)</td>
</tr>
<tr>
<td>Ireland</td>
<td>-0.0109* (1.32)</td>
<td>-0.0061* (-1.77)</td>
</tr>
<tr>
<td>Aus/N.Z.</td>
<td>-0.0089 (1.12)</td>
<td>0.0035 (0.90)</td>
</tr>
<tr>
<td>L. Amer.</td>
<td>0.0101 (1.39)</td>
<td>0.0051 (1.04)</td>
</tr>
<tr>
<td>S. Afr.</td>
<td>0.0318*** (3.11)</td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>-0.0308 (1.70)</td>
<td>-0.0015 (-0.23)</td>
</tr>
<tr>
<td>OPEC</td>
<td>0.0006 (0.05)</td>
<td>0.0012 (0.17)</td>
</tr>
<tr>
<td>Havens</td>
<td>-0.0439*** (4.06)</td>
<td>-0.0084*** (-2.82)</td>
</tr>
<tr>
<td>Industry dummies</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Province dummies</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Sample</td>
<td>475</td>
<td>873</td>
</tr>
</tbody>
</table>

Note:
The dependent variable is the ratio of tax liability over total assets. The independent variables are a set of locational dummies. Dragon refers to Asian “four dragons”: Hong Kong, Singapore, Taiwan, and South Korea. Asia stands for Asian and Oceania countries excluding Japan, “four dragons”, and Australia and New Zealand. LT Eur. stands for low tax European countries, which include European tax havens, and three countries with low tax rates—Belgium, Switzerland, and Netherland. HT stands for high tax European countries. Aus/N.Z. refers to Australia and New Zealand. L. Amer. refers to Latin American countries excluding the tax havens. S. Afr. stands for South Africa. OPEC refers to 12 OPEC countries.
The first column copies the results in column (2) of Table 8.4 in Harris et al. (1993). Numbers in brackets are t-ratios. Replication results are in columns (2) to (5). t-statistics are in parentheses.
*, **, ***: Significant at 10%, 5 %, and 1% levels.
4 CONCLUSION

This dissertation addresses some important issues in the field of international tax competition with an emphasis on income-shifting behaviour of multinational corporations (MNCs).

On the theoretical front, the first essay extends the existing literature by developing a two-sector general equilibrium model to study international income shifting and foreign direct investment (FDI). In the absence of income shifting, corporate tax redistributes income from entrepreneurs to workers, thereby increasing social welfare when workers’ consumption is assigned a higher weight in the social welfare function. Meanwhile, higher tax rates increase the user cost of capital, therefore dampening FDI and causing a negative impact on wages. The necessary and sufficient condition for a positive optimal tax rate is that the labour productivity be marginally higher in the domestic sector. When the two sectors share the same capital-intensive production technology, our model reproduces the conventional argument of a zero capital tax in a small open economy.

The key contribution of the theoretical chapter is that income shifting causes a reduction in the user cost of capital, thereby making FDI decisions less responsive to international tax rate differentials. An optimizing government would allow income being shifted to tax havens when the investment-enhancing effect dominates the revenue-eroding effect. Our results have implications for public policy by helping to understand the interaction between income shifting and FDI. In addition, our results have implications for empirical research. In future work, I would like to test the relationship between income shifting and FDI using firm-level data.
On the empirical front, I explore the evidence of income shifting to tax havens in Canadian MNCs. The data set contains confidential information collected from T2 tax returns and the reported non-arm’s length transactions with non-residents from 2001. The identification strategy is based on the variation in shifting behaviour between the corporations that report non-arm’s length transactions with tax havens and those that do not. I find that there is some evidence that Canadian MNCs are shifting income to tax havens through non-arm’s length transactions. Further, the effects of small havens are stronger than those of large havens on reported taxable income in Canada and income shifting is more likely to happen between more closely connected related corporations. Also, I find that the haven effect is stronger in corporations with no flexibility to carry forward losses than in those with such flexibility. Using a cross-sectional data set, I am not able to investigate income-shifting behaviour and corporation structure decisions dynamically (specifically: which type of corporations would be inclined to have haven non-residents to make non-arm’s length transactions). I am interested in continuing this investigation of income-shifting behaviour using a panel set in my future work.
5 REFERENCE


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