The international platform of Ludwig-Maximilians University's Center for Economic Studies and the Ifo Institute

Working Papers
www.cesifo.org/wp

Income Shifting under Losses

Arnt O. Hopland
Petro Lisowsky
Mohammed Mardan
Dirk Schindler

CESIFO WORKING PAPER NO. 5130
CATEGORY 1: PUBLIC FINANCE
DECEMBER 2014

CESifo
Center for Economic Studies & Ifo Institute

CESifo *Working Paper No. 5130*

Income Shifting under Losses

Abstract

This paper examines the flexibility of multinational firms to use income-shifting strategies within a tax year to react to operating losses. First, we develop an analytical model that considers how affiliate losses can be adjusted by using the transfer prices of tangible and intangible assets, as well as internal debt shifting, either by ex-post (i.e., by the end of the tax year) or ex-ante income shifting (i.e., before the current tax year). Our model predicts that, due to income shifting, multinational firms report lower profits when running profits, and lower losses when running losses, compared to domestic firms. It also suggests that under ex-post income shifting, loss affiliates have lower transfer prices and internal leverage than profitable affiliates, whereas under ex-ante income shifting, affiliates feature the same transfer prices and internal capital structure, regardless of making losses. Second, using data on direct transfer payments and internal debt of Norwegian affiliates, we find empirical evidence that, under losses, transfer pricing gives substantial flexibility to adjust income shifting ex post. In contrast, we do not find evidence for flexibility in the use of internal debt to shift income ex post. We contribute to the literature that neglecting the precautionary income-shifting behavior of potential loss affiliates underestimates the sensitivity of tax rates to transfer payments and to internal debt, whenever some ex-ante income shifting is present.

JEL-Code: F230, H250, H870.

Keywords: income shifting, losses, debt shifting, transfer payments.

Arnt O. Hopland
Norwegian School of Economics
Bergen / Norway
Arnt.Hopland@nhh.no

Petro Lisowsky
University of Illinois at Urbana-Champaign
Chaimpaign / Illinois / USA
lisowsky@illinois.edu

Mohammed Mardan
ETH Zurich
Zurich / Switzerland
mardan@kof.ethz.ch

Dirk Schindler
Norwegian School of Economics
Bergen / Norway
Dirk.Schindler@nhh.no

December 30, 2014
We are grateful to Julia Tropina Bakke, Andreas Haufler, Dominika Langenmayr, Martin Ruf, Helen Simpson, and participants at the 2014 Oxford University Centre for Business Taxation Annual Doctoral Meeting for valuable support and discussions. The foundations for this project were laid while Dirk Schindler was guest researcher at the CES in Munich. He wishes to thank this institution and its people for their hospitality and support.

1 Introduction

In recent years, tax avoidance using income shifting between affiliates of multinational companies has become a hotly debated issue. Newspapers and government commissions (e.g., Bergin, 2012; Levin and McCain, 2013) reported that large global players such as Apple, Google, and Starbucks hardly pay any income taxes. In its "Base Erosion and Profit Shifting" (BEPS) report, the OECD (2013) confirms that profit shifting is a substantial issue and states that "*at stake is the integrity of the corporate income tax.*"[1] The OECD identifies transfer pricing (i.e., intra-firm pricing for tangible and intangible assets) and debt shifting (i.e., thin-capitalization, particularly by using internal debt from related companies) as the two main strategies for shifting income from high-tax to low-tax countries. Both devices to reduce multinationals' overall tax payments are well-analyzed and well-understood in the accounting, finance, and economics literatures.[2]

It is also well-known and intuitively straightforward that the incentive to shift income out of high-tax countries is reversed if the affiliates in such countries run losses. In loss-making affiliates, the marginal tax rate drops to zero, and because intertemporal loss offsets are limited and cannot be carried forward with interest, multinationals have a clear incentive to balance losses immediately by shifting in income from other affiliates. Hence, there is evidence of some bunching around zero income for affiliates of multinationals compared to wholly domestic firms (see Grubert et al., 1993, chapter 7.4). Perhaps due to the fact that this intuition appears to be very simple at first glance, the literature on income shifting in loss-making affiliates has been very limited to date. However, the extant literature neglects that using tax-avoidance mechanisms within a tax year, in order to shift in income instead of shifting income out to lowest-taxed profit centers, requires substantial flexibility. In principle, this flexibility can be limited, because using income-shifting mechanisms can interfere with internal incentive systems for local management, arise the suspicion of tax authorities, and be bounded by other transaction costs.[3]

Using an analytical model and empirical tests, this paper examines the flexibility of multinational firms to use income-shifting strategies within a tax year to react to operating losses. We begin by setting up a simple model of a multinational company that owns productive affiliates in n countries and hosts a profit and financial center in a tax haven. The tax-haven affiliate uses its equity to lend internal debt to the other related affiliates. Moreover, it charges them user fees for a fixed factor (e.g., royalties

[1] Cf. OECD (2013, p. 8). For some estimates on induced losses in tax revenues, see the literature review below.

[2] Gresik (2001) and Gök and Schiller (2007) survey relevant transfer-pricing literature; Mintz and Weichenrieder (2010) provide an overview on (internal) debt shifting, while Huizinga et al. (2008) and Møen et al. (2011) introduce external debt shifting. The accounting literature on empirical tax research is reviewed by Shackelford and Shevlin (2001) and Hanlon and Heitzman (2010).

[3] It is even more surprising that none of the three fields examine this issue after taking into account that, for multinational affiliates, the average probability of running a loss is quite substantial. For example, Norwegian based multinationals experience losses in 38% of the observations.

on technology) and it serves as a vendor, buying an intermediate good at the world market and reselling it with a mark-up to the productive affiliates (e.g., the Apple Sales International case, see Levin and McCain, 2013). Thus, our model captures income shifting by transfer pricing both in intangibles and intermediate goods, as well as internal debt shifting. Shocks on the sale price of the final good introduce the risk to end up with net operating losses at the end of the tax year.[4]

The analytical model suggests that (in-) flexibility in income shifting has crucial implications for firm behavior in achieving tax-efficient income reporting under losses. Only under perfect flexibility can income shifting be adjusted ex post (i.e., by the end of the tax year) to ensure zero taxable income. If there is hardly any flexibility, all firms are forced to consider the likelihood of running losses at the end of the tax year and adjust their income shifting strategies ex ante (i.e., before the current tax year) – no matter whether they will run operating profits or losses in the end. Therefore, our model yields three testable predictions: (H1) Multinationals' affiliates report lower profits (smaller losses) when running profits (losses) than purely domestic firms, i.e., multinationals' affiliates bunch around zero profitability. (H2) Under full flexibility in income-shifting decisions during the tax year ('ex-post income shifting'), multinationals' affiliates disclose lower transfer prices and internal leverage if they are in a loss position than if they are profitable. (H3) If there is no flexibility in income shifting and all final tax decisions need to be settled at the beginning of the tax year ('ex-ante income shifting'), multinationals' affiliates will report the same transfer prices and internal leverage, regardless of whether they are in a loss or profit position.

We test our hypotheses using a firm-level panel data set of all Norwegian based firms' tax returns during 1998-2005. The key advantage of the Norwegian data is that we can directly observe explicit transfer payments between affiliates, as well as measure internal leverage ratios by affiliate, over time. First, we confirm that multinationals bunch profits around zero to a larger extent than purely domestic firms (consistent with H1). Second, we test whether or not firms have flexibility to adjust income shifting strategies ex post (consistent with H2) or must commit to an ex-ante strategy (consistent with H3). To do so, we regress intra-firm transfer payments and internal leverage ratios on an indicator variable equal to one if the firm experiences a loss position in that year, and control for a variety of other factors that may explain income shifting. If being in a loss position significantly reduces transfer payments and internal leverage in Norwegian affiliates, this indicates flexibility to shift income ex post. Ex-ante expectations are controlled for by

[4]To focus on the effects of (in-) flexibility of income-shifting strategies during the tax year, we assume central decision making by the headquarters. This assumption neglects both the incentive role of transfer prices on management in decentralized units and its interaction with the tax aspect of transfer pricing. See Göx and Schiller (2007) for an overview on these aspects. This assumption is not made because we believe that the incentive role is not important. But, for the comparison of ex-post differences in ex-ante identical affiliates, allowing for decentralization would add complexity without producing additional insights on the tax incentives.

including both the lagged loss position, which is strongly correlated with current losses, and an interaction term that captures whether the firm was in a loss position both at time t and $t-1$.

The empirical results indicate that multinational firms have substantial flexibility to adjust their transfer pricing ex post.[5] Hence, with respect to transfer pricing, we find clear support for H2. On the contrary, we do not find any evidence for flexibility in the use of internal debt to shift income ex post. Accordingly, we conclude that most debt-shifting decisions must be taken at the beginning of the tax year (or even earlier). Thus, H3 seems to hold in the case of internal leverage. We also note that, since less outgoing transfers and lower leverage reduce the risk of experiencing a loss, our estimates may suffer from an attenuation bias. Therefore, it is still possible that firms have some flexibility to also adjust internal leverage ex post. However, there appears to be at least some rigidity in internal capital structures, while transfer pricing is the more flexible instrument of the two income-shifting devices.

Our findings have policy implications for governments in high-tax countries that are concerned about an erosion of their tax base by income shifting in multinational firms. Our results suggest that tax authorities should not only focus on transactions between profitable affiliates in high-tax countries and related parties in low-tax countries, but should also scrutinize payments made to loss-making affiliates in other high-tax countries.[6] This suggestion is particularly true for firms that are flexible in using their income shifting strategies, i.e., firms with large intra-firm transfer payments. Our findings imply, however, that less flexible firms could be just as tax-aggressive even though they sometimes report profits and losses. By anticipating ex ante the likelihood of operational losses, they can still shift substantial income and it would be imprudent just to focus the audit on those firms whose income bunch around zero. This cautionary note matters in particular for firms with low transfer-pricing possibilities, but large amounts of financial capital.

Our study contributes to the literature in at least four ways. First, there is a very small literature in accounting that analyzes income shifting under losses. Klassen et al. (1993, section 4.1) discuss distinctive features of affiliates with net operating losses and point out that there is an incentive to shift income in to such affiliates. However, the authors drop loss-making affiliates in their main sample, instead of testing for their characteristics.[7] Using indirect evidence from IRS panel data on US companies from 1980 to 1987, Grubert et al. (1993) suggest that roughly 50% of the return-rate difference

[5]Consistent with findings in Dischinger et al. (2014), we find that there are important differences between multinationals' affiliates, controlled from abroad, and (Norwegian) parent companies. We point out that flexibility is more important for subsidiary, or daughter, companies.

[6]Our conclusions complement those of De Simone et al. (2014).

[7]This became the dominant strategy in (almost) all papers on both transfer pricing and debt shifting in order to, apparently, avoid any bias from reversed incentives under net operating losses.

between foreign- and domestically controlled firms needs to be attributed to tax-induced transfer pricing. The authors point out that foreign-controlled firms not only disclose significantly less taxable income, but also consistently achieve profitability to be bunched around zero, with significantly less deviations compared to domestic firms. This result is taken as evidence supporting the presence of active income shifting.[8]

Furthermore, both Gramlich et al. (2004) and Onji and Vera (2010) analyze income-shifting behavior within domestic Japanese trusts ('keiretsus') and find evidence that net operating losses in some Japanese affiliates are balanced by shifting in income from other Japanese affiliates. Onji and Vera credit this behavior to tax motives that arise from the fact that the Japanese corporate income tax did not provide group provision in order to consolidate keiretsus' overall taxable income. In concurrent research, De Simone et al. (2014) examine whether the unexplained income of loss affiliates is correlated with tax-related factors. They find that the potential tax savings and ability of profitable affiliates to contribute profits to loss affiliates both affect unexplained profit (loss). However, these studies neither directly identify the mechanism(s) for income shifting, nor their relative differences in flexibility.

We not only confirm the finding of bunching around zero income in multinationals' affiliates, we also extend this literature by pointing out that flexibility in income-shifting mechanisms matters for the extent of this bunching. By comparing intra-company transfer payments and internal leverage between loss-making and profitable affiliates of multinationals, our approach allows us to test directly for flexibility in income shifting across various mechanisms and sheds light onto the extent to which multinationals can actually adjust their income shifting strategies ex-post. Based on our empirical findings, affiliates that engage in substantial transfer pricing can balance losses more effectively than affiliates that must mainly rely on thin capitalization because the latter affiliate types neither have large internal sales nor royalty/patent payments.

Second, the finance literature reports a significant rigidity in capital structures so that they cannot be easily adjusted to changes in a firm's environment. Fischer et al. (1989) argue that firms will only adjust to their target capital structure when the losses from suboptimal leverage exceed the costs of adjusting. Particularly financially distressed (e.g., loss making) firms face high costs of adjusting their overleveraged external debt-to-asset ratios and operate longer with their suboptimal capital structure (e.g., Gilson, 1997; Strebulaev, 2007). Reasons are hold-out problems (no enforcement in settlement) and regulatory disincentives for institutional lenders to turn their debt into equity. Korteweg

[8]Maydew (1997) points out that, on the contrary, there can be an incentive to report high losses in multinational affiliates if these net operating losses can be settled immediately against taxable income from previous tax years. He finds evidence of such loss-carryback behavior for US firms in the years after the 1986 U.S. Tax Reform Act that reduced corporate taxes substantially. However, the availability of loss carrybacks has been massively limited both in magnitude and in time (mostly to one year only now) in the last 15 years, especially in European countries. In Norway, the loss-carryback possibility never was granted.

(2010, section 5C) summarizes this discussion and, using a new strategy to identify net benefits of debt financing, provides evidence for significant costs of suboptimal capital structures. Thereby, the costs of being overleveraged are much higher than the costs of being underleveraged. Therefore not surprisingly, Korteweg also finds evidence that firms are underleveraged on average.

Our empirical results on the inflexibility of (internal) debt-to-asset ratios support this view. Even a strong tax incentive (i.e., a drop from a 28% tax rate to an effectively zero tax rate)[9] does not induce a change in the capital structure during the tax year. Hence, the short-term rigidity seems to be substantial. Furthermore, the lagged adjustment also applies to internal debt that should neither suffer from transaction costs related to agency costs nor from costs of renegotiating with external lenders. Finally, a strategic underleveraging could be driven by taking into account the loss probabilities under ex-ante decision making. Strategic underleveraging in internal debt partly insures against tax payments on shifted interest income in the tax haven which are not backed by tax-deductible interest expenses in non-haven affiliates that run losses.

Third, although the effects from tax debt shields on external and internal debt shifting are always highly significant, the estimated magnitudes in economics studies such as Desai et al. (2004), Huizinga et al. (2008), Egger et al. (2010), Møen et al. (2011) or Büttner and Wamser (2013) are surprisingly low. The estimates for the semi-elasticity of internal debt lie between 0.69 and 1.3; for external debt the range is between 0.34 and 0.69. Still, debt shifting is seen as an important channel to shape income and tax payments, and the limited effects are perceived as a kind of puzzle in this literature. Büttner and Wamser suggest that the adjustment costs of the capital structure should be very high. They also find that minority ownership reduces the tax-rate sensitivity of debt, but point out that this effect is not strong enough to solve the puzzle.

Our results indicate an additional reason for the low tax-rate sensitivities. All the studies base their estimations on tax differentials between the multinational's highest and lowest affiliates' statutory tax rates. However, when firms are forced to anticipate potential losses ex ante, the correct tax rate differential should be the expected tax rate differential, which can be significantly lower. Consequently, by overestimating the decision-relevant tax differential, the debt-shifting studies to date underestimate the impact of debt tax shields on capital structures. To put it differently, the standard procedure of excluding (or controlling for) loss-making affiliates does not heal the problem, because even profitable affiliates will have adjusted their capital structure to the ex-ante risk of running losses.

Fourth, we suggest an additional explanation for the empirical findings of strong tax impacts in the transfer-pricing literature. For a long time, it was difficult to properly

[9] In our sample period, profitable affiliates in Norway faced a statutory corporate tax rate of 28%. When disclosing losses, the relevant tax rate drops to zero.

identify the effect of transfer pricing on income differentials.[10] Coming up with some direct evidence, Oyelere and Emmanuel (1998) point out that foreign-owned affiliates in the UK are characterized by lower income, but higher dividend distributions, than UK-controlled firms. Their findings suggest significant income shifting by foreign-controlled affiliates and directly identify transfer pricing as major driving force. Pak and Zdanowicz (2001), Bartelsman and Beetsma (2003), and Bernard et al. (2006) calculate that the absolute losses in US and European tax revenues, stemming from transfer pricing by multinational firms, are massive. For example, Bartelsman and Beetsma (2003) study OECD data and estimate that tax revenue earned from a unilateral tax increase could increase by a factor of three to eight times if income shifting by transfer pricing could be eliminated. Studies such as Swenson (2001), Clausing (2003) and Langli and Saudagaran (2004) confirm this strong impact of transfer pricing on tax avoidance. Conventional wisdom in the literature is that it is easier to shift large amounts of income by mispricing intra-firm trade than to rely on thin capitalization (and potentially low interest rates) for reducing the tax burden. Furthermore, transfer pricing is seen to generate lower concealment costs because it is more difficult to enforce the arm's-length principle for transfer prices than to enforce effective thin-capitalization rules.[11]

Based on our findings, some part of the (comparably) high tax-differential sensitivity of transfer pricing could be explained by the fact that transfer pricing provides sufficient flexibility to adjust reported income during the tax year. For transfer pricing, multinationals need not take into account the loss probability as much as if the multinational would like to manage its internal debt for income shifting, and thus the expected tax rate differential matters less under transfer pricing. Hence, the empirical studies on transfer pricing suffer less than the debt-shifting literature under using an 'incorrect' tax differential – and excluding loss-making firms indeed eliminates (at least to a larger extent) the incentives of using income-shifting mechanisms in the event of losses.

The outline of the paper is as follows. In section 2, we specify the theoretical model and derive some predictions on firm behavior that can be empirically tested. We describe the Norwegian affiliate data in section 3. In section 4, we outline the empirical strategy, report our empirical findings, and provide a discussion of the results. We offer concluding remarks in section 5.

[10] Most, and particularly the earlier, studies only provide indirect evidence by showing that profitability substantially differs between domestic and multinational firms and that these differences should be explained by income shifting (transfer pricing). See, e.g., Grubert and Mutti (1991), Harris (1993), Klassen et al. (1993), Hines and Rice (1994), Collins and Shackelford (1995), and Jacob (1996).

[11] Other indirect evidence for the strong impact of transfer prices on tax avoidance is provided in Lohse and Riedel (2013). Analyzing European multinationals, they point out that tightening the documentation rules for transfer prices substantially reduces income shifting and increases revenues for tax authorities, even though the administrative burden of this regulation is high.

2 Model

2.1 The setting

Consider a multinational firm (henceforth MNC) that has affiliates in n countries. Let country 1 be the country with the lowest tax rate so that $t_i > t_1, i = 2, ..., n$ and label country 1 as the 'tax haven'.[12] As a simplification, we assume that the affiliate in the tax haven acts exclusively as a financial and profit center of the MNC[13] and therefore does not produce any goods. All other affiliates use capital K_i and an intermediate good S_i to produce a homogenous final good y_i according to the production technology $y = F(K_i, S_i; \bar{X})$, which is concave in both inputs. The price p_i of the final good is stochastic and drawn from a cumulative distribution function $H(p)$ with support on $[\underline{p}, \bar{p}]$. $\bar{X}$ represents a fixed factor that we interpret as acquired technological know-how (e.g., resulting from R&D investment within the MNC group).

The profit center purchases a tangible, intermediate good $S = \sum_i S_i$ at marginal costs of q_S on the world market and re-sells it at price $G_i^S + q_S$ to the other affiliates, pretending that it has added value to the input good. The correct arm's-length price of S, however, is q_S. Furthermore, the patent rights for the intangible, technological know-how $\bar{X}$ are also located in the profit center which claims license fees $G_i^X + q_X$, while the true arm's-length price is q_X. Any deviation from the true arm's-length price leads to convex concealment costs $C^P(P_i^X, P_i^S)$, where $P_i^X = G_i^X \cdot X$ and $P_i^S = G_i^S \cdot S_i$, with $\frac{\partial C^P}{\partial G_i^a} > (<)0$ if $G_i^a > (<)0$ and $\frac{\partial^2 C^P}{\partial (G_i^a)^2} > 0, a = \{X, S\}$. The concealment costs are defined over shifted income and correspond to the set up in Allingham and Sandmo (1972), where a fine is calculated based on undeclared income. This concept of concealment costs in transfer pricing mirrors the 'comparable profit method' proposed by the OECD.[14]

The headquarters (henceforth HQ) of the MNC endows the financial center with equity E_1 and provides the producing affiliates with the equity necessary to reach both a tax-efficient financing structure and the optimal level of real capital. Thus, productive capital K_i in affiliate i is financed by equity E_i provided by the HQ and by internal debt D_i^I borrowed from the financial center so that $K_i = E_i + D_i^I$.[15] The financial center

[12] All countries $i > 1$ will be referred to as 'non-haven countries'. Because $t_i > t_1, i > 1$, any country $i > 1$ will optimally shift towards the tax haven only; hence, there is no need to differentiate between high-tax and low-tax countries.

[13] We use the terms 'financial center' and 'profit center' interchangeably. The reason is that the literature on transfer pricing often refers to a profit center as the lowest-tax affiliate, which receives shifted income from mispriced intra-firm trade, while the debt-shifting literature often labels a financial center as the internal bank, which lends funds to and receives interest income from related affiliates. In our setting, the result is the same in that a profit/financial center can be used to shift income within the multinational firm.

[14] The alternative approach would be to rely on the deviation of the true arm's-length price only, featuring the 'comparable unrelated price method,' see OECD (2013) and Gresik and Osmundsen (2008) for institutional details. Qualitatively, our results do not depend on which approach is chosen.

[15] For simplicity and without any consequences for our main results, we have assumed that there are

uses its equity E_1 to finance its internal lending $\sum_i D_i^I$ to all the other affiliates so that $E_1 = \sum_i D_i^I$. For expositional purposes, we define the leverage ratio of the producing affiliate as $b_i = D_i^I / K_i$ and assume that both types of finance are free of risk and carry the world-market interest rate r.

In line with most tax systems, we assume that the costs of equity are not tax deductible while interest expense related to debt can be deducted from the corporate tax base. As is standard in the literature (e.g., Mintz and Smart, 2004; Schindler and Schjelderup, 2012), the MNC needs to incur concealment costs $C^I(b_i)$ in order to conceal thin capitalization. These costs are proportional to the amount of capital employed and convex for any positive internal leverage $b_i > 0$, but zero otherwise (i.e., $C^I(b_i) = 0$ for $b_i \leq 0$).

Given these assumptions, the economic profit of affiliate i is given by revenue from the sales of the output good minus the license cost for the intangible good, the input cost for the tangible intermediate good, the concealment costs related to tangible and intangible goods due to deviations from the arm's length standard, concealment costs of the thin-capitalization rules related to internal leverage, and the user cost of capital

$$\pi_i^e = p_i y_i - (G_i^X + q_X)\bar{X} - (G_i^S + q_S)S_i - C^P(P_i^X, P_i^S) - C^I(b_i)K_i - rK_i. \qquad (1)$$

Taxable income differs from economic profit in that opportunity costs of equity and concealment costs are not tax-deductible. Furthermore, we assume that no loss offset is granted when the affiliate is running taxable losses. Hence, if the realization of the output price p_i is too low, the government does not participate in the resulting losses and the tax payments are zero.[16] Let p_i^0 be the price for which the taxable income of affiliate i is just zero. The taxable income of affiliate i can then be written as

$$\pi_i^t = \begin{cases} p_i y_i - (G_i^X + q_X)\bar{X} - (G_i^S + q_S)S_i - rb_i K_i, & \text{if } p_i > p_i^0 \\ 0, & \text{if } p \leq p_i^0. \end{cases}$$

The (after-tax) surplus of the financial center in country 1 amounts to the receipt from each non-haven affiliate of license fees, payments for goods, and interest income, less the development cost of intangibles and input costs of tangibles, as well as the financial center's aggregate cost of capital [17]

no external capital markets for debt available.

[16] In reality, loss carry forwards imply that current losses can be deducted against future profits. However, loss carry forwards are not inflated with interest so that the present discounted value decreases. Therefore, our simplifying assumption of no loss offsets is harmless, because multinationals always have the incentive to settle losses in one affiliate with taxable profits in other affiliates.

[17] In this model, all income is shifted to the financial center. Then, this center uses part of its surplus to shift income to loss affiliates in non-haven countries.

$$\begin{aligned}\pi_1 &= (1-t_1)\sum_i[(G_i^X+q_X)\bar{X}+(G_i^S+q_S)S_i+rb_iK_i-q_X\bar{X}-q_SS_i]-r\sum_i b_iK_i \\ &= (1-t_1)\sum_i G_i^X\bar{X}+G_i^SS_i-t_1r\sum_i b_iK_i. \qquad (2)\end{aligned}$$

The HQ of the MNC maximizes total after-tax income Π by choosing the optimal income-shifting activity, i.e., by optimizing over leverages b_i, and the transfer prices G_i^X and G_i^S. With respect to the timing of the tax-planning strategies of the MNC, two scenarios are applicable. First, the MNC could choose its tax-planning strategies after the realization of the output price, say, at the end of the year. We refer to this scenario as 'ex-post income shifting.' Second, it could be that the MNC has to decide on and to commit to its income-shifting activities before the revelation of the output prices. We refer to this setting as 'ex-ante income shifting.' We examine each timing scenario below.

Note that in our model, we assume central decision making by the HQ. We do so to isolate how flexibility influences the cost structures of affiliates that are ex-ante (otherwise) identical, but, ex post, report net operating losses and profits, respectively. Thus, allowing for decentralization would add complexity without producing additional insights on the tax incentives. One justification is that firms can always rely on two books and multiple transfer prices in order to separate tax-driven income shifting from handling principal-agent problems in a decentralized trust structure (cf. Smith, 2002; Nielsen and Raimondos-Møller, 2012). Furthermore, from the economics literature, it is well-known that centralization becomes the dominant strategy when tax differentials become large and tax savings important (Nielsen et al., 2008). Gök and Schiller (2007, p. 692) survey mixed empirical evidence for the use of two books, but anecdotal evidence fosters the view that big multinational companies that are very tax efficient (aggressive) operate with multiple transfer prices.[18]

2.2 Ex-post income shifting

Ex post, the MNC knows about the realization of the output prices p_i. Taking this information into consideration, the MNC optimally shifts income into the affiliates that give the higher effective reduction in tax payments. We can distinguish the two cases $p_i > p_i^0$ (generating positive taxable income) and $p_i \leq p_i^0$ (generating zero income or losses).

[18] A point in case here is General Electric. See Daniel Kocieniewski on 'G.E.'s Strategies Let It Avoid Taxes Altogether' in The New York Times of March 24, 2011, and informal statements by General Electric's Treasury officials.

Positive taxable income. In the first case, the producing affiliates earn economic profits and therefore face the local tax rate t_i. The overall income of the MNC can be written as

$$\begin{aligned} \max_{b_i, G_i^X, G_i^S} \Pi = \quad & \pi_1 \quad + \sum_{i>1} \pi_i^e - t_i \pi_i^t \\ \text{s.t.} \quad & \pi_i^t \quad > 0, \\ & \textstyle\sum_i \quad rb_i K_i = 0, \quad \sum_i G_i^X \bar{X} = 0, \quad \sum_i G_i^S S_i = 0. \end{aligned} \tag{3}$$

Differentiating the total after-tax income for the three income-shifting variables and considering λ_i as the Kuhn-Tucker multiplier yields[19]

$$t_i - t_1 - \frac{1}{r} \frac{\partial C^I}{\partial b_i} \leq \lambda_i, \tag{4a}$$

$$t_i - t_1 - \frac{\partial C^P}{\partial P_i^X} \leq \lambda_i, \tag{4b}$$

$$t_i - t_1 - \frac{\partial C^P}{\partial P_i^S} \leq \lambda_i, \tag{4c}$$

where the first-order conditions hold with equality and $\lambda_i = 0$ if $\pi_i^t > 0$.

The first-order conditions state that the effective marginal concealment costs for each income shifting device equalize in the optimum, i.e. $\frac{1}{r}\frac{\partial C^I}{\partial b_i} = \frac{\partial C^P}{\partial G_i^X} = \frac{\partial C^P}{\partial G_i^S}$. Furthermore, if the taxable income in the producing affiliates is positive, the MNC is unconstrained in the use of all income-shifting channels ($\lambda_i = 0$) and effective marginal concealment costs are equal to the marginal tax savings $t_i - t_1$. The consequences are that the MNC sets transfer prices above the correct arm's-length prices, and that the financial center lends internal debt to the non-haven affiliates in order to shift income into the tax haven.

Non-positive taxable income. Whenever the output price is equal to or below the break-even price ($p_i < p_i^0$), the producing affiliates have neither economic profits nor taxable income, i.e., they are in a loss position. Therefore, tax payments drop to zero.

[19] Due to the fact that taxable losses do not lead to refunds (i.e., negative tax payments), we have to allow for corner solutions in our optimization and are forced to rely on the Kuhn-Tucker approach. Different from standard Lagrange maximization, the Kuhn-Tucker approach allows for constraints being fulfilled as inequalities (while Lagrange always assumes that constraints are perfectly binding). Generally, the Lagrange or Kuhn-Tucker multiplier measures the shadow price or shadow cost of relaxing the side constraint by one unit. In our model, the multiplier λ_i represents the marginal revenue loss from not receiving a tax reduction when being in a loss position (i.e., when $\pi_i^t < 0$); hence, $\lambda_i = t_i$ if $\pi_i^t < 0$ and $\lambda_i = 0$ otherwise.

The overall income of the MNC can be written as

$$\begin{aligned} \max_{b_i, G_i^X, G_i^S} \Pi = \quad & \pi_1 \quad + \sum_{i>1} \pi_i^e \\ \text{s.t.} \quad & \pi_i^t \quad \leq 0, \\ & \textstyle\sum_i \quad rb_i K_i = 0, \quad \sum_i G_i^X \bar{X} = 0, \quad \sum_i G_i^S S_i = 0. \end{aligned} \tag{5}$$

The optimization problem is similar to the case with positive taxable income and yields

$$t_1 + \frac{1}{r} \frac{\partial C^I}{\partial b_i} \geq \mu_i, \tag{6a}$$

$$t_1 + \frac{\partial C^P}{\partial P_i^X} \geq \mu_i, \tag{6b}$$

$$t_1 + \frac{\partial C^P}{\partial P_i^S} \geq \mu_i, \tag{6c}$$

where for this Kuhn-Tucker parameter holds $\mu_i = 0$ if $\pi_i^t \leq 0$.

Once more, the first-order conditions state that the effective marginal concealment costs for each income-shifting device are equalized in the optimum. In the case of losses ($\pi_i^t < 0$), the effective marginal concealment costs, in absolute terms, equal the marginal loss $-t_1$ from shifting out income. Accordingly, the MNC has an incentive to reduce the transfer prices for the intermediate good and license fee below the correct arm's-length price.[20] Moreover, the internal debt tax shield in affiliate i becomes negative and internal debt drops to zero. In fact, the MNC even has an incentive to use the non-haven affiliates as internal banks as long as these affiliates are in a loss position and their marginal tax rate is zero. We will, however, assume that the MNC cannot reallocate its equity.[21] In sum, the MNC shifts income into the non-haven countries, which means that the incentives for income shifting are completely reversed in a loss position compared to a profit position.

Tax-efficient capital structure. The mechanism at play under debt shifting is that interest income is earned in the low-tax (haven) country and deducted in higher-tax (non-haven) countries, so that the tax savings arising from the deductions in non-haven countries exceed the corresponding tax payments in the haven country.

Following the empirical debt-shifting literature (e.g., Huizinga et al., 2008, Møen et al., 2011), we assume concealment costs of (internal) debt to be quadratic in leverage,

[20] Implicitly, we assume that there are no concealment costs related to shifting income out of a tax haven, because the tax haven does not monitor financial flows.

[21] Note that the total interest expenses and income over the entire tax year matter for global tax savings. Relocating the financial center at the end of a tax year will not generate substantial tax-free interest income there so that inverting the financial structure (i.e., changing the financial center) at year's end will not deliver any reward anyway.

i.e.,

$$C^I(b_i) = \frac{\eta_b}{2} \cdot (b_i)^2 \,. \tag{7}$$

η_b represents a constant cost parameter of debt shifting. Applying equation (7) in the first-order condition (4a), we find as optimal internal leverage in the case of a profitable producing affiliate

$$b_i^* = (t_i - t_1)\frac{r}{\eta_b} > 0. \tag{8}$$

All affiliates $i > 1$ will borrow internal debt from the financial center and, due to improved possibilities to save taxes, the internal leverage is increasing in the internal tax debt shield, that is

$$\frac{\partial b_i}{\partial t_i} = \frac{r}{\eta_b} > 0 \quad \text{and} \quad \frac{\partial b_i}{\partial t_1} = -\frac{r}{\eta_b} < 0.$$

If taxable income is negative, the affiliate experiences a negative debt tax shield ($-t_1 r$) and the optimal internal leverage is zero in affiliates that are in a loss position $\pi_i^t < 0$.

Optimal transfer pricing. As in the case of debt shifting, the literature on transfer pricing suggests quadratic concealment costs (e.g., Haufler and Schjelderup, 2000; Grubert, 2003; Nielsen et al., 2010). Since the MNC in our model has two devices for shifting income by transfer pricing, G_i^X and G_i^S, it is reasonable to consider the two as cost substitutes, i.e., the two devices are mutually increasing each others' concealment costs. We define the concealment cost function of income shifting as

$$C^P(P_i^X, P_i^S) = \frac{1}{2}\left[\frac{\eta_X}{2}\left(P_i^X\right)^2 + \frac{\eta_S}{2}\left(P_i^S\right)^2\right]^2. \tag{9}$$

Using (9) as the cost function leads to the following optimal (abusive) transfer prices for the license fee and the intermediate good[22]

$$\left(G_i^X\right)^* = \sqrt[3]{\frac{\eta_S}{\eta_S + \eta_X} \cdot \frac{2}{(\eta_X)^2} \cdot (\mathbb{1} \cdot t_i - t_1)}\, \frac{1}{\bar{X}}, \quad \mathbb{1} = \begin{cases} 1, & \text{if } \pi_i^t > 0 \\ 0, & \text{if } \pi_i^t \leq 0. \end{cases} \tag{10a}$$

$$\left(G_i^S\right)^* = \sqrt[3]{\frac{\eta_X}{\eta_S + \eta_X} \cdot \frac{2}{(\eta_S)^2} \cdot (\mathbb{1} \cdot t_i - t_1)}\, \frac{1}{S_i}, \quad \mathbb{1} = \begin{cases} 1, & \text{if } \pi_i^t > 0 \\ 0, & \text{if } \pi_i^t \leq 0. \end{cases} \tag{10b}$$

Not surprisingly, the surcharge on the correct arm's-length prices is positive in case of a profitable affiliate ($G_i^X, G_i^S > 0$). In this case, the mark-up increases with the tax rate of the producing affiliates t_i, but decreases with the tax rate t_1 of the profit center

$$\frac{\partial G^a}{\partial t_i} > 0 \quad \text{and} \quad \frac{\partial G^a}{\partial t_1} < 0, \quad a = X, S.$$

[22] We deliver a full derivation of the optimal transfer prices in the appendix.

A higher tax differential makes transfer pricing more attractive, because shifting income will result in higher tax savings.

In contrast, the MNC sets transfer prices that lie below the correct arm's-length price if the affiliate is in a loss position ($G_i^X, G_i^S < 0$). This is because the effective marginal tax rate is zero, regardless of t_i. Consequently, income-shifting incentives are reversed as long as the producing affiliates have non-positive taxable income (i.e., zero tax payments). In this case, the tax rate t_i does not affect the magnitude of the transfer prices. Contrary to before, now an increase of the tax rate t_1 in the profit center leads to a further deviation from the correct arm's-length price and to more income shifted to the producing affiliates. The reason is that the tax disadvantage of the tax haven increases relative to the effectively zero tax burden in the non-haven countries.

Putting both aspects together, affiliates of MNCs bunch around zero taxable income. For profitable affiliates, the HQ has an incentive to shift income into the haven country, whereas affiliates with taxable losses in the operating business will receive income from affiliates abroad (the financial center). For zero taxable income, the incentives to shift reverse. As a comparison, because domestic companies cannot shift income internationally, they cannot buffer their operating profits with losses and vice versa. Hence, the income distribution around zero is much less compressed for domestic firms than for affiliates of MNCs.

2.3 Ex-ante income shifting

If the MNC must decide ex ante on transfer prices as well as the level of internal debt, it cannot revisit these decisions after the output prices are revealed. The MNC's HQ maximizes the expected overall income, taking into consideration that the output prices p_i are stochastic and follow a cumulative distribution function $H(p)$ with support $[\underline{p}, \bar{p}]$. Then, expected income of a non-haven affiliate is

$$\begin{aligned} E(\pi_i) &= \int_{\underline{p}}^{\bar{p}} p_i h(p)\, dp \cdot y_i - (G_i^X + q_X)\bar{X} - (G_i^S + q_S)S_i - rK_i \\ &+ [1 - H(p_i^0)] \cdot t_i[(G_i^X + q_X)\bar{X} + (G_i^S + q_S)S_i + rb_iK_i] \\ &- t_i \int_{p_i^0}^{\bar{p}} p_i h(p)\, dp \cdot y_i - C^P(P_i^X, P_i^S) - C^I(b_i)K_i. \end{aligned} \tag{11}$$

The first line displays affiliates' economic profits; the size of the economic profits depends on the realization of p_i which is ex-ante uncertain. Additionally, affiliates have to pay taxes in the case of a sufficiently high output price. This happens only with the likelihood $[1 - H(p_i^0)]$. In any other case, tax payments in country i are zero. The last two terms in the third line show that the MNC incurs concealment costs for debt shifting and transfer

price manipulation. Accordingly, overall expected income of the MNC can be written as

$$E(\Pi) = \sum_{i>1} E(\pi_i) + (1 - t_1) \sum_i G_i^X \bar{X} + G_i^S S_i - t_1 r \sum_i b_i K_i. \tag{12}$$

Differentiating the expected after-tax income of the MNC for the three tax-avoidance variables, taking into consideration that the price p_i^0 is affected by changes in the transfer prices and internal debt, gives[23]

$$[1 - H(p_i^0)]t_i - t_1 = \frac{1}{r}\frac{\partial C^P}{\partial b_i}, \tag{13a}$$

$$[1 - H(p_i^0)]t_i - t_1 = \frac{\partial C^P}{\partial P_i^X}, \tag{13b}$$

$$[1 - H(p_i^0)]t_i - t_1 = \frac{\partial C^P}{\partial P_i^S}. \tag{13c}$$

With uncertainty in the realization of the output price, the risk neutral MNC is more cautious in setting transfer prices and allocating internal loans. The MNC only wants to shift income to the financial center if the producing affiliate has taxable income. The probability for this case ($\pi_i^t > 0$) to happen is $1 - H(p_i^0)$. Therefore, it is the *expected* tax rate (as opposed to the statutory tax rate) of the producing affiliate, $[1 - H(p_i^0)]\ t_i$, that matters for determining the tax savings ex ante. Consequently, overinvoicing transfer prices and internal debt shifting becomes less attractive if the probability of being unprofitable, $H(p_i^0)$, increases.

This insight leads to precautionary behavior and self-insurance that can be two-fold.[24] In order to self-insure against a low price and potential losses, firms can 'underinvest' in transfer pricing and internal leverage, which will reduce the exposure to the risk of ending up with losses that are not tax deductible. In addition, firms being at risk of running losses can choose instruments that allow for more flexibility during the tax year. For example, firms can choose to take more short-term internal leverage and reduce long-term obligations. Assuming a normal term structure of interest rates, this comes at the cost of less interest expense, but might allow for an easier re-adjustment of the capital structure during the tax year. Similarly, firms can choose to invoice licenses for intangibles either by a fixed license fee; by royalty payments that depend on the quantity sold or on sales revenues; or by a combination of both. Using royalty payments based on sales revenues would feature ex-ante implemented self-insurance, because the total transfer payments will automatically adjust to low- or high-income realizations. Combining this feature with a fixed-fee component even allows for ex-post calibration if the fee can be

[23] We deliver a full derivation of the ex-ante optimality conditions in the appendix.

[24] The following argument is an analogy to precautionary savings or investment into human capital analyzed in the economic literature.

adjusted during the tax year. Indeed, empirical studies find that only about 10 to 30% of firms rely on fixed license fees only, while the rest uses some kind of royalty payments. The vast majority of these firms seems to have combined invoicing systems (i.e., royalties plus a fixed fee) in place.[25]

2.4 Theoretical predictions

The theoretical model offers several predictions, which we are able to test empirically. First, in line with the prior literature (Grubert et al., 1993), the model predicts that, compared to purely domestic firms, affiliates of MNCs should report lower income if the affiliate is profitable. Analogously, under losses, affiliates of MNCs should report lower losses than purely domestic firms. In both cases, the reason is that MNCs can adjust their transfer prices and the financial structure to shift income between countries. We summarize this finding in:

Prediction H1 *Affiliates of multinational corporations report lower profits (smaller losses) when running profits (losses) as compared to purely domestic firms.*

Second, we should expect that income of MNC affiliates bunches around zero more so if the MNC has the possibility to adjust income-shifting strategies ex post – after the actual output price p_i is known (i.e., by the end of the year). As a result, affiliates of MNCs (even with the same output) will differ in their cost structures, but will all bunch around zero income due to the ability of ex-post income shifting. More precisely, our model predicts the following:

Prediction H2 *Under ex-post income shifting, affiliates of multinational corporations feature lower transfer prices and internal leverage if they are in a loss position ($\pi_i^t < 0$ before any income-shifting operation) than if they are profitable (i.e., $\pi_i^t > 0$).*

Third, if the MNC must commit to its income-shifting strategy ex ante, we should observe differences in the profit levels of these affiliates which stem from differences in the realization of the output price. However, incentives for income shifting are the same for all affiliates ex-ante, i.e., we should observe an identical cost and financial structure across affiliates. We summarize this idea as follows:

Prediction H3 *Under ex-ante income shifting, affiliates of multinational corporations will feature the same transfer prices and internal leverage, regardless of whether they are in a loss or profit position.*

We note that if the probability of being unprofitable increases, we should observe a reduction in the income-shifting incentives of ex-ante income shifters only. Incentives for

[25] See San Martín and Saracho (2010), p. 284 for a brief summary.

ex-post income shifters are not affected by the ex-ante probability of being unproductive since they decide on income-shifting strategies after the realization of the output price. We would like to test this effect of an increase of the loss probability empirically, as well. However, our data set provides us with too little variation and information to do so.

3 Data and descriptive statistics

Our sample is constructed by combining three unique data sources. First, Dun&Bradstreet provides data on financial statistics for all companies registered in Norway. Second, SIFON gives information about foreign ownership of Norwegian firms. Third, the Norwegian Tax Authorities (Skattedirektoratet) and Statistics Norway collected direct data on transactions and debt relationships between Norwegian firms and foreign affiliates (Utenlandsoppgaven), in both cases of whether the Norwegian firm is either the multinational parent/HQ, or a daughter (i.e., subsidiary) of a foreign firm. These three data sources are merged, using an identification key that identifies each Norwegian firm uniquely.

Although we do not observe the actual transfer prices, the big advantage of using Norwegian data is that we can observe the direct transfer payments made ('outgoing') and received ('ingoing') between each firm's affiliates in several categories. We contrast this feature with prior research that, due to data limitations, can only indirectly infer transfer pricing- or internal leverage-related income shifting by examining the empirical association between affiliate rates of return and tax rate differentials. In our study, we use transfer payments as a proxy for the transfer prices predicted in our theory model. For example, outgoing transfers include payments for intangible goods, e.g., royalties, license fees, and rental expenditures, as well as for tangible intermediate goods, e.g., purchases, that the Norwegian firm makes to a foreign affiliate.[26] Similarly, the Norwegian data allow us to observe the capital structure of each affiliate. This feature allows us to measure internal debt shifting. We classify a Norwegian firm as a MNC if it either controls at least one daughter company abroad or is controlled by a foreign owner. That is, the Norwegian firm is an MNC if it either owns, directly or indirectly, at least 50% of a foreign affiliate, or a foreign owner directly controls at least 50% of the shares of the Norwegian firm.

Our panel data covers the eight-year period from 1998 to 2005, and it includes all firms except financial firms and producers of oil and gas, which are subject to special laws and regulations, including restrictions on prices.[27] The variation in the data is limited;

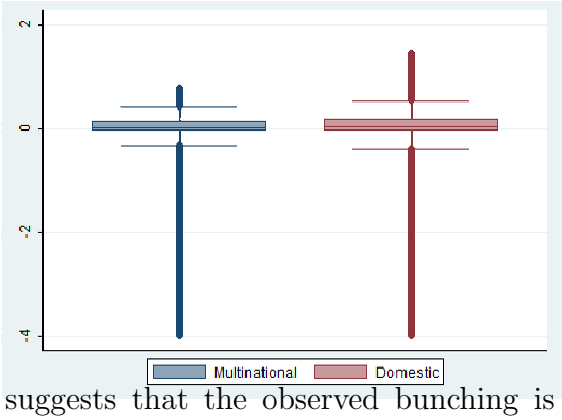
[26]We use the term 'outgoing' in reference to the Norwegian entity, because Norway is typically considered a high-tax jurisdiction, and the Norwegian entity is typically structured to be paying royalties, licenses, and purchases rather than recording income for such activities.

[27]The length of the sample period is limited by the fact that detailed data on transactions is not disclosed for later years. We also note that the observations used in our sample can be applied directly to our theory model because Norway does not have any loss carry back and introduced thin-capitalization rules, restricting the use of internal debt, in 2014.

in particular, there is not much variation in each firm's loss/profit positions over time. Therefore, we try to preserve as much as possible of the original data. We only exclude some very few observations with extreme values, notably negative sales and negative total assets. Finally, the measures for transfer payments are winsorized at the 1st and 99th percentiles, while we restrict the total internal leverage to the interval $[0; 1]$.[28]

In Figure 1, we start by examining the distribution of income before taxes (scaled by total assets) of both MNCs (left plot) and purely domestic firms (right plot). It is clear from the graphics of the vertical lines above zero that pre-tax income is smaller for MNCs than purely domestic firms when firms report positive pre-tax profits. The picture is somewhat less clear for firms in a loss position. However, the quantile marks indicate that MNCs bunch around break-even to a larger extent than purely domestic firms when in a loss position. These observations provide support for H1 and are in line with prior evidence in Grubert et al. (1993).

Figure 1: Distribution of pre-tax income over assets



The theoretical model suggests that the observed bunching is due to reversed incentives for income shifting under profits versus losses. It is, however, uncertain how much flexibility MNCs have when it comes to adjusting their transfer prices and internal leverage. The theoretical model offers two contrasting predictions. H2 states that, under ex-post shifting, MNC affiliates will feature lower transfer payments and internal leverage if they are in a loss position (i.e., $\pi_i^t < 0$ before any income shifting operation) compared to a profit position ($\pi_i^t > 0$). H3 considers the low-flexibility situation when MNCs have to commit to income-shifting strategies ex ante. If this is the representative scenario, we should observe an identical transfer pricing and internal capital structure across affiliates, regardless of whether they are in a loss or profit position. The remainder of our empirical analysis seeks to identify which of H2 and H3 applies more consistently to transfer pricing and internal leverage under losses, i.e., to which extent each income-shifting strategy is a function of whether or not the affiliate experiences a loss.

[28] 39 and 6 observations, respectively, are deleted from the sample of MNCs due to negative sales and negative total assets. 303 observations with an internal leverage outside the interval $[0; 1]$ are excluded from the analysis of internal debt, but are retained in the tests of transfer payments.

Table 1: Descriptive statistics, main dependent variables.

	Full sample	In loss position	Not in loss position	Difference
Net outgoing transfer payments				
All MNCs	-1.68	-1.39	-1.85	0.46
(St.dev.)	(10.19)	(9.15)	(10.77)	
Number of obs.	5,455	2,088	3,367	
Norwegian daughters	0.63	-0.65	1.43	-2.08***
(St.dev)	(8.39)	(5.50)	(6.69)	
Number of obs.	609	234	375	
Total internal debt				
All MNCs	4.61	4.09	4.94	-0.85**
(St.dev.)	(14.67)	(13.83)	(15.16)	
Number of obs.	5,226	1,989	3,237	
Norwegian daughters	4.66	3.12	5.60	-2.48*
(St.dev)	(15.22)	(12.14)	(16.77)	
Number of obs.	583	221	362	

Transfer payments and internal leverage are standardized as % of the
firm's average total assets over the time period and winzorized at the 1% level.
See appendix for further definition of variables.
*** p<0.01, ** p<0.05, * p<0.1

In order to test H2 and H3, we use a sample of only MNC firms. We generate a dummy variable (L_{it}) that is equal to 1 if the Norwegian firm i is in a loss position in year t, and that is zero otherwise. As we explain later, this measure will be our independent variable of interest. In terms of dependent variables, we first calculate net outgoing transfer payments as outgoing transfers minus incoming transfers, where transfer payments include the sum of royalties, licenses, rent, and purchases. We scale transfer payments by the mean total assets of the Norwegian affiliate over the sample period. Second, we calculate the internal leverage ratio as affiliate (short- and long-term) debt, scaled by mean total affiliate assets over the sample period. Using the mean total assets in the denominator ensures that any changes in transfer payments or internal leverage are caused by changes in income shifting rather than assets.

Table 1 takes an initial descriptive look at the relation between being in a loss position and income-shifting strategies (i.e., on transfer payments and internal debt). In contrast to what theory predicts, we observe in the full sample of MNCs that MNCs in a loss position do not have higher net outgoing transfers compared to MNCs in a profit position. However, Dischinger et al. (2014) offer a plausible explanation in that they find the income distribution is skewed in favor of the headquarters' location. This indicates that the headquarters plays a unique role in MNCs, or to quote the title of their paper, "There is no place like home". Moreover, their results are well grounded in theory that points to agency costs and moral-hazard problems between the headquarters and

the profit/financial center.[29] Hence, we also look at the sub-sample of MNCs that are controlled by foreign owners, i.e., at daughter companies only. For this sub-sample, we obtain the expected negative sign, and the difference is statistically significant ($p < 0.01$), suggesting that daughter companies make far fewer net outgoing transfer payments to affiliates when in a loss position than under a profit position. Due to the difference in behaviors between headquarter vs. daughter entities, in the remainder of the empirical discussion we will study and report the full sample of MNCs separate from the sub-sample of only daughter companies.

The difference between the full sample of MNCs and the Norwegian daughters is less visible when looking at internal leverage. In both cases, firms in a loss position hold less debt than those in a break-even or profit position. In fact, this difference is larger for the sub-sample of daughters. Overall, the descriptive results suggest that there is flexibility in both devices – transfer payments and internal leverage – for income-shifting. However, it would be premature to draw any conclusion before employing multivariate regression tests.

In particular, the first concern that regression tests can address is the potential for autocorrelation in performance. If losses in previous years are a good predictor of the probability of running losses also at time t, firms can adjust their strategies based not only on present, but also past performance. Failing to control for such dynamics will give rise to an omitted variables bias. We report the autocorrelation of losses in Table 2. It is evident that being in a loss position in one year is a strong predictor of performance in the next two years. As a result, we take this relation into account when specifying the empirical model later.

Table 2: Autocorrelation in loss positions

All MNCs	Loss at time t	Loss at time $t-1$
Loss at time $t-1$ ($N = 5,455$)	0.40***	
Loss at time $t-2$ ($N = 4,680$)	0.28***	0.39***
Daughters	Loss at time t	Loss at time $t-1$
Loss at time $t-1$ ($N = 609$)	0.37***	
Loss at time $t-2$ ($N = 528$)	0.29***	0.41***

*** p<0.01, ** p<0.05, * p<0.1

In addition, our regression tests must control for several key characteristics of the firm. The choice of control variables is motivated by earlier literature on income shifting, e.g., Møen et al. (2011), Büttner and Wamser (2013), Huizinga et al. (2008), and Rajan and Zingales (1995) for debt shifting as well as Grubert (2003) and Huizinga and Laeven (2008) for transfer pricing. First, pre-tax income as share of total assets serves as a performance measure. Second, the maximum tax rate differential between affiliates within the MNC captures the potential payoff from income shifting in terms of utilizing

[29] Also see O'Donnell (2000), Chang and Taylor (1999), and Hamilton and Kashlak (1999).

a lower tax rate. Third, (the log of) total assets acts as a control for size. Fourth, we include the age of the firm. Finally, we control for the tax loss carry forward.

Panel A in Table 3 presents descriptive statistics for the explanatory variables for each of the four main regressions to be discussed (i.e., transfer payment and internal leverage tests using the full MNC and daughters-only samples). Importantly, we observe that losses occur in 38% percent of the observations, and that this proportion is remarkably stable across all four samples.

In Panel B, we report the number of observations and the number of observed losses [in brackets] for each year.[30] Due to missing variables in the control variables, the number of observations is much lower in 2005 than in the earlier years. We have investigated whether this lack of observations affects our results (not reported). First, we imputed missing values in 2005 by replacing those missing with the values for 2004. Second, we re-ran the regressions while excluding the year 2005. In both tests, our results are unaffected.

4 Empirical analysis

4.1 Empirical strategy

Following from the discussion above, the empirical investigation relies on OLS estimations of variations of the following equation:

$$y_{ijt} = \beta_0 + \beta_1 L_{ijt} + \beta_2 L_{ijt-1} + \beta_3 L_{ijt} * L_{ijt-1} + \boldsymbol{z}'_{\boldsymbol{ijt}}\boldsymbol{\theta} + \delta_t + \alpha_j + \epsilon_{ijt} \tag{14}$$

where the dependent variable y_{ijt} is either transfer payments or internal leverage in affiliate i, being active in industry j at year t. In the main specifications, we successively use gross and net outgoing transfers, as well as total internal leverage. We use variations of these variables in robustness checks, reported later.

Our key independent variable is L_{ijt}, or the loss-position indicator, making β_1 the coefficient of interest in our study. According to H2, β_1 should be significantly negative if firms have the flexibility to adjust their income shifting ex post. If the ex-ante scenario is relevant, however, it follows from H3 that β_1 should be insignificantly different from zero because firms must commit to their transfer payments and internal leverages, respectively, at the beginning of the tax year, and being in a current loss position would not have any influence in this scenario.

[30] Note that the empirical model technically starts with time t being 1999 rather than 1998, because we require a one-year lag to capture prior losses (i.e., 1997 losses are not available). Therefore, the total counts in Panel B, which include observations in 1998, as a share of each respective sample do not correspond to the share of total losses in each sample as reported in Panel A (as well as in Table 1), with the Panel B observations in 1998 accounting for the difference.

Table 3: Descriptive statistics, explanatory variables.

Panel A: Descriptive statistics for main regression samples.

Regression	Net outgoing transfer payments, all MNCs ($N = 5,455$)	Net outgoing transfer payments, only daughter companies ($N = 609$)	Total internal leverage, all MNCs ($N = 5,226$)	Total internal leverage, only daughter companies ($N = 583$)
Loss position dummy	0.38	0.38	0.38	0.38
	(0.49)	(0.49)	(0.49)	(0.49)
Losses both at time t	0.25	0.25	0.25	0.24
and $t-1$	(0.43)	(0.43)	(0.43)	(0.43)
Pre-tax income as share	-0.03	-0.01	-0.03	-0.01
of total assets	(0.45)	(0.32)	(0.45)	(0.32)
Maximum tax rate	0.02	0.01	0.02	0.003
differential	(0.09)	(0.07)	(0.08)	(0.07)
Log of total assets	11.13	11.49	11.13	11.49
	(1.60)	(1.44)	(1.58)	(1.44)
Company age	17.81	14.47	17.81	14.60
	(19.24)	(14.31)	(19.17)	(14.11)
Loss carry forward as	0.01	0.11	0.02	0.12
share of pre-tax income	(0.77)	(0.87)	(0.78)	(0.89)

Panel B: Number of observations in each year for the main regressions [number of obs. in loss position in brackets]

1998	494 [190]	42 [20]	491 [190]	42 [20]
1999	536 [171]	53 [17]	536 [171]	53 [17]
2000	786 [295]	89 [39]	785 [295]	89 [39]
2001	958 [444]	101 [45]	956 [443]	101 [45]
2002	996 [443]	107 [44]	993 [441]	107 [44]
2003	973 [371]	110 [46]	883 [332]	110 [41]
2004	942 [284]	120 [35]	853 [248]	120 [30]
2005	264 [80]	29 [8]	220 [59]	29 [5]

In Panel A, mean values are reported; standard deviations are given in parantheses. See appendix for further definition of variables.
Pre-tax income and loss carry forward are winzorized at the 1% level.

As discussed above, the substantial autocorrelation in losses means that earlier years' performance is an important control for the expectations on performance in year t. Moreover, this expectation can have a direct impact on how a firm reacts to losses in year t. Hence, in the regressions we include the lagged loss position, as well as an interaction term between the current and lagged loss position that is equal to one if a firm experienced a loss position both at time t and $t-1$. The interaction term captures the use of ex-ante strategies that allow for some flexibility during the tax year (see the discussion of precautionary behavior at the end of subsection 2.3). By including both a simple lagged term and the interaction term, we try to control for the expectations on the loss probability $H(p_i^0)$, being relevant in the ex-ante shifting scenario, cf. equations (13a) to (13c). $\boldsymbol{z_{ijt}}$ is a vector that includes the control variables discussed in the previous section. In addition, all regressions include time and industry fixed effects, represented by δ_t and α_j, respectively.

Before proceeding to the empirical results, we caution the reader when interpreting the coefficient for the current loss-position dummy. In particular, the point estimates are likely biased for two reasons. First, since the income-shifting decisions affect the probability of being in a loss position, and, thus, L_{ijt}, β_1 can be subject to simultaneity bias. In Appendix A.3 the bias is derived and studied formally. The conclusion is that the simultaneity gives an attenuation bias in our main results, suggesting that our estimates are conservative.

Second, the interpretation of our results depend on the ability to control for relevant firm characteristics. Since the data do not contain enough variation to use firm fixed effects, one may fear that the results are driven by unobservable characteristics. Specifically, we recognize that the baseline regressions compare companies with very different performances. Companies with large profits or losses can be very different from those that are close to break-even, despite being on the same side of zero. In order to investigate whether our results are sensitive to this issue, we also estimate the model using sub-samples consisting only of firms close to break-even. Similar strategies for reducing problems related to unobservable characteristics have been used in previous research, e.g., Ferraz and Finan (2008) and Hopland (2014).

Finally, affiliates with persistent losses might be unique and could be treated differently by MNCs. Running persistent losses should feature a high risk of bankruptcy. However, in case of bankruptcy, all income shifted to such an entity would be lost for the MNC. Though unlikely, it could also be that affiliates with persistent losses were set up to generate losses deliberately. Alternatively, it could simply be that these firms are badly managed and feature strong agency problems between the affiliate's management and the headquarters. In order to be sure that persistently loss-making affiliates are not driving our results, we exclude them from the regressions in a final robustness test.

Despite our attempts to address the shortcomings in the data, we remain reluctant to interpret the point estimates as marginal effects from being in a loss position. Rather,

we restrict ourselves to a discussion about how the direction of the effects corresponds to the predictions from the theoretical model, and the extent to which the estimated effects appear robust.

4.2 Results

Table 4 presents the main results for testing whether transfer-pricing and payment strategies are a function of losses. Columns (A) and (B) present results for our main empirical model, identical to equation (14); this specification will also be used in all robustness analyses. In Column (A), we include all Norwegian based MNCs in our estimation of net outgoing transfers. In line with our descriptive evidence, there is no significant difference in transfer payments between companies with profits and losses when including all MNCs. Consistent with the findings in Dischinger et al. (2014), we assume that this, at least to some extent, is explained by the unique behavior of Norwegian parent companies. Thus, we devote Columns (B)-(G) to studying Norwegian daughter companies only.

Column (B) reports our main estimates for Norwegian daughters. Recall that in the descriptive statistics, we found a statistically significant raw difference of -2.08 between profit and loss daughter entities. After conditioning on the control variables in our multivariate tests, the effect from being in a current loss position is even stronger, with a coefficient of about -2.8 ($p < 0.05$). Given that Norway is already a high-tax jurisdiction with baseline incentives to shift income out to lower-rate jurisdictions when the Norwegian entity is profitable, our results suggest that Norwegian daughter companies shift out less income using transfer payments under losses than under profits. This behavior is consistent with our theoretical model that demonstrates affiliates can either shift more income in, or shift less income out, when the affiliate runs losses.

Perhaps somewhat surprisingly, none of the coefficients on the control variables are significant. This is probably due to the limited variation in net outgoing transfers; of the 609 observations in the regressions, close to 500 take the value of zero, while the remaining observations are almost evenly distributed between positive and negative. In addition, the industry and time fixed effects capture a substantial amount of the variation, ultimately yielding an R-squared of almost 0.21.

In Column (C), we only include the loss position variables (as well as the industry and year fixed effects) and exclude the controls. We observe that omitting the control variables reduces the size (in absolute terms) and significance of the coefficient for the loss position dummy ($p < 0.10$) compared to Column (B). This result illustrates the importance of the control variables, even though they are individually mostly insignificant. In Column (D), we exclude the interaction term between losses at time t and $t-1$ and instead, add a second lag of the loss position dummy (i.e., at time $t-2$) as an additional control for persistence. We observe that the coefficient for the main loss position dummy at time

Table 4: Estimation of transfer payments.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
	All MNCs	Norwegian daughters					
	Net outgoing transfers	Net outgoing transfers	Net outgoing transfers	Net outgoing transfers	Net outgoing transfers	Gross outgoing transfers	Gross incoming transfers
Loss position at time t	-0.0300	-2.813**	-1.748*	-2.752**	-3.381**	-3.123*	0.421
	(0.452)	(1.324)	(0.929)	(1.220)	(1.510)	(1.618)	(0.720)
Loss position at time $t-1$	0.198	-1.259	-1.019	-0.636	-0.527	-2.093*	-0.188
	(0.380)	(0.830)	(0.684)	(0.541)	(0.911)	(1.081)	(0.388)
Loss position at time $t-2$				-0.678	-1.449		
				(0.688)	(0.946)		
Loss position both	0.674	0.448	0.190		-0.118	1.020	0.370
at t and $t-1$	(0.650)	(1.075)	(0.930)		(1.201)	(1.183)	(0.717)
Loss position both at					1.753		
t and $t-2$					(1.405)		
Pre-tax income as share	-0.0739	-0.874		-1.727	-1.509	-0.883	-0.00938
of total assets	(0.203)	(1.244)		(1.190)	(1.165)	(1.886)	(0.444)
Maximum tax rate	-3.028	5.896		7.890	8.103	15.32	2.801
differential	(3.046)	(7.931)		(9.842)	(9.790)	(13.79)	(2.090)
Log of total assets	-0.309*	-0.678		-0.680	-0.664	-0.695	0.418**
	(0.167)	(0.422)		(0.464)	(0.466)	(0.660)	(0.189)
Company age	-0.00338	-0.0109		-0.00184	-0.00146	-0.0603	-0.0157
	(0.0128)	(0.0482)		(0.0511)	(0.0510)	(0.0721)	(0.0138)
Loss carry forward as	0.244	-0.208		-0.241	-0.158	-0.109	0.00642
share of pre-tax income	(0.161)	(0.414)		(0.420)	(0.401)	(0.550)	(0.262)
Observations	5,455	609	720	528	528	609	609
R-squared	0.087	0.208	0.176	0.232	0.234	0.188	0.082

A constant term and time and industry dummies (not reported) are included in all regressions. The transfers are standardized as % of the firm's average total assets over the period. See appendix for further definition of variables.

*** p<0.01, ** p<0.05, * p<0.1

t is almost identical to the main estimate in Column (B), despite the fact that we lose observations by adding an extra lag. In Column (E), we estimate a very ambitious model, including two lags for the loss position dummy, in addition to interactions both between losses at t and $t-1$ and t and $t-2$. This formulation should capture persistence in losses and the effect these may have on present-day decisions, although we consider it to be too data demanding to serve as our main specification given the lower observation count. Interestingly, the coefficient for the current loss position dummy becomes more negative and significant than in Column (B). The fact that the effect of losses on net outgoing transfers seems to be stronger after we control for more variables suggests that our main estimate in Column (B) is likely a conservative estimate of the true effect.

To further confirm that Norwegian daughters are shifting out less income as opposed to shifting in more income when the affiliate has losses, in Columns (F) and (G) we split the net outgoing transfers into gross outgoing and gross incoming transfers. We find that our model explains much more of the variation in outgoing transfers than for the incoming transfers. Moreover, we observe that the effect on net outgoing transfers is entirely driven by a reduction in gross outgoing transfers as reported in Column (F), while the incoming transfers remain unchanged as reported in Column (G).

Given the results that daughter companies experience lower outgoing transfer payments than profitable firms, we explore in our next set of tests whether the flexibility in transfer payments is higher due to the internal transfer pricing of intangibles compared to tangibles. We believe it is reasonable to assume that the flexibility is greater for intangible goods than for tangible goods, as arm's length prices are more difficult (or impossible) to observe for intangibles (e.g., trademarks and patents) compared to tangibles (e.g., cost of materials). In addition, payments for intangibles are typically due at the end of the tax year instead of being a regular expenditure during the year as for tangibles, thus affording intangibles more flexibility to respond to losses using income shifting. To explore this issue, we successively re-estimate our main regression (see Equation 14) by using the two transfer payment types as the dependent variable. In particular, we measure net outgoing transfers related to intangibles as the sum of royalties, licenses, and rent; we measure net outgoing transfers related to tangibles as the sum of cost of materials.

The results in Table 5 indicate, as expected, that the previously documented link between losses and net outgoing transfer payments are more likely due to payments for intangibles than tangibles, as seen by the significantly negative coefficient on the loss position dummy in Column (A), but the insignificant coefficient in Column (B). These results corroborate common intuition and our theoretical model that flexibility in transfer prices for loss firms appears when one would more likely expect. Ideally, we would like to use this level of analysis throughout our study, but splitting the transfer payments along these lines significantly reduces variation in a dataset that already has limited variation. Therefore, we continue to use the sum of all transfer payments, whether from intangibles

Table 5: Transfer payments split on net outgoing payments for intangibles and tangibles. Only daughter companies included.

	(A) Intangibles	(B) Tangibles
Loss position at time t	-0.0155*	-0.00691
	(0.00909)	(0.00663)
Loss position at time $t-1$	-0.00655	-0.00158
	(0.00494)	(0.00369)
Loss position both	0.00513	-0.00148
at t and $t-1$	(0.00627)	(0.00598)
Pre-tax income as share	-0.0125*	0.00409
of total assets	(0.00740)	(0.00434)
Maximum tax rate	0.0711	-0.0402**
differential	(0.0500)	(0.0190)
Log of total assets	-0.00164	-0.00207
	(0.00221)	(0.00162)
Company age	2.73e-06	8.77e-05
	(0.000342)	(0.000109)
Loss carry forward as	-0.00280	0.000471
share of pre-tax income	(0.00188)	(0.00243)
Observations	609	609
R-squared	0.250	0.137

A constant term and time and industry dummies (not reported) are included in all regressions. The transfers are standardized as % of the firm's average total assets over the period. Intangibles include royalties license fees, rental expenditures, and R&D. Tangibles include purchases (cost of materials). See appendix for further definition of variables.

*** p<0.01, ** p<0.05, * p<0.1

or tangibles, in the main analysis.

Table 6 presents our main results for internal leverage. As when studying transfer payments, it is reasonable to expect that it is not trivial whether a firm is a parent or daughter company. Hence, Table 6 has the same structure as Table 4, with estimations using the full sample of MNCs in Column (A), and estimations using only Norwegian daughters in Columns (B)-(G).

Recall from the descriptive statistics that there was a negative raw difference in total internal leverage for loss versus profit firms, in both the full sample of MNCs and daughters only. However, we see from Column (A) that after controlling for a wide set of covariates in a regression framework, the coefficient for our current loss position dummy is insignificant. The control variables seem to be of some more importance when estimating internal leverage, most likely because this variable contains more information than

the transfer payments. In particular and as expected, the maximum tax rate differential yields a significantly positive sign in Column (A), suggesting that debt tax shields increase as tax rate differences between affiliates increase. In addition, large companies have more internal leverage than smaller firms.

When studying the total internal leverage in Norwegian daughter companies in Columns (B)-(G), we continue to yield insignificant coefficients for the current loss-position dummy. Among the control variables, only the pre-tax income as share of assets is significant. The negative coefficient suggests, as expected, that more profitable affiliates report lower internal debt (after conditioning on all other variables). Re-estimating our models without controls in Column (C), with additional lags in Column (D), and an ambitious model with multiple lags and interaction terms in Column (E), we continue to find insignificant coefficients on the loss position dummy. Finally, in Columns (F) and (G), respectively, we report the results for splitting internal leverage into short-term and long-term maturities. Again, the coefficient for the loss-position dummy is not significant at any conventional level of significance in either of the two splits.

Table 7 presents the first of two sets of robustness tests for our transfer payment and internal leverage estimations. In our first set of tests, we use sub-samples of daughter firms close to break-even. Using these sub-samples helps to reduce problems related to unobservable characteristics, since we only compare firms with similar performance. In Columns (A) and (B), we restrict the sample to daughter companies with pre-tax income over assets between the 25th and 75th percentile, i.e., we throw out the highest and lowest performers in year t. In Columns (C) and (D), we go much further and keep only daughter companies with pre-tax income over assets between -1.5% and 1.5%. We observe that the number of observations is reduced heavily in both cases.

The results for net outgoing transfers are displayed in Columns (A) and (C). Interestingly, we see that the coefficient on the loss position dummy becomes more negative compared to the main regressions in Table 4. Specifically, when using the less restrictive cut-off in Column (A), the coefficient is more than twice as negative as in the main tests [i.e., Column (B), Table 4], while it is more than three times as negative when using the more restrictive cut-off in Column (C). As explained in the previous section, we hesitate to interpret the coefficients as marginal effects. However, the fact that the coefficients become more negative as (1) our sample size is drastically reduced; (2) we seek to reduce problems related to omitted variables; and (3) the fact that the simultaneity bias probably causes an attenuation bias, indicate that our main results are not overestimated. Hence, we are confident that MNCs (at least daughter companies) use transfer-pricing strategies in order to shift losses, not only profits. In total, being rather a conservative estimate, the significantly negative coefficient on the loss-position dummy gives support for the ex-post scenario in the case of transfer pricing, consistent with H2.

Results for total internal leverage are reported in Columns (B) and (D). We observe

Table 6: Estimation of internal leverage.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
	All MNCs	Norwegian daughters					
	Total internal leverage	Total internal leverage	Total internal leverage	Total internal leverage	Total internal leverage	Short-term internal leverage	Long-term internal leverage
Loss position at time t	0.00547	-0.520	0.505	-1.857	-0.444	0.694	-1.214
	(0.624)	(2.313)	(2.195)	(1.467)	(2.735)	(1.937)	(0.856)
Loss position at time $t-1$	-0.118	0.381	0.247	-1.881	0.796	1.713	-1.332
	(0.612)	(2.118)	(1.796)	(1.457)	(2.753)	(1.785)	(0.810)
Loss position at time $t-2$				-1.513	-2.788		
				(1.866)	(2.340)		
Loss position both	0.319	-3.862	-3.648		-5.750	-4.605	0.743
at t and $t-1$	(0.947)	(3.690)	(3.133)		(4.573)	(3.258)	(1.024)
Loss position both at					2.661		
t and $t-2$					(2.919)		
Pre-tax income as share	0.358	-3.511**		-4.245**	-4.406**	-2.414	-1.097*
of total assets	(0.360)	(1.623)		(1.798)	(1.761)	(1.508)	(0.605)
Maximum tax rate	16.82***	-0.816		1.910	0.895	1.808	-2.624
differential	(3.698)	(10.16)		(12.04)	(12.05)	(9.029)	(3.428)
Log of total assets	0.295*	-0.0113		-0.0413	0.0222	-0.0257	0.0144
	(0.170)	(0.510)		(0.587)	(0.595)	(0.484)	(0.130)
Company age	-0.00795	-0.0836		-0.117*	-0.117*	-0.0329	-0.0507*
	(0.0154)	(0.0572)		(0.0655)	(0.0660)	(0.0427)	(0.0259)
Loss carry forward as	-0.334	-0.328		-0.217	-0.304	-0.345	0.0170
share of pre-tax income	(0.288)	(0.867)		(0.890)	(0.867)	(0.576)	(0.452)
Observations	5,226	583	688	504	504	583	583
R-squared	0.151	0.214	0.214	0.221	0.226	0.174	0.210

A constant term and time and industry dummies (not reported) are included in all regressions.
Internal leverage is standardized as % of the firm's average
total assets over the period. See appendix for further definition of variables.
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Estimations on sub-samples close to break-even. Only daughter companies included.

	(A) Net outgoing transfers	(B) Total internal leverage	(C) Net outgoing transfers	(D) Total internal leverage
Loss position at time t	-6.331**	-1.369	-9.230**	-9.998
	(2.469)	(3.131)	(4.535)	(11.49)
Loss position at time $t-1$	-1.674*	0.362	-0.581	-2.673
	(0.869)	(2.373)	(1.175)	(3.866)
Loss position both	1.511	-5.567	1.471	7.829
at t and $t-1$	(1.458)	(4.754)	(2.624)	(8.824)
Pre-tax income as share	-21.39**	-28.47	-383.4**	-193.3
of total assets	(10.19)	(20.75)	(190.0)	(571.3)
Maximum tax rate	6.540	-12.00	12.68	-2.131
differential	(8.370)	(11.50)	(18.83)	(24.83)
Log of total assets	-0.659	0.429	-1.666**	-0.559
	(0.546)	(0.505)	(0.797)	(1.040)
Company age	-0.00877	-0.0833	-0.0105	-0.242
	(0.0601)	(0.0752)	(0.0615)	(0.150)
Loss carry forward as	-0.791	-1.088	-0.500	2.400*
share of pre-tax income	(0.537)	(1.013)	(0.678)	(1.383)
Observations	410	396	104	102
R-squared	0.307	0.254	0.442	0.511
Sample	Pre-tax income over assets between -6% and 18% (25th-75th percentile)	Pre-tax income over assets between -6% and 18% (25th-75th percentile)	Pre-tax income over assets between -1.5% and 1.5%	Pre-tax income over assets between -1.5% and 1.5%

A constant term and time and industry dummies (not reported) are included in all regressions.
The transfer payments and internal leverage are standardized as % of the firm's average total assets over the period. See appendix for further definition of variables.
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Omitting companies with persistent losses. Only daughter companies included.

	(A) Net outgoing transfers	(B) Total internal leverage	(C) Net outgoing transfers	(D) Total internal leverage
Loss position at time t	-3.076**	-0.122	-2.842*	-0.450
	(1.515)	(2.304)	(1.525)	(2.421)
Loss position at time $t-1$	-1.098	0.230	-0.314	0.849
	(0.813)	(2.152)	(0.729)	(2.294)
Loss position both	0.0805	-3.751	-1.018	-3.332
at t and $t-1$	(1.102)	(3.823)	(1.172)	(4.139)
Pre-tax income as share	-1.524	-1.910	-2.149	-3.159
of total assets	(2.077)	(2.367)	(3.054)	(3.231)
Maximum tax rate	6.647	-1.993	5.709	-8.451
differential	(8.301)	(11.19)	(7.879)	(10.94)
Log of total assets	-0.674	0.0911	-0.752	0.524
	(0.431)	(0.521)	(0.518)	(0.458)
Company age	-0.0101	-0.0911	-0.00723	-0.0811
	(0.0482)	(0.0576)	(0.0503)	(0.0610)
Loss carry forward as	-0.415	-0.276	-0.426	-1.320
share of pre-tax income	(0.475)	(0.910)	(0.512)	(0.878)
Observations	573	549	504	484
R-squared	0.218	0.221	0.250	0.216
Companies excluded	Loss in all years	Loss in all years	Loss in at least 75% of years	Loss in at least 75% of years

A constant term and time and industry dummies (not reported) are included in all regressions.
The transfer prices and internal leverage are standardized as % of the firm's average total assets over the period. See appendix for further definition of variables.
*** p<0.01, ** p<0.05, * p<0.1

that even though the coefficients also become more negative compared to the main tests in Table 6, they are still far from being significant at any conventional statistical level. Accordingly, the conclusion is that companies seem to use internal leverage to a lesser extent than transfer pricing when shifting losses. This interpretation is in line with Büttner and Wamser (2013) who suggest that the adjustment costs of the capital structure are high. However, since the simultaneity bias gives an attenuation bias, we cannot conclude that internal leverage is not changed as a response to losses. However, it does seem that transfer pricing is the more flexible tool of the two. Moreover, it suggests that there is at least some support for H3 and ex-ante income shifting when it comes to debt shifting.

In our second set of robustness tests, we exclude affiliates with persistent losses. As discussed at the end of subsection 4.1, affiliates that are unable to generate any profits might be unique and treated differently from other affiliates. Table 8 reports our results

after re-estimating our main tests on the sub-sample of daughter companies. In Columns (A) and (B), we exclude affiliates generating losses in all years they appear in the data, while in Columns (C) and (D), we exclude firms that generate losses in at least 75% of the years. The results look very similar to the baseline results in that loss affiliates continue to report significantly lower transfer payments than profitable affiliates (consistent with ex-post income shifting in H2), while loss firms are no different than profit firms as it relates to internal leverage (consistent with ex-ante income shifting in H3).

4.3 Discussion

Our first empirical finding, based on descriptive statistics and summarized in Figure 1, is that affiliates of MNCs bunch more around zero taxable income than purely domestic (stand-alone) firms. Although this result is consistent with H1, this finding does not provide direct evidence that MNCs use income-shifting strategies to reduce losses. Thus, although these results confirm earlier findings in Grubert et al. (1993), we believe the more interesting issue is how flexible MNCs are in adjusting their income shifting during the tax year to bunch around zero profits; that is, which income-shifting devices can be used to reduce losses, and are particular devices more flexible than others? Our regression analyses aim to answer these questions.

We find substantial flexibility in transfer pricing, indicated by a highly significant loss-position dummy that indicates a reduced outflow of transfer payments of roughly 6 and 9 percentage points of total assets (for affiliates with returns over assets in $[-6\%; 18\%]$ and $[-1.5\%; 1.5\%]$ respectively) if an affiliate reports losses at the end of the tax year, cf. columns (A) and (C) in Table 7. After considering that our results suffer from attenuation bias, we conclude that our evidence strongly supports ex-post income shifting in H2 when it comes to transfer pricing.

However, for internal leverage and debt shifting, the picture is very different. In none of our regressions on internal debt does the loss-position dummy reach any conventional level of significance, even when we analyze short-term and long-term debt separately. But, there is again an attenuation bias at work so that we cannot draw any definite conclusion. Therefore, there is tentatively more support for H3 than H2 as it relates to internal debt shifting.

Nevertheless, the data clearly indicate that transfer pricing is providing more flexibility to adjust and to revert income shifting. Furthermore, our preferred interpretation of our findings is that there is substantial inflexibility in internal leverage indicating that H3 and some need for ex-ante income shifting are closer to reality, when talking about debt shifting. A 28 percentage point reduction of the debt tax shield should trigger some significant effect on leverage. Another indicator for the relevance of ex-ante income shifting could be the fact that the expected loss probability, measured via being in a

loss position in the previous year, has a negative impact on long-term internal debt that borders the 10% significance level (cf. column (G) in table 6). Accordingly, loss expectations seem to affect the debt-shifting decision at the beginning of the year.

Our interpretation of rather inflexible internal leverage also relates to other studies and to findings on external leverage. When conceding that the tax effects on internal debt shifting are surprisingly low in magnitude, Büttner and Wamser (2013) suggest that the adjustment costs for internal leverage are substantial. Inflexible internal leverage also would have its counterpart in a rigid capital structure of external debt. In the finance literature, it is well known that the target capital structure is only adjusted when the deviations from the optimal leverage become large enough, because adjustments are costly, in particular due to hold-out problems and regulatory issues (e.g., Fischer et al., 1989; Gilson, 1997; Strebulaev, 2007). Korteweg (2010) finds evidence that firms are strategically underleveraged on average, particularly because the costs of overly leverage are significantly higher.

We cannot explain the source of inflexibility in holding internal debt because neither enforcement problems to accept an earlier repayment of debt nor regulatory disincentives should matter for internal debt. One reason could be covenant issues, i.e., contracts with external debt holders, that prevent affiliates from paying back internal loans, as such a settlement would reduce the liquidity and the ability to serve external debt. A common incentive to underleverage both in external and in internal debt, however, would be to avoid having leverage when ending up with losses. Hence, ex-ante income shifting and anticipating potential year's end losses are a consistent piece of explanation for underleveraging affiliates, even if they are profitable.

Such anticipation also has a major impact on the tax sensitivity of debt shifting and could contribute to finding an explanation for an important puzzle in the literature on debt shifting. All studies in this area find highly significant, but surprisingly modest/low effects of tax incentives on the use of internal debt.[31] Still, debt shifting is considered to be an important channel to shape income and tax payments (OECD, 2013). Common to all these studies is that they estimate the tax effect by focusing on the statutory tax rate (differential) and that they try to eliminate reversed income-shifting incentives under losses by dropping all firm-year observations in which affiliates report losses in that year. But, under ex-ante income shifting when managers anticipate potential losses when deciding on internal debt at the beginning of the year, this procedure is insufficient and gives rise to an omitted-variable bias, underestimating the tax sensitivities.

Based on our theory model and on equation (13a), the explanatory equation for internal leverage should be based on the expected tax rate differential. That is, one

[31] See, in particular, Desai et al. (2004), Huizinga et al. (2008), Egger et al. (2010), Møen et al. (2011) and Büttner and Wamser (2013). Møen et al. also provide a more extensive discussion of this issue as well as some literature review.

should not only capture the maximum tax rate differential, but also correct for the fact that the debt tax shield cannot be utilized with a given probability, i.e., when the firm has losses.[32] Therefore, rearranging equation (13a) and applying the specification of debt costs (7), internal leverage needs to be explained by

$$b_i = (t_i - t_1)\frac{r}{\eta_b} - H(p_i^0)t_i \cdot \frac{r}{\eta_b} = \gamma_1 \cdot (t_i - t_1) - \gamma_i \cdot H(p_i^0)t_i. \tag{15}$$

As the two terms are correlated by definition, the coefficient on the tax rate differential, γ_1, will pick up the negative impact of anticipating potential losses at year's end if the estimation equation omits the second explanatory variable, i.e., arbitrarily imposes $\gamma_i = 0$ in the regression, as the entire debt-shifting literature to date does. Consequently, neglecting the adjustment for loss anticipation will lead to a potentially severe underestimation of the correct tax-rate sensitivity of internal debt. Note that the unconditioned likelihood of ending up with losses, i.e., the share of observations with losses, within a tax year is 38% in our data set.

Based on these considerations and our finding of substantial flexibility in transfer pricing, it should also be less of a surprise that empirical studies focusing directly on the tax sensitivity of transfer pricing find large effects (e.g., Swenson, 2001; Clausing, 2003; Bartelsman and Beetsma, 2003; and Langli and Saudagaran, 2004). Under the ex-post income-shifting scenario of H2, the anticipation of losses to come within the tax year does not matter for the behavior of affiliates that report positive income at year's end. Accordingly, the standard procedure to exclude affiliates disclosing negative income works well for transfer pricing and eliminates the offsetting effects of reverted income-shifting strategies under losses. Conventional wisdom to date is that transfer pricing is more attractive because it can shift more income, and costs of concealing income shifting are lower than for conducting debt shifting. However, our findings suggest that part of the difference in the empirical literature should also be due to the fact that transfer pricing is very flexible whereas the debt-shifting literature suffers from a so far unrecognized negative omitted-variable bias.

5 Conclusion

This paper examines whether and to what degree multinational firms have the opportunity to adjust their income shifting strategies during the tax year when some affiliates run losses. The theory portion of our study points out that (in-) flexibility in adjusting income-shifting has crucial implications for firm behavior in achieving efficient tax reporting under losses. Under full flexibility, firms can adjust their payments ex-post, i.e., by

[32] For internal debt shifting, not being able to utilize the debt tax shield in the leveraged affiliate increases total tax payments because the internal bank still has to pay taxes on interest income received.

the end of the tax year, and ensure zero taxable income. Without flexibility, firms have to decide ex ante on their income shifting strategies and cannot revisit these decisions once they are taken. According to our empirical estimation using data on Norwegian multinationals and daughter companies, we conclude that transfer-price manipulation provides firms with substantial flexibility to adjust their income-shifting channels ex post. We do not find that firms adjust their financial structure to adjust payments, implying that internal financing decisions need to anticipate the likelihood of operating losses. Thus, our results suggest another explanation for why the sensitivity of tax rates to debt, as reported in the debt-shifting literature, are so low. If firms are inflexible in adjusting their capital structure, i.e., if they are forced to decide on their income shifting strategies at the beginning of the tax-year, it is the expected tax-rate differential that is decisive and not the commonly used statutory tax differential. The latter underestimates the true effect.

While most of the existing empirical work investigates income shifting of profitable affiliates to low-tax countries, income shifting to unprofitable non-haven affiliates seems to have escaped the attention of both researchers and policymakers. Alarmingly, standard regulation is ineffective in correcting firms' incentives to adjust income-shifting streams if income is shifted to non-haven affiliates with operating losses. Therefore, tax authorities should both increase their focus on firms whose income bunches around zero, and scrutinize payments to non-haven affiliates that disclose operating losses.

A Appendix

A.1 Derivation of ex-post optimal abusive transfer prices

Differentiating the concealment cost function given in equation (9), we obtain as marginal concealment costs for manipulating the transfer prices of the license fee and the intermediate input good, respectively,

$$\frac{\partial C^P}{\partial P_i^X} = \left[\frac{\eta_X}{2}\left(P_i^X\right)^2 + \frac{\eta_S}{2}\left(P_i^S\right)^2\right]\eta_X P_i^X, \tag{A.1}$$

$$\frac{\partial C^P}{\partial P_i^S} = \left[\frac{\eta_X}{2}\left(P_i^X\right)^2 + \frac{\eta_S}{2}\left(P_i^S\right)^2\right]\eta_S P_i^S. \tag{A.2}$$

By equating the two expressions (A.1) and (A.2), we find an 'inverse-cost rule' for transfer-pricing devices,[33]

$$\frac{P_i^S}{P_i^X} = \frac{\eta_X}{\eta_S}, \tag{A.3}$$

[33]Note that, in the optimum, marginal concealment costs will be equalized for both transfer-pricing strategies.

Relying on equation (A.3) in order to substitute for P_i^S in equations (A.1) and using (4b) leads to the optimal (abusive) transfer prices in the case of a profitable affiliate

$$\left(G_i^X\right)^* = \sqrt[3]{\frac{\eta_S}{\eta_S+\eta_X}\cdot\frac{2}{(\eta_X)^2}\cdot(\mathbb{1}\cdot t_i - t_1)}\,\frac{1}{\bar{X}}. \tag{A.4}$$

Analogously, we can determine the optimal transfer price for the intermediate good and obtain

$$\left(G_i^S\right)^* = \sqrt[3]{\frac{\eta_X}{\eta_S+\eta_X}\cdot\frac{2}{(\eta_S)^2}\cdot(\mathbb{1}\cdot t_i - t_1)}\,\frac{1}{S_i}. \tag{A.5}$$

A.2 Derivation of the first-order conditions for ex-ante tax-planning

In the following, we report the first-order condition for the license-fee transfer price in the case that all income shifting decisions need to be taken ex-ante (i.e., before the true sales price is revealed). This first-order condition is given by

$$\begin{aligned}\frac{\partial E(\Pi)}{\partial G_i^X} &= -\bar{X} + (1-H(p_i^0))t_i\bar{X} - \frac{\partial C^P}{\partial P_i^X}\bar{X} + (1-t_1)\bar{X} + h(p_i^0)t_i p_i^0 y_i \frac{\partial p_i^0}{\partial G_i^X} \\ &- h(p_i^0)t_i[(G_i^X+q_X)\bar{X} + (G_i^S+q_S)S_i + rb_iK_i]\frac{\partial p_i^0}{\partial G_i^X} = 0.\end{aligned} \tag{A.6}$$

Rearranging the terms gives

$$\begin{aligned}&\left[(1-H(p_i^0))t_i - t_1 - \frac{\partial C^P}{\partial P_i^X}\right]\bar{X} \\ -\;& h(p_i^0)t_i[p_i^0 y_i - (G_i^X+q_X)\bar{X} - (G_i^S+q_S)S_i - rb_iK_i]\frac{\partial p_i^0}{\partial G_i^X} = 0.\end{aligned} \tag{A.7}$$

Recall that the price p_i^0 is defined as the price for which taxable income is zero. Hence, the term in the second line vanishes as the value of the squared brackets is zero. Therefore, we obtain

$$[1-H(p_i^0)]t_i - t_1 = \frac{\partial C^P}{\partial P_i^X}. \tag{A.8}$$

A.3 Simultaneity bias

Our aim is to estimate the effect from being in a loss position (dummy $L_{it} = 1$ if firm i experiences a loss in year t, zero otherwise) on transfer payments and internal leverage on internal debt in year t, y_{it}. z_{it} is an exogenous control variable (or a vector of such) that is potentially correlated with both y_{it} and the probability of experiencing a loss.

$$y_{it} = \alpha_1 L_{it} + \beta_{10} + \beta_{11} z_{it} + u_{1it},\ \alpha_1 < 0 \tag{A.9}$$

The problem is that reducing outgoing transfer prices and/or lowering internal leverage also lowers the probability of experiencing losses. We thus also have the following relationship

$$L_{it} = \alpha_2 y_{it} + \beta_{20} + \beta_{22} z_{it} + u_2,\ 0 > \alpha_2 \tag{A.10}$$

This is an example of two-way causality, where both variables have an effect on the other. (A.9) and (A.10) present the model in structural form. The reduced form presentation is found by solving the system for the two endogenous variables and finding quantity and price as functions of the exogenous variable(s). The solution for y_{it} is then given by

$$y_{it} = \underbrace{\frac{\beta_{10} - \alpha_1\beta_{20}}{1 - \alpha_1\alpha_2}}_{\pi_{10}} + \underbrace{\frac{\beta_{11} - \beta_{22}}{1 - \alpha_1\alpha_2}}_{\pi_{11}} z_{it} + \underbrace{\frac{u_{1it} - \alpha_1 u_{2it}}{1 - \alpha_1\alpha_2}}_{e_{1it}}$$

By introducing some auxiliary notation, this reduces to

$$y_{it} = \pi_{10} + \pi_{11} z_{it} + e_{1it} \tag{A.11}$$

Similarly, we find the solution for the loss position dummy as

$$L_{it} = \underbrace{\frac{\beta_{20} + \alpha_2\beta_{10}}{1 - \alpha_1\alpha_2}}_{\pi_{20}} - \underbrace{\frac{\beta_{11} + \beta_{22}}{1 - \alpha_1\alpha_2}}_{\pi_{21}} z_{it} + \underbrace{\frac{u_{2it} + \alpha_2 u_{1it}}{1 - \alpha_1\alpha_2}}_{e_{2it}}$$

Again, auxiliary notation helps to make the notation more compact

$$L_{it} = \pi_{20} + \pi_{21} z_{it} + e_{2it} \tag{A.12}$$

(A.11) and (A.12) give the reduced form presentation of the model, since transfer prices and loss position are given as functions only of exogenous variables.

In this paper, we estimate the structural equation (A.9). The problem by estimating this equation directly is that L_{it} is endogenously decided within the model and thus correlated with the error term u_{1it}. The covariance between L_{it} and u_{1it} is

$$\operatorname{cov}(L_{it},\, u_{1it}) = E\left[(\pi_{20} + \pi_{21} z_{it} + e_{2it})\, u_{1it}\right] = E\left(e_{2it} u_{1it}\right)$$

since the z-variable(s) is/are exogenous. If we insert for e_{2it}, and assume that u_{1it} and u_{2it} are uncorrelated, we obtain

$$\operatorname{cov}(L_{it},\, u_{1it}) = E\left(\frac{u_2 + \alpha_2 u_1}{1 - \alpha_1\alpha_2} u_1\right) = \frac{\alpha_2 \sigma_1^2}{1 - \alpha_1\alpha_2} > 0 \tag{A.13}$$

since $\alpha_2 > 0$, and $1 - \alpha_1\alpha_2 > 0$. $\sigma_1^2 = E\left(u_{1it}^2\right)$, the variance of u_1, assuming homoscedas-

ticity. Importantly, OLS is likely to give a positive bias in the estimator for α_1. Keep in mind that this bias is negative, meaning that OLS will underestimate the effect from losses on transfer payments/internal leverage.

A.4 Definition of variables

Dependent variables	
Net outgoing transfer payments	The net outgoing transfer payments to royalties, license fees, rental expenditures, and purchases, standardized by mean total assets over the period in order to adjust for size.
Gross outgoing transfer payments	The gross outgoing transfer payments over all categories, standardized by mean total assets over the period in order to adjust for size.
Gross incoming transfer payments	The gross incoming transfer payments over all categories, standardized by mean total assets over the period in order to adjust for size.
Net outgoing transfer payments for intangible goods	The net outgoing transfer payments to royalties, license fees and rental expenditures, standardized by the mean total assets over the period in order to adjust for size.
Net outgoing transfer payments for tangible goods	The net outgoing transfer payments for purchases (cost of materials), standardized by mean total assets over the period in order to adjust for size.
Total internal leverage	Total internal debt divided by mean total assets.
Short-term internal leverage	Short-term internal debt divided by mean total assets.
Long-term internal leverage	Long-term internal debt divided by mean total assets.
Explanatory variables	
Loss position dummy	A dummy equal to 1 if a firm runs a loss in year t, zero otherwise.
Loss position at t and $t-1$	A dummy equal to 1 if a firm runs a loss in both year t and $t-1$, zero otherwise.
Loss position at t and $t-2$	A dummy equal to 1 if a firm runs a loss in both year t and $t-2$, zero otherwise.
Pre-tax income	The firm's taxable income (result) as share of total assets.

Maximum tax rate differential	The Norwegian business tax rate (28%) less the tax rate for the affiliate with the lowest tax rate.
Log of total assets	The natural logarithm of the firm's total assets (in 1,000 NOK).
Company age (in years)	The age of the company.
Loss carry forward	Loss carry forward as share of pre-tax income.

References

Allingham, M.G., and A. Sandmo, 1972. Income Tax Evasion: A Theoretical Analysis. Journal of Public Economics 1, 323–338.

Bartelsman, E.J., and R.M.W.J. Beetsma, 2003. Why Pay More? Corporate Tax Avoidance Through Transfer-pricing in OECD Countries. Journal of Public Economics 87, 2225–2252.

Bergin, T., 2012. Tax-free Latte. Starbucks Slips the UK Tax Hook. Reuters Special Report, Thomson Reuters. http://graphics.thomsonreuters.com/12/10/Starbucks.pdf.

Bernard, A.B., J.B. Jensen, and P.K. Schott, 2006. Transfer Pricing by U.S.-Based Multinational Firms. NBER Working Paper No. 12493.

Büttner, T., and G. Wamser, 2013. Internal Debt and Multinationals' Profit Shifting – Empirical Evidence from Firm-Level Panel Data. National Tax Journal 66, 63–95.

Chang, E., and M.S. Taylor, 1999. Control in Multinational Corporations (MNCs): The Case of Korean Manufacturing Subsidiaries. Journal of Management 25, 541–565.

Clausing, K., 2003. Tax-motivated Transfer-pricing on Intra-firm Trade. Journal of Public Economics 87, 2207–2223.

Collins, J.H., and D.A. Shackelford, 1995. Corporate Domicile and Average Effective Tax Rates: The Cases of Canada, Japan, the United Kingdom, and the United States. International Tax and Public Finance 2, 55–83.

Desai, M.A., C.F. Foley, and J.R. Hines, 2004. A Multinational Perspective on Capital Structure Choice and Internal Capital Markets. Journal of Finance 59, 2451–2487.

De Simone, L., K. Klassen, and J.K. Seidman, 2014. Unprofitable Affiliates and Income Shifting Behavior. Rock Center for Corporate Governance Working Paper Series No. 157.

Dischinger, M., Knoll, B., and N. Riedel, 2014. There's No Place like Home: The Profitability Gap between Headquarters and their Foreign Subsidiaries. Journal of Economics and Management Strategy, forthcoming.

Egger, P., Eggert, W., Keuschnigg, C., Winner, H., 2010. Corporate taxation, debt financing and foreign plant ownership. European Economic Review 54, 96–107.

Ferraz, C., and F. Finan, 2008. Exposing Corrupt Politicians: The Effects of Brazil's Publicly Released Audits on Electoral Outcomes. Quarterly Journal of Economics 123, 703–745.

Fischer, E.O., R. Heinkel, and J. Zechner, 1989. Dynamic Capital Structure Choice: Theory and Tests. Journal of Finance 44, 19–40.

Gilson, S.C., 1997. Transaction Costs and Capital Structure Choice: Evidence from Financially Distressed Firms. Journal of Finance 52, 161–196.

Göx, R.F., and U. Schiller, 2007. An Economic Perspective on Transfer Pricing. In: C.S. Chapman, A.G. Hopwood, and M.D. Shields (eds.), Handbook of Management Accounting Research Vol. II. Elsevier, Amsterdam, 641–672.

Gramlich, J.D., P. Limpaphayom, and S.G. Rhee, 2004. Taxes, Keiretsu Affiliation, and Income Shifting. Journal of Accounting and Economics 37, 203–228.

Gresik, T., 2001. The Taxing Task of Taxing Transnationals. Journal of Economic Literature 39, 800–838.

Gresik, T., and P. Osmundsen, 2008. Transfer Pricing in Vertically Integrated Industries. International Tax and Public Finance 15, 231–255.

Grubert, H., 2003. Intangible Income, Intercompany Transactions, Income Shifting, and the Choice of Location. National Tax Journal 56, 221–242.

Grubert, H., T. Goodspeed and D. Swenson. Explaining the Low Taxable Income of Foreign-Controlled Companies in the United States. In: A. Giovannini, R. G. Hubbard and J. Slemrod (eds.). *Studies in International Taxation.* Chicago: University of Chicago Press, 1993, 237–70.

Grubert, H., and J. Mutti, 1991. Taxes, Tariffs and Transfer Pricing in Multinational Corporate Decision Making. Review of Economics and Statistics 73, 285–293.

Hamilton, R.D., and R.J. Kashlak, 1999. National Influences on Multinational Corporation Control System Selection. Management International Review 39, 167–189.

Hanlon, M., and S. Heitzman, 2010. A Review of Tax Research. Journal of Accounting and Economics 50, 127–178.

Harris, D.G., 1993. The Impact of U.S. Tax Law Revision on Multinational Corporations' Capital Location and Income-Shifting Decisions. Journal of Accounting Research 31, 111–140.

Haufler, A., and G. Schjelderup, 2000. Corporate Tax Systems and Cross Country Profit Shifting. Oxford Economic Papers 52, 306–325.

Hines, J.R., and E.M. Rice, 1994. Fiscal Paradise: Foreign Tax Havens and American Business. Quarterly Journal of Economics 109, 149–182.

Hopland, A.O., 2014. Voter Information and Electoral Outcomes: The Norwegian List of Shame. Public Choice 161, 233–255.

Huizinga, H.P., and L. Laeven, 2008. International Profit-Shifting within Multinationals: A Multi-Country Perspective. Journal of Public Economics 92, 1164–1182.

Huizinga, H.P., L. Laeven and G. Nicodème, 2008. Capital Structure and International Debt-shifting. Journal of Financial Economics 88, 80–118.

Jacob, J., 1996. Taxes and Transfer Pricing: Income Shifting and the Volume of Intrafirm Transfers. Journal of Accounting Research 34, 301–312.

Klassen, K., M. Lang, and M.A. Wolfson, 1993. Geographic Income Shifting By Multinational Corporations in Response to Tax Rate Changes. Journal of Accounting Research 31, 141–173.

Korteweg, A., 2010. The Net Benefits to Leverage. Journal of Finance 65, 2137–2170.

Langli, J.C., and S.M. Saudagaran, 2004. Taxable Income Differences between Foreign and Domestic Controlled Corporations in Norway. European Accounting Review 13, 713–741.

Levin, C., and J. McCain, 2013. Offshore Profit Shifting and the U.S. Tax Code - Part 2 (Apple Inc.). Memorandum, May 21, 2013. US Congress Permanent Subcommittee on Investigations, Washington.

Lohse, T. and N. Riedel, 2013. Do Transfer Pricing Laws Limit International Income Shifting? Evidence from European Multinationals. CESifo Working paper No. 4404, Munich.

Maydew, E., 1997. Tax-Induced Earnings Management by Firms with Net Operating Losses. Journal of Accounting Research 35, 83–96.

Møen, J., D. Schindler, G. Schjelderup, and J. Tropina, 2011. International Debt Shifting: Do Multinationals Shift Internal or External Debt? CESifo Working Paper Series No. 3519, Munich.

Mintz, J.M., and M. Smart, 2004. Income Shifting, Investment, and Tax Competition: Theory and Evidence from Provincial Taxation in Canada. Journal of Public Economics 88, 1149–1168.

Mintz, J.M., and A.J. Weichenrieder, 2010. The Indirect Side of Direct Investment – Multinational Company Finance and Taxation. MIT Press, Cambridge.

Nielsen, S.B., and P. Raimondos-Møller, 2012. Multiple Roles of Transfer Prices: One vs. Two Books. In: W. Schön, and K. Konrad (eds.), Fundamentals of International Transfer Pricing in Law and Economics. MPI Studies in Tax Law and Public Finance 1, Springer, Heidelberg, 25–46.

Nielsen, S.B., P. Raimondos-Møller, and G. Schjelderup, 2008. Taxes and Decision Rights in Multinationals. Journal of Public Economic Theory 10, 245–258.

Nielsen, S.B., P. Raimondos-Møller, and G. Schjelderup, 2010. Company Taxation and Tax Spillovers: Separate Accounting Versus Formula Apportionment. European Economic Review 54, 121–132.

O'Donnell, S.W., 2000. Managing Foreign Subsidiaries: Agents of Headquarters or an Interdependent Network? Strategic Management Journal 21, 525–548.

OECD, 2013. Adressing Base Erosion and Profit Shifting, Paris.

Onji, K., and D. Vera, 2010. Tax Law Asymmetries and Income Shifting: Evidence from Japanese Capital Keiretsu. The B.E. Journal of Economic Analysis and Policy 10 (Advances 1/4).

Oyelere, P. B., and C.R. Emmanuel, 1998. International Transfer Pricing and Income Shifting: Evidence from the UK. European Accounting Review 7, 623–635.

Pak, S.J., and J.S. Zdanowicz, 2001. Executive Summary of 'US Trade with the World: An Estimate of 2000 Lost US Federal Income Tax Revenues due to Over-Invoiced Imports and Under-Invoiced Exports'. Mimeo, Florida International University.

San Martín, M., and A.I. Saracho, 2010. Royalty Licensing. Economics Letters 107, 284–287.

Schindler, D., and G. Schjelderup, 2012. Debt Shifting and Ownership Structure. European Economic Review 56, 635–647.

Shackelford, D.A., and T. Shevlin, 2001. Empirical Tax Research in Accounting. Journal of Accounting and Economics 31, 321–387.

Smith, M., 2002. Tax and Incentive Trade-Offs in Multinational Transfer Pricing. Journal of Accounting, Auditing and Finance 17, 209–236.

Strebulaev, I.A., 2007. Do Tests of Capital Structure Theory Mean What They Say? Journal of Finance 62, 1747–1787

Swenson, D., 2001. Tax Reforms and Evidence of Transfer Pricing. National Tax Journal 54, 7–25.