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Debt Shifting in Loss-making Affiliates

An empirical study on parental debt in Norwegian multinationals

Emma Elisabeth Soares Schippert and Ida Birkeland

Supervisors: Mohammed Mardan and Arnt Ove Hopland

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Acknowledgements

The master thesis is a great opportunity to immerse oneself more deeply into a self-selected topic. We chose to study debt shifting in Norwegian multinational corporations. The choice was motivated by a drive to explore a topic both interesting and challenging, alongside being relevant and important in today's business world and in society in general.

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Emma Elisabeth Soares Schippert

Ida Birkeland

Abstract

As the economy is becoming more globalised, debt shifting in multinational corporations has received increasing attention from policy makers, academics and the media. MNCs have an advantage of using differences in corporate tax systems across countries to ensure tax efficiency by minimising global tax payments. A neglected field in previous literature is the tax-motivated use of parental debt in loss-making affiliates. In this master thesis, we explores a new field within internal debt shifting. It has been observed that *high-taxed* parent companies provide debt to *low-taxed* loss-making affiliates. An explanation for this could be that there are tax related motives behind using parental debt in such a setting. A possible tax-minimising strategy for a MNC could be to undertake external debt at the parent level and reroute this as parental debt to its foreign affiliates. We examine the incentives for Norwegian MNCs to increase the parental debt-to-asset ratio, when the probability of the subsidiary running losses increases. In the event of losses, it is expected that the affiliate will default on its interest payments. The worldwide tax savings are then solely realised from the external debt tax shield at the parent level.

To investigate the debt shifting strategy, we use the Survey of Outward Foreign Direct Investment, accompanied by the SIFON-registry, the Norwegian Corporate Accounts and other supplementary data. The results present a positive and significant relationship between the loss probability in affiliates and the parental debt-to-asset ratio, where long-term loans are mostly used to execute the strategy. The outcome of the empirical analysis suggests that Norwegian MNCs consider the loss probability ex-ante when deciding upon the use of rerouted external debt. This could be a caution to policy makers, as it suggests that anti-tax avoidance rules are relaxed for loss-making affiliates.

Keywords – Internal debt shifting, parental debt, loss probability, tax minimization

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1 Introduction

Multinational corporations (henceforth, MNCs or multinationals) have the advantage of using the differences in corporate income tax systems across countries to ensure tax efficiency by minimising global tax payments. In recent years, reports of large multinationals paying little to no taxes has been widely discussed in media. The low tax payments are often a result of profit shifting (Bjørnestad, 2016). The scope of international profit shifting is extensive in Europe, as the larger European multinationals usually operate subsidiaries across the world. As a result, profit shifting has become a prominent area for academics, policy makers and the public eye in general.

The media is flooded with cases of large MNCs paying little to no taxes as a result of tax planning. This has caused the public to become more aware of the large extent of profit shifting in large multinationals (NTB, 2013). MNCs like Google, Facebook, Amazon, Microsoft, Apple and Starbucks, make use of tax havens[1] and utilise the interaction between the tax systems of different countries to legally shrink tax payments substantially (Bjørnestad, 2016). It was made public that the Norwegian affiliate of Facebook, in both 2016 and 2017, paid less than one million Norwegian kroner (NOK) in taxes, despite an estimated revenue of more than two billion NOK. A substantial amount of Facebook's revenues come from offering advertisement to other companies. However, Facebook Norway AS' financial statements show that the affiliate does not get its income directly from the advertisers, but rather from other parts of the MNC. Facebook's explanation for the low tax payments in Norway were that when someone buys advertisement from them, the purchase goes through the European headquarters in Dublin, instead of through the affiliate in Norway (Aldridge et al., 2017). Many find this type of behaviour, by Facebook and other large MNCs, to be unethical and consider it an exploitation of the law.

The Organization for Economic Co-operation and Development (OECD) identifies transfer pricing and debt shifting as the main tax planning strategies in multinationals. Both devices are frequently used to reduce MNCs' overall tax payments (Hopland et al., 2018, p.

[1] Wilson (2014) define a tax haven as a country that provide foreign investors with low or zero taxes, in addition to attractive regulatory policies (p. 32).

165). Profit shifting through transfer pricing is carried out by multinationals influencing their transfer prices on intra-firm transactions. The transactions are usually between affiliates operating in different tax jurisdictions. Transfers of tangible or intangible property, or provision of services or financial instruments within multinationals, will trigger transfer pricing issues (KPMG, 2017, p. 18). By utilising debt shifting, on the other hand, the MNCs exploit the fact that interest on debt financing is tax deductible in most countries. Due to this favourable tax shield, MNCs will choose to be highly leveraged.

The attention tax planning has received by policymakers and the business world is mainly based on concerns related to the consequences of income shifting. When MNCs shift income from high-taxed affiliates to low-taxed affiliates, the tax bases in countries with relatively high tax rates will be weakened. According to OECD (2013), the use of profit shifting will also weaken the competitiveness of purely domestic companies, and will for the remaining tax payers lessen their trust in the tax system. The OECD launched the final reports of the Base Erosion and Profit Shifting (BEPS) project in 2015. The project was created as a response to the increasing use of profit shifting and its purpose was to prevent companies from engaging in tax planning. The BEPS consists of a 15-point action plan, some of which are tightening of existing regulations (Riddervold, 2018). The OECD established these measures to ensure that the tax payments remain in the jurisdiction where the economic activities take place. In addition, the European Union Commission assessed the possibility of countries sharing information on the activities and tax payments a MNC has within each specific country. This would make the tax systems more transparent and thus it would be easier to detect tax planning in MNCs (Bjørnestad, 2016).

As mentioned, multinationals can make use of two main tax planning strategies to minimise their global tax payments. There are several ways of benefiting from these strategies, and many of the different aspects have been studied for years by academics. Our thesis will however be limited to tax planning with the use of internal debt shifting.

When determining the financing structure, purely domestic firms only have to take the domestic tax system into consideration. Multinationals, however, face a more complicated choice. MNCs need to consider the tax systems across all countries in which they operate, as they have the opportunity to allocate debt between their affiliates located in the different countries. Thus, the financial structure of MNCs are expected to reflect the tax systems of all the countries where they operate (Huizinga et al., 2008, p. 81). Affiliates of MNCs borrow considerable amounts of internal debt, both from their parent company and other group affiliates. Tax savings are a well-known motive for internal debt shifting. The tax savings are maximised if lending is undertaken by the affiliate within the group facing the lowest tax rate. This allows the affiliates facing higher tax rates to shift their profits into lower taxed affiliates. Hence, the debt interest payments are deducted from the tax bases of the higher taxed affiliates, and the shifted profits are taxed at the lowest tax rate within the group. Consequently, the amount of tax savings depend on the tax rate difference between the borrowing and the lending affiliate (Møen et al., 2018, p. 2).

Previous literature provides evidence that MNCs make use of internal debt shifting to minimise global tax payments. Møen et al. (2018) investigate the relationship between different tax mechanisms and the internal debt-to-asset ratio. They find that there is a negative and significant relationship between the lowest tax rate within the corporations and the internal debt-to-asset ratio. Through the regression on internal debt they find that a 1% increase in the minimum tax rate leads to 0.05% less internal debt financing. Furthermore, they find that the probability of an affiliate being a lender is high when the entity is located in a low-tax country. In addition, their analysis suggests that the probability of being a lender is lower when the minimum tax rate within the MNC increases.

However, it has also been observed that parent companies in MNCs provide debt to low taxed affiliates. The parent company is usually not located based on favourable tax legislation, and is therefore often located in a high tax country. Møen et al. (2018) take previous research a step further by modelling the choice between parental debt, non-parental internal debt and external debt. They find that the tax-efficient financing structure for MNCs facing transaction costs related to both external and parental debt

entails the use of both types of debt. The authors find that parental debt is negatively correlated with both external and internal debt, and that the optimal behaviour for the parent is to borrow in the external market and reroute the borrowed funds to its affiliates. In the research paper, they argue that the use of parental debt is hard to explain unless the parent company is located in a low-tax jurisdiction, or where there are non-tax costs and benefits related to parental debt. The researchers try to reason why parents with high tax rates provide internal debt to affiliates with lower tax rates. An explanation they suggest is that parent companies have better access to external funds. Due to their size and lower risk, the parent may get the funds at better terms. Another piece of evidence they find suggests that there are fixed costs related to setting up an internal bank. For small MNCs and companies with modest within-group tax differences, the tax advantage may not be sufficiently large to compensate for the costs. The parent company can for non-tax related reasons choose to use external debt and forward it to its affiliates. This is rather an argument related to cost minimisation, as the parent wishes to forward the favorable loans instead of having the affiliates taking loans with higher costs and worse conditions (Møen et al., 2018).

Whether there could be more tax-related motives behind pursuing parental lending has not yet been researched. Hence, this thesis sets out to investigate this. We analyse the debt shifting channel by considering a setting consisting of a parent company facing the highest tax rate, a financial center located in a tax haven with low to zero taxes, and an affiliate facing a tax rate in between the latter two entities' rates. All three firms are part of the same MNC. We analyse the financing decision in a setting with loss probabilities, and assume that the affiliate is running losses with the probability p. The affiliate is accordingly profitable with the probability $(1\text{-}p)$. This means that the lender only receives interest income with the probability $(1\text{-}p)$, and that the affiliate will default on its interest payments with the probability p. The investments in the affiliate can be financed in three ways. Either by internal lending from the financial center, through external funds from a third party lender, or by parental debt. The parental debt is assumed to be external debt at the parent level, rerouted to the affiliate. The MNC has an incentive to finance the affiliate with parental debt when the probability of the affiliate running losses increases. If the affiliate runs losses, the parent company has to repay the loans to the external

lenders, without receiving interest income from the affiliate on the forwarded debt. This reduces the MNCs tax payments, because the parent firm can not only deduct the interest expenses the affiliate is not able to deduct, but also at a higher tax rate. If instead the affiliate is expected to be profitable, the MNC would preferably use internal debt provided by the financial centre and shift profits into the tax haven affiliate. In this case the affiliate would repay the loan to the lowest taxed affiliate and deduct the interest payments from its own tax base, as mentioned above. Because of the research gap on the topic, we wish to investigate whether there is a positive relationship between loss probabilities and the use of parental debt. Thus, our research hypothesis is:

The incentive for the MNC to increase the parental debt-to-asset ratio in the affiliate increases with the probability of the subsidiary running losses.

Our thesis adds to the existing literature on the tax efficient use of parental debt. Firstly, as Møen et al. (2018, p. 5) highlight, the relationship between internal lending within the group and parental debt has been a neglected issue. The already existing literature identifies some advantages of parental debt, however, the focus is on non-tax costs and better market conditions. None of the papers examine the tax-efficient use of parental debt in multinationals, nor why a high-taxed firm would be willing to incur additional tax payments by using parental debt as a debt shifting device. Thus, the first contribution of our thesis is the investigation of whether the use of parental debt can be explained by tax advantageous interest treatments in Norwegian multinationals.

Secondly, the literature on loss-making affiliates is highly limited, particularly concerning internal debt shifting. A large portion of the existing literature on internal debt shifting has either omitted loss-making affiliates from their data, or looked at the flexibility in changing the income shifting strategies when affiliates face losses in a given year (Hopland et al., 2018; Klassen et al., 1993). Hence, the second contribution of our thesis is that we assume full inflexibility and investigate the effect the loss probability has on the use of internal debt, and more specifically parental debt.

In order to test our hypothesis and address existing gaps in the academic literature, we consider the setting described in the previous paragraph. We assume that the parent faces a higher statutory tax rate and can deduct the external debt interest expenses at the higher rate. The parent must also have majority ownership, and we assume total inflexibility in financing decisions. We also assume that the affiliate is considered to be a producing affiliate, which means that it is not functioning as a financial centre located in a tax haven with (close to) zero tax.

All data, except for the accounting information, is provided by Statistics Norway and the Norwegian Tax Administration. The Survey of Outward Foreign Direct Investment (FDI) (Utenlandsoppgaven) provides the base for our sample. We supplement this data with foreign ownership data on Norwegian firms from the SIFON-registry and accounting data on the parent from Norwegian Corporate Accounts (provided by SNF). Lastly, the tax rates and other country specific data is collected from the OECD database, KMPG tax table and the World Bank. The data covers the time period between 1992 and 2006, where the unit of observations is affiliate-year reportings within MNC-groups. In total, the data sample consists of 1,131 Norwegian parent firms and 4,364 foreign affiliates operating in 66 different countries. Overall, there are 28,489 affiliate-year observations over the sample period of 15 years.

Before running the data on our main specification, we estimate the loss probabilities of the affiliates by using a probit model. The financing decisions of a firm are expected to be taken *ex-ante*. Thus, MNCs are assumed to make decisions based on the probability of loss rather than the actual financial outcome. The estimation of the probit model suggest that losses in previous years are most significant in determining the probability of the affiliate running losses in the following year.

For the empirical analysis, we test our specification on the estimation sample by running four different regressions on three different dependent variables. These dependent variables are the total parental debt-to-asset ratio, the long-term parental debt-to-asset ratio and the short-term parental debt-to-asset ratio. The loss probability is included in the regression as the explanatory variable of main interest. In addition, we include several other explanatory

variables such as the tax rate difference, the fixed asset ratios of the affiliate and the parent, a measure for affiliate size, inflation and the return on total assets (ROTA).

The setting described above is the framework for our analysis. This setting addresses three firms, all part of the same MNC and the loss probability of the affiliate, p. According to the obtained results from our regressions, the loss probability has the most significant effect on the long-term parental debt-to-asset ratio. This is implied by the coefficient for the loss probability on long-term parental debt, which has a value of 0.113 when all assumptions are controlled for. The coefficient suggests that a 1 percentage point increase in the loss probability increases the long-term parental debt ratio by 0.00113, all else equal. For an affiliate with the average long-term parental debt-to-asset ratio in the sample of 4.48%, an increase in the loss probability by 10 percentage points will increase the debt ratio by 25%. This would result in a long-term parental debt-to-asset ratio of 5.61%. The short-term parental debt, on the other hand, is not significantly affected by the loss probability after controlling for all assumptions. Another interesting finding is that when we do control for all assumptions in the regression, we find that close to no other explanatory variables have significant effects on the long-term debt ratios. This suggests that in a setting where the affiliates face lower tax rates compared to their parent company and where all affiliates are regarded as producing affiliates, the use of parental debt is mostly explained by the probability of loss.

The central policy implication from our research is that policy makers should not only focus on profitable affiliates when trying to combat tax avoidance, but also on the ones running losses. Our results indicate that the arm's length principle[2] may be relaxed for firms in financial distress, as they are able to make use of the strategy we investigate, which requires the internal interest rate to be lower than the one that the parent must pay to its external creditor. However, in a setting where the affiliate is expected to face losses, the interest rate the affiliate faces in the external market, which will be the arm's length interest rate, will probably be higher as the affiliate is considered more risky. Another

[2]The Norwegian Tax Act contains the arm's length principle for pricing of transactions between related parties, both domestic and cross-border transactions. The arm's length principle implies that the allocation of profits between the headquarters and the permanent establishment is based on what the permanent establishment would have earned at arm's length if it was a separate and independent enterprise (KPMG, 2017).

policy implication may be that the non-existing thin-capitalisation[3] rules could give leeway to make use of the strategy in Norwegian MNCs.

The robustness of the regression results is tested in several ways. Firstly, we estimate quantile thresholds for the loss probability, to examine whether the magnitude of loss probability determines to what extent the strategy is utilised. The results from the regression, where all assumptions are controlled for, show that a higher loss probability has a higher impact on the parental debt ratio. A loss probability within the interval 0.6 and 0.8 has a significantly higher impact than the intervals in the lower case, but a remarkably lower impact than the highest interval from 0.8 to 1. Secondly, we run the regression on a restricted data samples based on narrower loss probability intervals. The results from this test also suggests that the parental debt-to-asset ratio increases in the probability of loss and that the strategy is more likely to be used by affiliates that have very high probabilities of running losses.

In the last robustness check, we test whether the value of the parent company's tax base has an effect on the parental debt ratio in the affiliate. As the decision has to be made ex-ante, we use a one year lagged variable for the parent company's tax base. We run the regression on more restricted samples, either only consisting of parent companies with lagged tax bases below -1,000 and -10,000, or only consisting of parent companies with lagged tax bases above -1,000 and -10,000 (in thousand NOK). We expect the tax base of the parent to affect the coefficient of the loss probability, as the strategy is initially only profitable if the parent has a tax base to deduct interest payments from. In these regressions we also find results in line with our expectations. When controlling for all assumptions, we find that the loss probability has a larger effect on affiliates of parent companies with tax bases above the set limits.

[3]Thin capitalisation rules apply to the use of intra-firm loans and implies interest deduction limitations. This rule was introduced in Norway in 2014 and limits the extent to which companies can deduct interest expenses to related parties. These rules apply where annual net interest expenses exceed a threshold amount of NOK 5 million per firm. If the threshold is exceeded, the right to deduct interest on debt to related parties is limited to 25% of taxable EBITDA. This applies to those considered related parties, e.g. the parent controlling at least 50%. If the entity is regarded as being thinly capitalised, part of the entity's interest and debt may be reclassified to dividend and equity (PwC, 2019).

In the remainder of this thesis, the literature review and project background are presented in section 2. In section 3, the development of our hypothesis is described. Section 4 contains a presentation of the data sources and descriptive statistics on our estimation sample. Section 5 discusses the utilised empirical strategy, and section 6 presents the empirical results and the analysis of our findings. In section 7 we perform several robustness checks of the results, and section 8 concludes the thesis.

2 Literature Review and Project Background

This section provides an overview of existing literature related to financing strategies in MNCs, as well as a discussion of the projects background. The motive is to give an outline of findings from previous studies to provide a frame for the aim of our thesis. The empirical literature existing on tax-efficient financial structures takes different paths and has over the years gone into more detail on specific topics of debt shifting. To give a proper guidance, we first discuss articles highlighting the advantages of using debt versus equity financing, and the advantage given by the debt tax shield. Secondly, we reflect on how changes in tax rates will affect the capital structure of the firm (e.g. external debt, parental debt and an internal bank). Thirdly, we consider the benefits of using internal and parental debt, and why rerouted external debt from the parent to the foreign affiliate could be a favourable strategy. Further, we discuss publications related to the use of parental debt and losses in affiliates. We find, however, that most studies neglect or omit observations where the subsidiaries are in a loss position. Especially when the loss-making affiliate is located in a lower taxed country compared to the parent. Consequently, discussion on former literature within this field will be rather meagre. Lastly, we focus the attention on how the presented literature has inspired the idea behind our thesis, and how it can add more knowledge around loss-making affiliates and parental debt within debt shifting strategies.

2.1 Literature Review

Modigliani and Miller (1958) were the first to acknowledge the advantages of debt financing over equity financing. In the correction of the original paper, Modigliani and Miller (1963) highlights the importance of company taxation in financing decisions and recognise that debt financing could lead to a beneficial tax shield. They find debt to be favourable over equity. The debt tax shield could increase the company value as interest payments are tax deductible while dividends, on the other hand, are paid out of net-of-tax corporate income.

As discussed by Modigliani and Miller, the use of debt will (in general) grant a debt tax shield and is therefore an important motive for internal and external debt shifting. When interest on corporate debt is tax deductible, it generates a corporate tax advantage in debt financing (Booth et al., 2001, p. 96). In former literature, there are primarily three different paths in the empirical investigation of the debt tax shield[4], and how it could play a role in increasing the firm value (Kemsley and Nissim, 2002, p. 2045-2046). Both Booth et al. (2001) and Kemsley and Nissim (2002) find positive and significant values of the debt tax shield, and in addition suggests that the debt tax shield increases in the statutory corporate tax rate over time.[5] These results are crucial in supporting the advantageous effects of using debt financing.

In considering the size of the debt tax shield, the debt shifting strategy (i.e. the difference in tax rates and types of debt) used is important. Despite the work of Modigliani and Miller (1958), which highlights the importance of taxes and their impact on firm's optimal capital structure, most of the empirical literature studying debt shifting strategies in a multinational setting came in the early 2000s. Several of the studies consider the relationship between firm leverage and taxation, but differ in how the debt is categorised, i.e. external versus internal debt. This consideration has been found to have a great significance on how much the differences in tax rates affect debt shifting strategies.

One of the studies on debt shifting is done by Huizinga et al. (2008). They present a model of a MNC's optimal external debt policy incorporating international taxation factors. The model is tested on firm data from 32 European countries in the Amadeus database, covering the years 1994 to 2003. Furthermore, their model predicts that a multinational's capital structure depends on the national and international structure of the firm and the tax systems of all the countries where the firm operates. Their findings suggest that for a multinational with affiliates of equal size in two countries, a 10% overall tax increase in one country increases the debt-to-asset ratio in that country by 2.4%. The debt-to-asset ratio in the other country consequently falls by 0.6% (Møen et al., 2011, p. 8). Egger et al.

[4](1) Investigation of the Modigliani and Miller prediction on the advantage of using debt versus equity in the absence of a debt tax shield, (2) usage of firm-level financial statements to calculate the benefits of debt, and (3) direct marked evidence from debt tax shields (e.g. Fama and French (1998) found negative relation between firm value and debt), however numerous lack of evidence and significance.

[5]For other examples, see Graham (2000) on tax benefit of debt finance for U.S. companies.

(2010) models debt shifting by the use of internal debt, and compares the debt-to-asset ratio for domestic and multinational firms. They use data from 32,067 European firms and the results show that foreign-owned firms have significantly higher debt-to-asset ratios than purely domestic firms. Huizinga et al. (2008) and Egger et al. (2010) use total debt, i.e. the sum of internal and external debt, in their empirical analysis. This is criticised by Møen et al. (2011) for not providing unambiguous empirical evidence in favour of their theory models, as the results are based on variations in total debt.

Hence, Møen et al. (2011) take the study of Huizinga et al. (2008) a step further by incorporating internal debt shifting. The authors were the first to model companies' choice between internal and external debt shifting, and show that it is optimal for firms to use both types of debt to save taxes. Møen et al. (2011) considers, as an example, a MNC consisting of two affiliates of equal size. They find that if the affiliate located in the high tax country experiences a 10 percentage point tax increase, the total effect of the tax change for a company with an average debt-to-asset ratio at the outset, is a 7.4% increase in total debt (all else equal) (p. 27). This effect is significantly larger than the one estimated by Huizinga et al. (2008) and is expected to be the outcome when distinguishing between internal and external debt shifting.

As presented above, both domestic and multinationals have the option to use debt shifting to maximise tax saving. However, a multinational has the additional advantage of utilising internal debt shifting to minimise its global tax payments, by using the differences in corporate tax systems across the countries where it operates. Such internal debt shifting can be carried out in two ways. The lending can either be undertaken by an affiliate of the multinational or by the parent company itself; both of the methods will be presented below.

Parent companies located in high-tax countries are more likely to structure their lending operations in a financial centre, often referred to as an internal bank. The internal bank is a separate entity located in a low or zero tax jurisdiction, with the sole purpose of undertaking the lending to other affiliates of the MNC. To minimise global tax payments, the MNC will usually place equity in the internal bank, which would then lend the funds

as internal debt to the higher-taxed affiliates. As a result, the borrowing affiliate transfers part of its surplus to the internal bank as interest payments. By using an internal bank located in a tax haven, the MNC gets the full benefit of the debt tax shield in the high tax jurisdiction. The higher taxed affiliate can deduct the interest payments from its tax base, whereas the tax obligations on interest income in the internal bank are (close to) zero (Schjelderup, 2016, p. 113). This setup maximises the value of internal debt shifting. In the absence of costs related to setting up an internal bank, the strategy is profitable as long as the lending is undertaken by an affiliate situated in a country with a lower tax rate than the host country of the borrowing affiliate. However, realistically, there are costs related to setting up an internal bank and utilising profit shifting through the use of internal debt. A tax-efficient MNC will optimally balance its marginal tax savings against marginal costs of shifting income, based on U-shaped tax avoidance costs. These costs include effort and resource costs, as well as expected penalties from taking advantage of the ambiguity of regulation such as arm's-length pricing and thin capitalisation rules (Hopland et al., 2018, p. 166).

An alternative to the internal bank is where the parent company act as the lending entity. Empirical studies show that a significant amount of lending originates from parent firms.[6] Schjelderup (2016) argues that a motive for this is the combined effect of external and parental lending. If the parent company is located in a low tax country, the tax rate difference between the parent and the affiliate gives the parent the incentive to charge the subsidiary with a high interest rate. The paper suggests that the parent will do so by using external financing. It has an incentive to make the affiliate look more risky, which will result in a high market interest rate. This makes it easier for the parent to set a high interest rate for internal lending, as it uses the external interest rate as a proxy for the arm's length rate (p. 114). The costs related to setting up an internal bank are in such a case not present, but the costs related to income shifting through debt financing mentioned in the previous section must also be considered for the use of parental debt.

Based on the aforementioned literature, we know that when interest payments are tax deductible, it generates a corporate tax advantage and makes debt financing preferable

[6]For example, Møen et al. (2018) find that 42% of affiliates of German MNCs receive parental debt.

over equity financing. A MNC has the advantage of using both internal and external debt when interacting in profit shifting, and the company's capital structure will therefore depend on the corporate tax system of the countries where it operates. The size of the tax shield will depend on the differences in the statutory tax rates and the type of debt. A marginal change in the tax rates will result in a rebalancing of the indebtedness of the affiliates of the MNC. However, the size of the effect found in the empirical research seems to vary based on how the debt is characterised, i.e. total debt, internal or external debt, or both. By distinguishing between internal and external debt, instead of using total debt, the effect of a tax rate change on the company's debt-to-asset ratio is significantly higher. When using internal debt shifting, a MNC can as mentioned choose between the parent company or a financial centre (internal bank) as the creditor. The use of parental debt has, however, not been studied to the same extent as other debt shifting strategies. The choice between using the parent or an affiliate as a lender has received little attention in the literature. In former research, parental debt has been acknowledged as a substitute for external funding, but has only in the more recent literature been found to have more specific advantages as a financing option. In the following parts, some of these studies will be presented.

The use of internal debt, in preference to external funding, has been a matter in the literature for decades, and not only for tax-motivating purposes as presented above. In 1984, Myers and Majluf published a paper reflecting that the ranking preference on financial sources is based on information asymmetry between managers and investors. The asymmetry assumption is based on the fact that managers in general have more information on the prospects, economic situations and the risk of the company than investors and external creditors. According to this pecking order theory, the preferred source of capital is internal funding (e.g. internal debt or retained earnings) (Leary and Roberts, 2010).[7] Former literature has also pointed out that parental debt, financed as external debt at the parent level, can act as a substitute for external debt financing in the foreign affiliates. Gertner et al. (1994) and Chowdhry and Coval (1998) discuss important consequences regarding the use of internal capital markets and parental debt. The studies argue that using internal debt provides a closer monitoring, as a better flow of

[7]Followed by external debt financing and external equity financing (e.g. equity issue).

information between the receiver and provider of the internal debt will reduce borrowing and agency costs, compared to external financing. Furthermore, the study by Desai et al. (2004) concludes that the use of parental debt reduces bankruptcy costs, and more or less disregards the insolvency threat represented by using external debt financing in subsidiaries.[8]

Besides the benefits of reduced costs and better monitoring by the use of internal financing, Møen et al. (2018) adds weight to other motives for why parental debt is utilised. The paper explores tax efficient capital structures in a MNC, with a focus on the choice between using the parent or an affiliate as a lender. In addition, they take previous research further by distinguishing between external debt, parental debt and the use of an internal bank. The article features, among other things, two possible non-tax motivated reasons why a MNC would choose to use parental debt. The first is that the parent has higher solvency and therefore a cost advantage in raising external capital, compared to what the foreign affiliate is subject to in the host country. The second reason why parental debt might be an optimal financing option is that the fixed cost of setting up an internal bank might overcompensate the tax savings (Møen et al., 2018). To undertake the empirical analysis, the authors use data from Deutsche Bundesbank (the German central bank). The main sample consists of 195,516 observations in the timeline from 1999 to 2012. It includes 4,699 MNCs and 32,748 foreign subsidiaries in 129 host countries, and contains information on external debt, as well as on internal debt from both parent companies and other affiliates within the group (Møen et al., 2018, p. 3).

The findings on the first motive for using parental debt proposes that an increase in the credit constraints in the parent company decreases the use of parental debt (i.e. rerouted external debt from parent company). In absence of the credit constraints, a more favourable access to external debt in the parent company will imply an increase in the parent debt-to-asset ratio in the subsidiary. The estimates suggests that a higher value of SATA (sales over total assets of the parent firm) is linked to a favourable access to external funding, but is only rerouted as parental debt to subsidiaries if there is a tax incentive to do so (p. 33). Supporting the second motive, Møen et al. (2018) find that

[8]See Desai et al. (2004) for a broader discussion on why subsidiaries located in countries with shallow capital markets and weak creditor rights borrow more from the parent and less from external markets.

parental debt is mainly used in smaller firms where there is not enough lending to cover the costs of setting up an internal bank. Larger MNCs, however, are believed to have the capital to set up and operate an internal lending entity. The amount of capital within a MNC of considerable size is greater, and thus, the tax savings are considered to be relatively higher than for smaller MNCs.

Looking closer at the internal capital markets, the authors find that 42% of affiliates of German MNCs receive parental debt, and the average share of parental debt to total assets in the subsidiaries is 19% (p. 2). From a group level perspective, the share of parental debt is 30% in MNCs, in contrast to only 14% internal lending from internal banks. The authors interpret the results as though the probability of the affiliate being a lender is higher if it is located in a low tax jurisdiction. In addition, they suggests that the probability of internal debt increases with sales. This indicates that the higher the sales in the affiliate, the greater the incentive to use more debt from the internal bank to shift profits from the subsidiary to the internal bank. Even though profit shifting from a high taxed affiliate to a low taxed affiliate is a more common strategy, the study shows that numerous German parent companies provide parental lending even if the parent is located in a higher taxed country. The paper does, however, not conclude on why this strategy occurs (Møen et al., 2018).

The empirical evidence supports the theory presented in the paper, and the work of Desai et al. (2004), indicating that parental and external debt are substitutes. This proposes that parental lending to foreign affiliates is raised through external borrowing in the parent's home country. However, the ratio depends on the relative cost of issuing capital through the parent and the subsidiary (Møen et al., 2018, p. 2). By examining the tax effects of parental debt, important findings show that a 1 percentage point increase in statutory tax rate in the host country of an affiliate leads to a 0.14 percentage point higher parental debt-to-asset ratio of the affiliate (p. 3). This suggests that parental debt responds to changes in tax rates in a positive way.

In regard to the discussion of parental debt shifting and internal debt shifting it is important to note that tax-efficient capital structures are highly desirable among MNCs. There are numerous internal debt shifting strategies that can be utilised to reduce tax payments, however, few have been utterly acknowledged by academics and policymakers. One strategy that has been largely ignored is debt shifting in the event of loss-making affiliates. A considerable share of MNCs' subsidiaries are unprofitable, but the lack of inclusion of these affiliates in the data has been a dominant empirical strategy in most of former literature (Cooper and Knittel, 2006). Klassen et al. (1993) reflect on the incentives for MNCs to shift income into loss-making subsidiaries to reduce worldwide tax payments. The study does however, state that the loss-making subsidiaries should be omitted to eliminate biases occurring from reversed incentives under losses. Hopland et al. (2015) were one of the first to consider the combination of internal debt and deficits in subsidiaries. The study finds that the pre-tax income as a share of assets yields a negative coefficient, which suggests that more profitable affiliates imply lower internal debt. Furthermore, the authors observe that an increase in the tax difference coefficient (parent's tax rate less subsidiary's tax rate) increases the amount of internal debt. However, the results are not clear as the loss-position indicator for affiliates represents insignificant coefficients.

Hopland et al. (2018) add to the otherwise absent literature regarding debt shifting strategies and loss-making affiliates. The authors state that losses are often unpredicted and driven by sales or price shocks. However, they deliver evidence that subsidiary losses are expected with some probability, but the occurrence remains stochastic (p. 167). Furthermore, the paper analyses the use of flexibility in the capital structure of MNCs. They emphasise that if a MNC has little to no flexibility in adjusting the leverage ratios, it will take the loss probability into account when deciding the income shifting strategies ex ante. In contrast, if the MNC faces full flexibility, there will be no uncertainty in the tax planning. Hence, the optimal income shifting is adjusted after observing the profit or loss realisation, to reduce worldwide taxable income ex-post. In the event of inflexibility (i.e. the MNC has to base its tax planning on ex-ante assumptions), the results show that affiliates report the same internal capital structure regardless of the loss position (p. 168). The outcome reporting on internal leverage, shows that neither the present or lagged loss position indicator have significant effects on the internal leverage, and firms have little, if

any, flexibility to adjust the capital structure to losses. However, due to large standard errors, the authors do not reject that the coefficients are zero, nor that there is ex-post or ex-ante debt shifting (p. 175).

As presented, losses in subsidiaries are not uncommon and it can be argued, based on findings in prior literature, that unprofitable affiliates might be unique and treated differently from other affiliates. Nevertheless, the results from (partly) excluding loss-making affiliates compared to keeping them in the analysis are similar. Thus, the only difference is the subsidiaries' financial performance. This helps to eliminate insecurities in foregoing research indicating that the difference in performance drive results, and consequently reduces the problems related to omitted variables (Hopland et al., 2018).

2.2 Project Background

The important findings derived from foregoing literature create the basis of this thesis, and the following paragraphs will review why these are essential for the project's background. There exists plenty of debt shifting literature on both domestic firms and multinationals. However, the methods of the empirical studies differ and only a few debt shifting strategies have been analysed to a great extent. All of the literature in this chapter is of great interest, as it creates an understanding of how and why MNCs would choose to participate in income shifting (e.g. internal and external debt tax shield, tax effect on debt-to-asset ratios, minimising tax payments, the optimal location of internal lending and the benefits of internal compared to external debt). However, our thesis is mainly related to a combination of the papers on loss-making affiliates and the article by Møen et al. (2018).

As highlighted in the beginning and throughout this chapter, research regarding loss in affiliates is highly limited, particularly in concern with internal and parental debt shifting. The literature related to income shifting in loss-making affiliates will hence be of great relevance for several reasons. Firstly, it will be the base for the inflexibility assumption we hold in our hypothesis. Secondly, part of the intention behind the thesis is to add to the debt shifting literature, and thus increase the empirical knowledge surrounding tax planning in loss-making affiliates and the use of parental debt.

In addition to the literature on subsidiary losses, the work by Møen et al. (2018) is of particular significance as it investigates how the use of parental debt fits into a MNC's tax-efficient capital structure. The authors argue that while previous research has supplied evidence on the use of internal debt, external debt or total debt in multinationals, none of the earlier studies have provided evidence on the use of parental debt as a financing option, and especially not as a debt shifting strategy. The model used by Møen et al. (2018) adds to previous theory of multinationals' tax-efficient capital structure by modeling parental debt, non-parental internal debt, and external debt separately. They suggest that high-taxed firms in some cases should be willing to incur additional tax payments by using parental debt as a debt-shifting device, instead of locating internal lending in a separate internal bank located in a low-tax jurisdiction. They reason that this may be beneficial because of non-tax costs and benefits related to parental debt. One of their findings indicate a strategy where the parental debt provided is raised through external borrowing in the parent firm and thereafter forwarded to the foreign affiliates. We will take this detection further and investigate whether there could be a more *tax-motivated* reason for the latter strategy. Hence, the main focus will be to examine a setting where the parent is located in the higher taxed country, and the affiliate receiving the parental debt has a probability of running losses. This brings us to the next chapter, describing the background and development of the hypothesis.

3 Hypothesis Development

The following chapter gives guidance and clarification in the development of our hypotheses. Chapter 2 presented several debt shifting strategies which have received attention in earlier research and amongst academics. These strategies are used by multinationals to minimise the group's worldwide tax payments. The difference between the previously described internal debt shifting strategies and the strategy that our hypothesis deals with is how the MNC operates its internal lending.

A well-known approach, both in the field and in academia, involves shifting income from a *low-tax* country to a *high-tax* country. The lowest taxed affiliate, normally functioning as a financial centre, provides the higher taxed affiliates with debt. This structure ensures that the interest, which is paid to the financial centre, is taxed with the lowest possible tax rate within the group. Additionally, the interest is deducted from taxable income in affiliates that face higher tax rates. The debt tax shield is maximised when the tax rate difference between the affiliates is maximised. To obtain the debt tax shield when using this strategy, the borrowing affiliate must be profitable. Otherwise, the affiliate cannot repay the loans to the lending parties and it will not be able to deduct any interest expenses from its tax base. In the event of losses, this particular strategy would therefore no longer be lucrative. As presented in the literature review, several studies exclude all loss-making affiliates. By omitting affiliates with negative tax bases, the studies have not examined the potential use of debt shifting in unprofitable affiliates (Cooper and Knittel, 2006). In the following section, we consider an alternative debt shifting strategy involving lending from parent companies to affiliates. This could potentially help explain why internal borrowing is still observed in loss-making affiliates.

Before stating the hypotheses, we will present assumptions and important insights of its fundamentals. We consider a MNC, with a Norwegian parent firm, a foreign producing affiliate and a financial centre located in a tax haven (i.e. a low tax jurisdiction). We assume that the Norwegian parent is the highest taxed entity within the group, and that the affiliate faces a statutory tax rate between the Norwegian rate and the one faced by the internal bank. Moreover, taxes are imposed by the source country of the investments.

This implies that the resident country of the parent exempts the income of the financial centre and the affiliate. Further, we presume that the parent company has majority ownership in the affiliate (i.e. 50% or more). This is a central condition as it is crucial that the MNC can decide upon the capital structure of its affiliates (Møen et al., 2018). Further, the parent acts as a holding company, and the MNC will decide the amount of funding in the affiliate.

The funding of the affiliate could initially be financed in three ways. Either by internal lending from the financial centre, parental debt or external funds from a third party lender at an exogenous interest rate. Instead of raising the external debt at affiliate level, the parent could borrow externally and forward this as parental debt to the subsidiary.[9] As discussed in Desai et al. (2004) and Møen et al. (2018), the parent could have a more favourable access to the external capital market. However, to underline the role parental debt plays in reducing the world-wide tax savings, we assume that there are no cost differences in raising external debt compared to parental debt in the affiliate. Moreover, we assume along with Desai et al. (2004), that parental debt and external debt are perfect substitutes in the affiliate.

Regardless of the financing method used by the MNC, we presume inflexibility. As stated in the literature review, Hopland et al. (2018) find that the flexibility of MNCs to change the income shifting strategy within the same year is certainly limited, particularly for (internal) leverage. Therefore, we find it reasonable to assume full inflexibility, meaning that the affiliate's financial decisions are made ex-ante. Consequently, there is no flexibility to adjust debt shifting strategies in response to financial performance outcomes. Hence, we assume that the MNC anticipates the loss probability in the affiliate, and decides upon its capital structure in response to these expectations. Further, we assume that the affiliate is profitable with a probability *(1-p)*, and is running losses with a probability *p*.

In a case where the affiliate is profitable, it will be able to deduct interest payments from its tax base. The lending party will therefore receive interest income on the loan. Internal lending from a financial centre will in this case be more lucrative, as income is shifted from

[9]The parent chooses to forward an external loan, as equity financing would not be tax deductible, and thus not generate any tax savings.

a high taxed to a low taxed entity. The use of parental debt will not generate a similarly advantageous tax shield if the affiliate is profitable. The reason being that income is shifted to a higher taxed entity, which pays the interest on to an external lender.

As previously mentioned, when an affiliate is incurring losses, internal debt from a tax haven affiliate is not a lucrative strategy. In such an event, the affiliate would default on its loans (internal and/or parental), and it cannot deduct interest payments from its (negative) tax base. Even though the internal bank will not be able to deduct the use of equity, the parent can deduct its interest payments on the external loan (i.e. the parent incurs the cost of repaying the external loan).

If the affiliate is financed with a weighed ratio of the three presented methods, awareness of the mechanisms that will be affected by the financial performance of the subsidiary is fundamental. There are costs related to an increase of the external debt-to-asset ratio.[10] The MNC will therefore have to weigh the expected external debt tax shield against the cost of increasing the ratio. The internal bank will, unlike the standard trade-off, only receive interest income with the probability *(1-p)*. In the case of parental debt financing, the parent firm incurs the cost of repaying the external loan with the probability *p*. If the affiliate is running losses, the parent company will be able to deduct the interest payments at a higher tax rate than the affiliate, and hence increase the multinational's overall tax savings.

Further, we will focus on the strategy concerning the use of parental debt in affiliates expected to be loss-making, specifically. From the discussion in the last paragraphs, we reason that the strategy is only rational if there is a probability that the affiliate will run losses. To reduce the overall tax payments, the external debt shield needs to be utilised at parent level. Hence, part of a successful strategy is that the affiliate's interest burden is shifted to the parent company. We therefore assume that the parent, located in the highest taxed country, can deduct the interest expense for the rerouted external debt at a higher tax rate, and obtain a large external debt tax shield. If the affiliate is successful ($p = 0$), the strategy would no longer be profitable, and parental debt should not be used.

[10] E.g. the costs of bankruptcy.

The parent will then receive interest income on the parental debt, and the tax savings will be evened out by the taxed interest income. The MNC should instead use loans from the financial centre, which enables it to shift income from a high-taxed affiliate to the tax haven affiliate.

Based on these insights, we expect that the use of rerouted external debt is lucrative with the probability p only. The MNC will therefore, based on the loss probabilities, find a balance between the financing methods of the affiliate. An increase in the loss probability would increase the incentive of the MNC to finance its affiliate with parental debt. Although an increased probability of loss also increases the likelihood of the parent incurring the external debt payments, it increases the overall tax savings of the MNC. Accordingly, an increase in the loss probability will reduce the internal debt financing from the internal bank, and consequently the internal debt-to-asset ratio. We summarise the parental debt shifting strategy in the following hypothesis:

Hypothesis 1: *The incentive for the MNC to increase the parental debt-to-asset ratio in the affiliate increases with the probability of the subsidiary running losses.*

This can be interpreted in the following way: the higher the probability of loss, the higher the incentive to finance the affiliate with debt from the parent company. The hypothesis provides an explanation as to *why* parental debt is still used as a financing method in unprofitable affiliates. In the event of profitable affiliates, the most reasonable strategy for reducing world-wide tax saving is to use internal debt from an affiliate located in the lowest taxed entity within the group. This ensures that the income is taxed at the lowest possible tax rate, and interest payments are deducted at a higher tax rate. If the MNC chooses to use rerouted external debt in profitable affiliates, the tax payments on interest income and the obtained external debt tax shield would be offset by each other. However, if the affiliate has a high probability of running losses, the MNC will use debt from an entity facing the *highest* tax rate within the group, which in our case is the parent located in Norway.

Furthermore, for the purpose of our empirical analysis, we define a benchmark for the hypothesis stated above. We consider two possible outcomes where we cannot reject the null hypothesis (H0). A situation where we find, (1) no significant relationship, or (2) a negative relationship between the parental debt-to-asset ratio and the probability of loss. If the analysis returns an insignificant relationship, it will be difficult to give a specific reasoning for the strategy. A negative relationship suggests that the MNC reduces the parental debt-to-asset ratio when the probability of loss in the affiliate increases. This outcome suggests that the strategy in the hypothesis is not (particularly) utilised by the Norwegian MNCs in our data sample.[11] If we however, reject the null hypothesis and find a significant positive relationship, we present a solution suggesting that the aforementioned strategy is pursued (to some extent) by MNCs. Thus, we imagine a scenario where the MNC predicts the probability of loss in the affiliate the coming year, and increases (decrease) the parental debt if the loss probability is relatively high (low). Regardless of the results, a significant relationships indicates that MNCs are able to anticipate the probability of loss in the affiliates.

An indirect way of exploring the parental debt shifting strategy could be to examine if the parental debt-to-asset ratio is positively correlated with the parent company's tax rate (i.e. the Norwegian statutory tax rate). If there is a positive correlation between the two variables, it would imply that the use of parental debt in the affiliate should increase (decrease) when the Norwegian tax rate increases (decreases). An increase in the Norwegian tax rate would lead to a higher debt tax shield for the parent company. Thus, rerouting more external debt to the loss-making affiliate would enlarge the overall tax savings of the MNC, vice versa. We summarise this in the following hypothesis:

Hypothesis 2: *If MNCs use parental debt to minimise their global tax payments, affiliate's parental debt-to-asset ratio should be positively correlated with the Norwegian tax rate.*

An important aspect of the second hypothesis is that variation occurs in the parent's tax rate throughout the sample period. This enables us to examine how the rerouted external debt is affected by changes in the parent's host country statutory tax rate. In a setting

[11] A possible strategy could then be suggested by Klassen et al. (1993) reflect in the incentives for MNCs to shift income (instead of debt) into loss-making subsidiaries to reduce worldwide tax payments.

with variations in the statutory tax rate faced by the parent, we would expect a positive correlation between the parental debt and the Norwegian corporate tax rate. However, a complication with our data sample is that the Norwegian tax rate is at a constant 28% throughout the sample period. This is further discussed in chapter 4 and 5.

Møen et al. (2018) suggest that cost advantages of external capital in the home market and high set up cost of internal banks are two reasons why one observes lending from parents who are not located in the lowest taxed jurisdiction. The study does however, not present concluding results in the event of parental debt and losses in affiliates. Our hypothesis is therefore particularly interesting as it could provide empirical evidence of a 'new' debt shifting strategy. The use of parental debt shifting under anticipation of loss probabilities in foreign subsidiaries could have important implications for the empirical studies on debt shifting, as earlier studies have dropped or neglected loss-making affiliates from the empirical analysis. Based on our discussion, parental debt shifting under losses could affect the worldwide tax payments of the MNC, and should in the case of a positive and significant relationship, be considered when dealing with debt shifting in multinationals. Not including this strategy could potentially underestimate benefits of debt shifting regarding the tax savings of MNCs, or overestimate the effect of external and internal non-parental debt shifting strategies. By researching and testing this hypothesis, we want to add to the existing empirical research of the relationship between parental debt and loss-making affiliates.

4 Data and Descriptive statistics

4.1 Data Source

The intention of the following subsections is to give an overview of the data sources providing the base for our regressions and analysis presented later on. In addition, we explain why the different data sets are important factors to answer our hypotheses. The data sample used in this thesis is constructed by combining three main sources, in addition to supplementary data, for the time period 1992 to 2006.

4.1.1 Survey of Outward Foreign Direct Investment

The Survey of Outward FDI (Utenlandsoppgaven) provides the base for our sample. The data was obtained by the Norwegian Tax Administration (Skattedirektoratet) and Statistics Norway (Statistisk Sentralbyrå) in the time period 1990 to 2006. We are provided with two data sets, one from 1990 to 2005 and a separate one for 2006. The variables of interest are reported in both, and are therefore combined into one data set. Our analysis is initially limited to the given years of the Survey of Outward FDI. However, due to lack of accounting data in the first two years, we restricted the sample period, to start from 1992.

The Survey of Outward FDI holds information on Norwegian entities (investors) with at least 10% direct or 50% indirect ownership in foreign affiliates (Statistics Norway, 2008). All Norwegian investors who fall within the ownership requirements are obligated to report their interest in foreign subsidiaries according to the Norwegian law.[12] As mentioned in chapter 3, a condition of the hypotheses is that the affiliates are majority owned by the Norwegian parent. Accordingly, the ownership share variable is of great relevance. We create a variable containing the combined ownership share (direct and indirect), and thus, we can easily separate entities with minority and majority Norwegian ownership.

[12]Legal basis of the Act of 16th of June 1989 no. 54 of official statistics and Statistics Norway (The law of Statistics) §2-2.

In addition to the ownership share, the Survey of Outbound FDI has other important variables that are helpful for testing our hypotheses. These variables include transactions between the Norwegian parent and the foreign affiliate, balance sheet and accounting data of the affiliate, as well as country specific information on the host country (i.e. corporate tax rate and country name). As the data set provides transactions between the Norwegian company and its foreign affiliate, we get variables covering the debt between the entities (parental debt), both the long and short term. These debt transactions are particularly helpful when determining the parental debt to asset ratio later on. Other variables from the data set used in our analysis are total assets, fixed assets and EBT (earnings before taxes).

Lastly, it is important to note that the data gives information on affiliate-year observations, which is helpful when looking at changes in variables over time. To help identify and distinguish between the different affiliates and parent companies, the data set holds de-identified parent-ID for every parent (group) company and de-identified affiliate-ID for each of the different affiliates within the group.[13] This is further used when connecting the different data sets.

4.1.2 SIFON-registry

The SIFON-registry is provided by Statistics Norway, and is connected to the Survey of Foreign FDI to determine the foreign ownership structure in the Norwegian companies. The registry holds, among other things, information on the largest foreign ownership share, total foreign ownership share and the origin country of the foreign investor. We can thereby determine if the Norwegian parent companies (i.e. foreign affiliates in Norway or Norwegian affiliates) in the Survey of Outward FDI are wholly or partially foreign-owned. The information on foreign ownership is useful as the main focus of this thesis is parental debt from the (ultimate) Norwegian parent company, whereas internal debt from holding companies or other affiliates is not of particular relevance in our research. The ultimate Norwegian parent companies are found by connecting the SIFON-registry to the Survey of Outbound FDI, which enables us to later on exclude all foreign majority-owned Norwegian

[13]The companies in the Survey of Outbound FDI are de-identified by an identification key that is common with the SIFON-Registry and the Norwegian Corporate Accounts

companies (i.e. with over 50% foreign ownership). The data sets are connected using parent-ID.

However, before the SIFON-registry can be connected to our main sample, there are two main adjustments that have to be executed. Firstly, we where given data files for each year of the time period, and these files merged into one data set. Secondly, we find that some of the ownership observations are missing. This is solved by sample testing, to see the change in ownership structure in the affiliates during the years of reporting. We find that there are very small, to no changes. We therefore calculate the mean of the ownership structure in each company and append it to the associated affiliate-year observation.

4.1.3 Norwegian Corporate Accounts

In addition to the data sets above, we connect the Norwegian Corporate Accounts to our sample. The accounting information is provided by the Institute for Research in Economics and Business Administration AS (SNF), and submitted by the Register of Company Accounts in Brønnøysund (Brønnøysundregistrene) via Dun and Bradstreet Norway. The data contains company accounts for all Norwegian companies in the years 1992 to 2014 (Berner et al., 2014). However, due to the ended data collection on the Survey of Outward FDI, we limit the accounting data from 1992 to 2006. The accounting characteristics used from the accounting data is the parent's EBIT, company-ID, fixed[14] and total assets. In treatment of the Norwegian corporate accounts we are, like in the SIFON-registry, provided with yearly files. The files covering the sample period are therefore combined before we append them to the main data set.

4.1.4 Supplementary Data

Although the above data is quite helpful, we supplement the sample with additional information to control for other effects. The variables include tax rates (Norwegian and host countries' statutory tax rate) and inflation, where the latter is included for the host country only.

[14]Fixed assets is generated as a function of fixed assets over total assets.

Collection of Statutory Tax Rates

The Survey of Outward FDI provides a variable for yearly tax rate observations for the host countries of the affiliates. We find however, by studying the variable, that it is indefinite and numerous observations are missing, both across time and countries. To solve this matter, and make sure we have the correct tax rate for the given firm-year observation, we collect tax rate information from a few different sources. First, we include tax rates from the KPMG corporate tax rate table, however this is only reported from 2003 and on (KPMG, 2019). As a supplement to the KPMG table, we use two tables from the OECD. One historical table ranging from 1981 to 1999, and one from 2000 and on (OECD, 2018, 2019). However, a limitation concerning the OECD tax table is that it only includes tax rates from the organisation's member countries. Lastly, we obtain the remaining missing tax rate observations from the Trading Economics website (Trading Economics, 2019).

From the collection of the tax rate data, we initially end up with two variables. One for the different host countries and one containing the Norwegian statutory tax rate. As discussed in chapter 3, we want to test our hypotheses on countries that have lower tax rates than Norway at any given moment of time. The tax rate observations are therefore useful in determining which countries faces a lower tax rate than the Norwegian parent.[15]

Collection of Inflation

The aforementioned data sets do not supply any country specific variables, except the statutory tax rates and country code. We therefore include one additional variable controlling for country specific effects. The *inflation* data is found in the World Bank Database providing worldwide indicators (The World Bank, 2019). This data does not contain company or affiliate ID, and is therefore connected with the main sample using the country code which is common for both.

[15]The different tax variables created with the tax data are described in chapter 4.3.2

4.2 Sample Restrictions

As there are limitations in the data, we have performed some data trimming procedures. The raw data contains 60,159 affiliate-year observations in the time span 1992 to 2006. Table 4.1 summarises the exclusion of observations due to limitations and restrictions.

To obtain this estimation sample, we first drop all companies where the Norwegian firm is not the ultimate parent and all observations where the parent owns less than 50% of the affiliate. We thereafter eliminate observations where the firm has reported negative assets, and observations with missing financial statement information on affiliate and parent level. Furthermore, we exclude observations with extreme parental debt-to-asset ratios outside the interval [0;1]. Lastly, we drop all firms with less than three firm-year observations. This gives the regression sample for our model, where all affiliates are majority owned by the Norwegian parent company, and where the parent company is the ultimate parent in the MNC. It also results in the data set only consisting of affiliates with observations in at least three years. After performing the data trimming procedures we are left with the estimation sample for our empirical analysis, consisting of 28,489 affiliate-year observations of Norwegian MNCs.

Table 4.1: Data Trimming Procedure

The table shows the sample selection criteria used in our main sample and provides descriptive statistics for the different steps going from raw data to the estimation sample. The data set is provided by Statistics Norway and contains annual information on outbound foreign direct investments (FDI) of Norwegian MNCs, accompanied by selected information from SIFON, the accounting data and the supplementary data. The unit of observations is affiliate-year reportings within MNCs in the period 1992 - 2006.

Exclusion	Observations	Percent
(1) All firm-year observations (1992 - 2006)	60,159	100.0%
(2) Norwegian firm not ultimate parent*	53,819	89.5%
(3) Minority-owned affiliates (< 50%)	46,129	76.7%
(4) Negative asset observations**	45,929	76.3%
(5) Missing financial statement observations on affiliate	37,746	62.7%
(6) Missing financial statement information on parent company	37,719	62.7%
(7) Affiliate-year observations with extreme parental debt-to-asset ratios***	35,386	58.8%
(8) Less than three firm-year observations	28,489	47.4%
Estimation sample	28,489	47.4%

* Foreign investor owning more than 50% of Norwegian company.
** Negative sign on current and fixed assets.
*** Total parent debt-to-asset ratio outside the interval [0;1].

4.3 Variables

4.3.1 Dependent Variables

We use the *parental debt-to-asset ratio* as the dependent variable in our regression analysis. The ratio is constructed as the affiliates amount of liabilities to the Norwegian parent over total assets. We run several regressions where we use different parental debt-to-asset ratios. The *short-term parental debt-to-asset ratio* expresses the share of parental debt due within a 12-month period, also known as part of current liabilities. The *long-term parental debt-to-asset ratio* expresses the share of parental debt which has a maturity of 12 months or more, also known as part of non-current liabilities. The *total parental debt-to asset ratio* expresses the share of both short-term and long-term parental debt to total assets. The ratios do not include other types of debt, which means that it only consists of the debt due to the ultimate parent company.

4.3.2 Explanatory Variables

Our main specification, explained in chapter 5, consists of a set of explanatory variables. These are included in the attempt to increase the explanatory power of the model. We include the tax rate difference, the fixed asset ratios of both the affiliate and the parent company, the log of assets in the affiliate, inflation, the return on total assets, the loss probability and a set of dummy variables. The selection of these variables is to a great extent based on the paper by Hopland et al. (2018) and Møen et al. (2018), and explained in detail below.

Tax Rate Difference

The *tax rate difference* is measured as the difference between the statutory tax rate in the residence country, which in our case is Norway, and the tax rate in the host country, i.e. the country where the foreign affiliate is located. We include the variable to be able to examine whether the difference between the statutory tax rates has an impact on the parental debt-to-asset ratio.

The variable is not expected to have a major effect in any of the regressions. When the motive for using parental debt is deduction of interest payments and tax savings, parental debt will only make sense in the case of positive tax rate differences or negative tax rate differences, depending on whether we look at a setting with or without losses. When parental debt is used because of beneficial non-tax related costs, we would expect the tax rate to be of minimal interest, however, a low tax rate difference would probably be preferable. When we only include observations with positive tax rate differences and exclude tax haven affiliates, we expect the tax rate difference to generally have little impact. Affiliates not facing losses would have no tax related motive for using parental debt when facing a lower statutory tax rate than the parent. In a setting with losses, the tax rate difference is not of great interest as long as it is positive. The tax rate of the parent company, independently, would probably be of more relevance in the decision making, and hence in analysing hypothesis 2. Unfortunately, the tax rate for the parent is, as mentioned, constant at 28% for the sample period. This means that we cannot analyse how changes in the rate affects the use of parental debt.

Fixed Asset Ratio

The *fixed asset ratio* is a measure of tangibility. It is constructed as the ratio of fixed assets to total assets. There is an important relationship between the fixed asset ratio in the affiliate and the parental debt-to-asset ratio. Affiliates with high fixed asset ratios will normally find it easier to borrow externally using the fixed assets as collateral. A larger fixed asset ratio decreases the risk for creditors, as it is relatively easier to reclaim a bankrupt firm's tangible assets. This means that the higher the fixed asset ratio of the affiliate, the easier it will be to access external debt directly, and it may also give better borrowing conditions. This is because the willingness of external lenders to provide loans will probably increases with the fixed asset ratio (Møen et al., 2018). We therefore, expect there to be a negative relationship between the affiliate's fixed asset ratio and the parental debt-to-asset ratio, as a higher fixed asset ratio gives the affiliate less incentive to use parental debt.

Furthermore, we analyse the effect the fixed asset ratio of the parent has on the parental debt-to-asset ratio, and consider the same reasoning as above. There is also an important

relationship between the fixed asset ratio of the parent company and the parental debt-to-asset ratio. The reason is that the debt provided to the affiliate by the parent company is rerouted external debt. The larger fixed asset ratio decreases the risk for the creditors in this case as well. This means that the higher the fixed asset ratio at the parent company, the easier it will be to access external debt and forward it as parental debt to the affiliates. Based on this, we expect there to be a positive relationship between the fixed asset ratio at parent level and the parental debt-to-asset ratio.

Log of Assets (Affiliate Size)

The explanatory variable for *affiliate size* is, as in Hopland et al. (2018, p. 171), measured by the logarithm of total assets. Firm size is also often measured as the log of sales, but as our data does not contain information on sales in the affiliates, we measure it by total assets. Normally, we would expect the size of the affiliate to have a negative effect on the parental debt-to-asset ratio, as it is usually expected to be positively related to external borrowing (Møen et al., 2018, p. 19). The reason is that larger firms with more assets tend to have easier access to external debt. However, in a setting with losses, we would not expect the affiliate size to have a large effect on the parental debt ratio.

Inflation

We include *inflation* as a country specific explanatory variable measured by the consumer price index. It reflects the annual percentage change in the cost for the average consumer to acquire a basket of goods and services that may be fixed or changed at specified intervals. Inflation is an economic indicator reflecting the stability of a country. The inflation variable in our regression is the annual percentage change in the consumer price index which is obtained from the World Development Indicators of the World Bank data base (The World Bank, 2019).

There are several views on how inflation affects a firm's leverage, and some of them are conflicting. Desai et al. (2004) argue that foreign affiliates of MNCs favour external borrowing over internal borrowing in countries with high inflation. The view is based on the underlying assumption that external debt often is denominated in the local currency, which gives the affiliate the opportunity to hedge inflation risk through greater external

borrowing. However, one of the most recognised views is that the inflation variable has a negative effect on the debt-to-asset ratio, as high inflation reduces the real value of deductible interest payments, and thereby the tax advantage of debt (Mintz and Weichenrieder, 2010). Huizinga et al. (2008) argue that countries with higher inflation tend to have higher risk premiums and higher business risk in general, which discourages external borrowing.

Following Mintz and Weichenrieder (2010) and Huizinga et al. (2008) we would expect a positive relationship between inflation and the parental debt-to-asset ratio, as internal borrowing becomes more attractive when external debt has higher risk premiums. However, following Desai et al. (2004), we would expect a negative relationship between the inflation variable and the parental debt-to-asset ratio, as external borrowing is argued to be the favoured financing option.

Return on Total Assets (ROTA)

The *ROTA* variable is measured as the net income before taxes over total assets (Visma, 2019). This variable is included to control for the profitability of the affiliate. As we expect the probability of loss to have a positive relationship to the parental debt-to-asset ratio, we envisage the return on total assets to have a negative effect on parental debt. The reason for this expectation is that a lower ROTA would come from either lower net income or higher assets.

Loss Probability, Pr(Loss)

The *loss probability* is a *predicted* firm-level explanatory variable and is estimated using the probit model explained in section 5.1. We assume that firms use information from previous years to make an estimation on the probability of losses the coming year. The model therefore contains information on affiliates from the time periods t_{-1} and t_{-2}. This includes the loss position dummy, the parental debt-to-asset ratio, the affiliates fixed asset ratio and ROTA. In addition, we include a variable for the tax rate differences between the Norwegian parent and its affiliate from t and t_{-1}. The loss probability variable measures the probability of loss in year t in affiliate i, based on information about the affiliate the two previous years. The variable is included in the main regression to analyse how being

in an expected loss position affects the parental debt-to-asset ratio. We expect to find a positive relationship between the loss probability and the parental debt-to-asset ratio, following Møen et al. (2018) and our main specification.

Dummy variables

We use year dummies, parent industry dummies, and the interaction between the two. In addition, we include parent dummies and control for affiliate fixed effects in two separate supplementary regressions. Using year dummies enables us to analyse whether some years are more statistically significant than others by controlling for temporal variation in the dependent variable. By including industry and parent dummies, and affiliate fixed effects we account for unobserved heterogeneity with respect to debt policy among industries, MNCs and affiliates included in our sample.

4.4 Descriptive Statistics

In this section, we will analyse our data sample and present the descriptive statistics relevant for our study, which focuses on the relationship between the loss probability and parental debt.

Table 4.2 shows the total number of firm observations each year in the time span of 15 years. The purpose of the main regression is to analyse whether there could be a positive relationship between the affiliate's probability of running loss and the parental debt-to-asset ratio. The number and share of loss-making affiliates in each of the years is therefore an interesting insight and is reported in the table. The total number of loss-making affiliates over all years is 8,496, which amounts to about 30% of the sample. The number of affiliates facing losses in each year amounts to between 25% and 34%. Further, figure 4.1 illustrates how many years in a row the affiliates in our sample face losses. We find that most of the loss-making affiliates face losses in one year only, as shown by the first bar. However, a large number of the affiliates also face losses two years in a row, or more. This indicates, according to our sample, that a substantial amount of affiliates facing losses in one year, will face losses in years to come as well.

Table 4.2: Number of Firm-year Observations in the Main Sample

The table shows the total number of firm-year observations and the amount and share of loss-making affiliates each year. The total number of firm-year observations is 30,168 and the share of loss-making affiliates is varying between 25% and 34% in the data sample.

Year	Total Firm-year Observations	Loss-making Affiliates	Loss Percentage
1992	1,312	449	34.2%
1993	1,451	466	32.1%
1994	1,566	470	30.0%
1995	1,585	468	29.5%
1996	1,650	519	31.5%
1997	1,744	505	29.0%
1998	1,771	558	31.5%
1999	1,922	589	30.6%
2000	1,889	609	32.2%
2001	2,367	677	28.6%
2002	2,322	725	31.2%
2003	2,480	722	29.1%
2004	2,362	676	28.6%
2005	2,156	579	26.9%
2006	1,912	484	25.3%
Total	28,489	8,496	29.8%

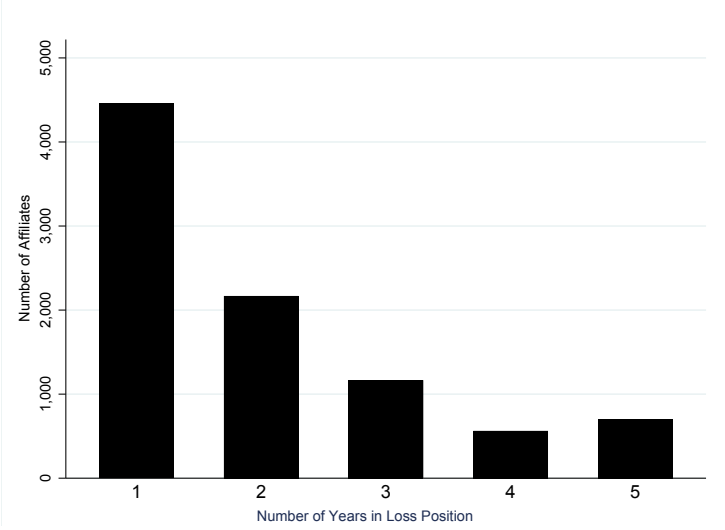


Figure 4.1: Years in a Loss Position

Table 4.3 presents the mean values and standard deviations of both the dependent and the explanatory variables used in the empirical analysis. These variables are explained in detail in section 4.3. Column (1) reports the summary statistics for all affiliates in the main regression. The sample size is shown in the last row, and is smaller than the sample size reported in table 4.1. The reason is, as mentioned in section 5.1, that the

loss probability is estimated only on 18,212 of the observations. Column (2) reports the summary statistics for affiliates that are in an loss position, and column (3) reports the same statistics for affiliates not in a loss position. When estimating the mean values of these affiliates, we have taken the actual financial performance of the affiliate into account, and not the probability of the affiliate ending up in a loss position. Column (4) shows the statistics for affiliates that are using long-term parental debt, and column (5) shows the statistics for the affiliates that are not using long-term parental debt.

Table 4.3: Dependent and Explanatory Variables

The table reports descriptive statistics on the dependent variables and the explanatory variables used in our main regression. All columns report mean values. Column (1) reports the values for the whole regression sample. Column (2) and column (3) report the values when splitting the sample into loss-making affiliates and profitable affiliates. Column (4) and column (5) report values when we divide the sample into affiliates who are using long-term parental debt, and affiliates who have not reported long-term parental debt.

Variables	(1) Main sample	(2) In a loss position	(3) Not in a loss position	(4) Parental debt > 0	(5) Parental debt $= 0$
Short-term parental debt-to-asset ratio	0.0600 (0.0012)	0.0739 (0.0025)	0.0548 (0.0013)	0.0928 (0.0034)	0.0545 (0.0013)
Long-term parental debt-to-asset ratio	0.0428 (0.0010)	0.0703 (0.0025)	0.0315 (0.0010)	0.2925 (0.0048)	0.0000 (0.000)
Total parental debt-to-asset ratio	0.1029 (0.0016)	0.1441 (0.0035)	0.0859 (0.0017)	0.3853 (0.0055)	0.05445 (0.0012)
Loss probability	0.2913 (0.0018)	0.4881 (0.0035)	0.2105 (0.0016)	0.3830 (0.0052)	0.2756 (0.0019)
Tax difference	-0.0369 (0.0006)	-0.0409 (0.0010)	-0.0352 (0.0007)	-0.0410 (0.0014)	-0.0362 (0.0006)
Fixed assets (affiliate)	0.3639 (0.0027)	0.3741 (0.0049)	0.3597 (0.0032)	0.4385 (0.0065)	0.3511 (0.0029)
Fixed assets (parent)	0.6580 (0.0019)	0.6696 (0.0033)	0.6533 (0.0022)	0.6651 (0.0046)	0.6568 (0.0020)
Log of assets	9.8119 (0.0194)	9.8666 (0.0354)	9.7893 (0.0231)	10.7050 (0.0399)	9.6588 (0.0214)
Inflation	3.6293 (0.3833)	3.1758 (0.5556)	3.8156 (0.4903)	4.6553 (1.3490)	3.4535 (0.3850)
ROTA	-0.1714 (0.1714)	-1.5968 (0.5210)	0.4140 (0.1251)	-0.0022 (0.0050)	-0.2004 (0.2059)
Number of observations	18,212	5,302	12,910	2,665	15,547

Standard errors in parentheses

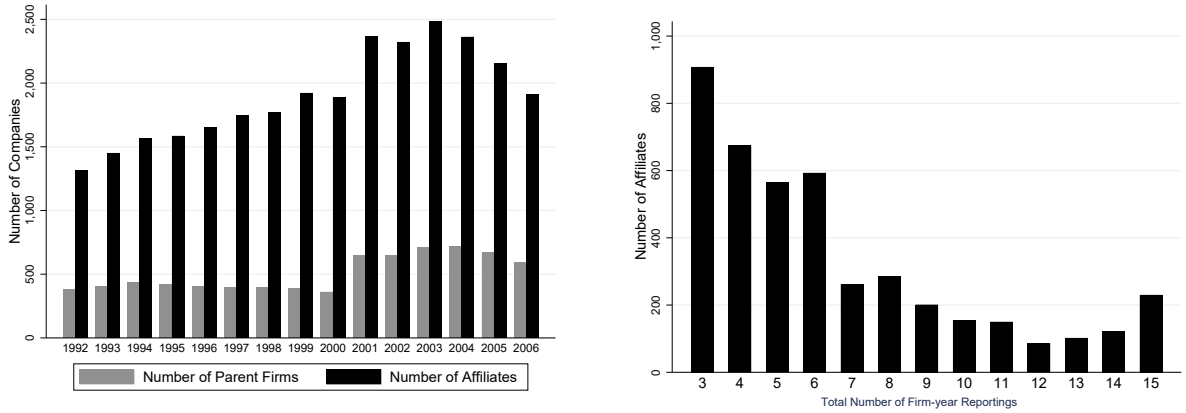
The three parental debt-to-asset ratios in table 4.3 are the dependent variables in our analysis. The variables are measured as the shares of short-term, long-term and total parental debt to total assets. From the first column we see that the mean value of the long-term parental debt is smaller than the one for short-term parental debt. This means that the affiliates in our estimation sample use more short-term debt from their parents. Long-term debt is normally more used for debt shifting and tax savings as the interest payments are deductible from the tax base, and short-term debt usually comes at the cost of less interest expenses. As the mean value of short-term debt is higher, it may imply that affiliates use debt from their parent companies for non-tax related reasons. The analysis in chapter 6 examines the differences between the coefficients from the regressions on these two types of parental debt. From column (2) and (3) we see that the affiliates in a loss position have a mean value of long-term parental debt substantially larger than for those who are not in a loss position. However, the affiliates who are not facing losses do, based on the mean values in column (3), also use some amount of parental debt. Short-term debt from the parent company does also have a higher mean value for the loss-making affiliates, though the difference is not as large as for the long-term parental debt.

The remaining variables in the table are all explanatory variables used in our regression. The table shows that only 5,302 of the affiliates are in a loss position, and the remaining 12,910 are profitable. Our hypothesis focuses on the relationship between the anticipated loss probability and the parental debt-to-asset ratio. Hence, the variable measuring the loss probability is of great interest. We see from column (2) and (3) that the mean of the loss probability is also substantially higher for the loss-making affiliates, compared to the mean for the ones who are profitable. This may imply that the loss probability to some degree does predict whether the affiliates will end up in a loss position, or not. However, the affiliates who are not in a loss position do also have a relatively high mean value of the loss probability, which suggests that the estimated loss probability not always predicts the future performance of the affiliates perfectly. Except for the already mentioned variables and the return on total assets (ROTA), the remaining variables in column (2) and (3) seem to have quite similar mean values both for affiliates in a loss position, and for those who are profitable.

From column (4) and (5) we see that only 2,665 affiliates use long-term parental debt. The columns show that, although the mean of the loss probability is higher for the affiliates using long-term parental debt, the affiliates not using parental debt have a mean value of the loss probability not much lower. The mean of the tax rate difference is negative in both cases, which suggests that most affiliates in our sample face a higher tax rate than their Norwegian parent companies.

The table presents descriptive statistics on how loss affect the parental debt-to-asset ratio and whether there could be any clear links between being in a loss positions, the use of parental debt and the other explanatory variables. Column (2) and (3) are included to show how the mean values of affiliates facing losses in a given year differ from the mean values of the affiliates not facing losses in the given year. Further, column (4) and (5) are included to show the mean values for those who use parental debt, and those who do not. Our main regressions and the empirical analysis, however, focus on how the probability of loss, and not how the actual loss position, affects the parental debt-to-asset ratio as we assume financing decisions to be made ex-ante. The aim of this table is therefore not to answer the research question, but only to describe the summary statistics of the regression sample.

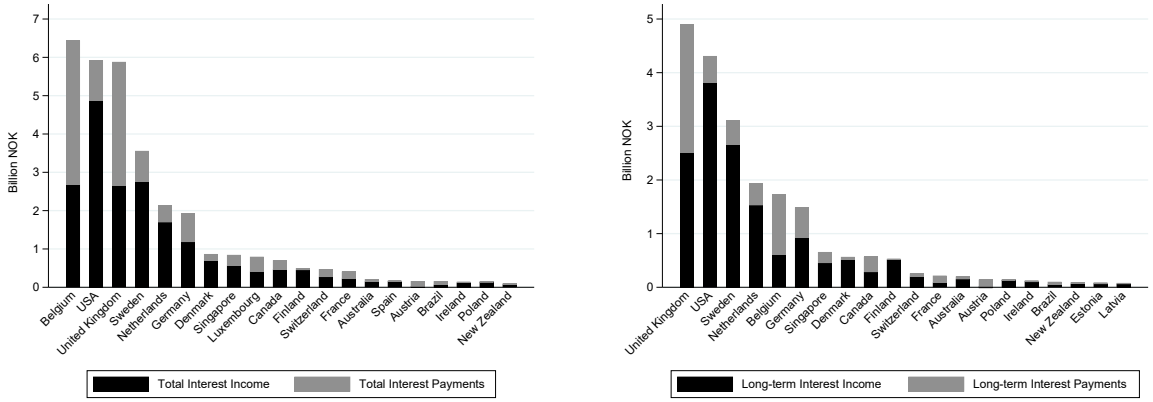
The information on intra-group debt is obtained from the FDI reporting, where one MNC can have several observations each year as it can lend to several affiliates in the given year. Figure 4.2a shows that a significant share of the affiliates in the regression sample are part of the same MNC. The grey bars show the total number of parent companies, while the black bars show the total number of affiliates related to the parent companies. The number of affiliates each year is substantially larger than the number of parent companies. This means that several affiliates have the same parent companies and do therefore belong to the same MNC. Figure 4.2b displays how many years each affiliate is observed in the data set. From the graph we can see that only a fraction of the affiliates are reported all periods in the time span of 15 years. As we drop affiliates with less than three reportings in the Survey of Outward FDI, the graph is also limited to those who hare reported at least three years. We see that most of the affiliates are reported in the FDI between three and six years.



(a) Number of Parent Companies/Affiliates **(b)** Number of Year Observations per Affiliate

Figure 4.2: Firms Observed in the Regression Sample

Figure (a) shows the number of parent companies and affiliates observed in the regression sample each year. Figure (b) shows how many years affiliates are observed in the regression sample.



(a) Total Interest Transactions **(b)** Long-term Interest Transactions

Figure 4.3: Host Countries

Figure (a) shows where Norwegian parent companies in our regression sample get their interest income on total borrowing from and to where they have the most interest payments on total lending to. Figure (b) shows the same, only it is limited to interest income and interest payments on long-term debt. The countries reported in the figures are the host countries where the affiliates are located.

Figure 4.3 shows some of the host countries where the affiliates in the regression sample are situated, and the aggregated amount of interest payments and interest income the Norwegian parent companies have reported over the time span of 15 years, for each country. The figures only report 20 of the countires, where the parent companies have the highest amounts of transactions. Figure 4.3a includes the transactions that result from total borrowing and lending, while figure 4.3b includes the transactions resulting from

long-term borrowing and lending. The purpose of this thesis is to investigate whether there is a relationship between the use of parental debt and affiliates facing losses, and whether there is a tax motive behind this strategy. If all debt financing was motivated by taxes and by making use of the *normal tax planning strategy*[16], we could expect the graph to show that each host country would either only receive interest income or only have interest payments. However, from the graphs we can see that this is not the case, and it is possible that it is a result of affiliates using parental debt when expecting to face losses in the future years. In table 4.3 we found the short-term parental debt ratio to have a higher mean value, compared to the long-term parental debt ratio. We interpreted this as though the affiliates in our sample use larger amounts of short-term debt from parent companies. However, as the differences between the amounts of interest transactions on total parental debt and long-term parental debt are rather small, this could imply that the long-term debt is much more interest bearing. This coincides with the earlier discussed theory.

[16]Where borrowing is undertaken by the affiliate facing the highest tax rate, and the lending is undertaken by the affiliate that faces the lowest tax rate.

5 Empirical Strategy

In order to test our hypotheses and further execute the empirical analysis, we define an empirical strategy. In light of this, the following chapter will provide information on the constructed regression models. Firstly, we use the probit model to find the anticipated probability of loss in the affiliates. Lastly, we use the ordinary least square (OLS) estimation model, where we include the predicted loss probability variable. The latter regression function will be the foundation for the regressions presented in the empirical analysis in chapter 6.

5.1 Probit Model

In chapter 3, we consider the hypothesis stating that the higher the likelihood of loss in the affiliate, the more likely it is that the affiliate uses parental debt. An important step towards testing this hypothesis is to estimate an indicator for the probability of loss in the affiliate in year *t*. The prediction of this probability variable is done by using the probit model. The probit model is a binary response model, meaning that the dependent variable is a dummy variable. The regression specification is presented by function 5.1 below, and the regression results are given in table 5.1.

Further, in the hypothesis development we reason that MNCs lack flexibility in internal debt shifting. Thus, the multinationals must commit to their debt shifting strategies before having information on the coming year's financial performance (i.e. ex-ante debt shifting). In addition, evidence indicates that managers form some kind of expectations about the performance of the affiliate ex-ante (Hopland et al., 2015). To control for the latter, we estimate an indicator for the loss probabilities in the affiliates the coming fiscal year. The outcome of this estimation could give an indication on whether the parental debt-to-asset ratio should be increased or decreased, depending on the probability of loss in the affiliate.

The abbreviated probit model regression specification is:

$$Pr(y_{Pit} = 1|\mathbf{X}) = G(\beta_0 + \delta_1 D_{it-1} + \delta_2 D_{it-2} + \beta_1(t_2 - t_1) + \beta_2 \mathbf{x}_{it-1} + \beta_3 \mathbf{z}_{it-2} + \lambda_t + \mu_P) \quad (5.1)$$

Where i and P denotes the cross-sectional variation in the affiliate and parent company respectively, and t the time period. The dependent variable, y_{it}, has two possible outcomes; it takes the value of 1 if the affiliate is running losses in year t, and 0 otherwise. Vector $\mathbf{X}$ contains all the independent variables in the specification, which we assume influence the outcome y_{Pit}. Hence, the left side of the probit model specification can be written as $Pr(y_{Pit} = 1|\mathbf{X})$, where Pr denotes the probability. Function G ensures that the estimated loss probability is between 0 and 1 for all values of the parameter (Wooldridge, 2015). Along with Hopland et al. (2015), we find it reasonable that earlier year's performance can be a strong predictor for next year's performance, thus we mostly include one and two year lagged explanatory variables. Accordingly, an important factor for predicting losses in an affiliate in year t, will be if the affiliate has been facing losses in previous years. There are two reasons why deficits in past years are included and important for the probit regression. First, table 4.2 showed that the share of loss making affiliates in our sample period is quite high, and between 25% and 34%. Second, figure 4.1 illustrated that a considerable amount of affiliates run losses 2, 3, 4 and 5 years in a row.[17] Based on this reasoning, we estimate a one year lagged and a two year lagged binary loss variable. These are denoted as δ_1 and δ_2, for loss in t_{-1} and t_{-2} respectively. The latter variables are equal to 1 if the affiliate was running losses the given year, and 0 otherwise.

By including the lagged variables for loss only, we estimate a loss probability that is fully dependent on the loss from preceding years. To control for other factors affecting the loss probability, we add more explanatory variables. We estimate β_1, denoting the tax rate difference in year t and t_{-1}.[18] The variable is defined as the Norwegian rate, t_2, less the host country's statutory tax rate, t_1. Further, we include the vectors $\mathbf{x}_{it-1}$ and $\mathbf{z}_{it-2}$,

[17] Estimation of dummy variables for loss in 2, 3, 4 and 5 years in a row show that 2,168 affiliates run losses 2 years in a row, 1,166 for 3 years, 563 for 4 years and 703 affiliates are loss-making over 5 years in our sample.

[18] We find it reasonable to add the tax rate difference of the same time period as the dependent variable, as corporate statutory tax rates often are announced and have come to companies knowledge some time before the end of the fiscal year. Companies can therefore account for the tax rate in the same year as the loss probability is estimated.

consisting of one and two year lagged variables respectively. This applies to the variables: total parental debt-to-assets ratio, fixed asset ratio and ROTA. The fixed asset ratio and the ROTA could give an indication on the financial performance of the affiliate (i.e. a low return on total assets could mean it is more exposed to losses). To capture time effects, we include a yearly binary variable for all the years in the sample, denoting λ_t. Moreover, we estimate μ_P as dummies capturing the parent industry specific effects, in addition to an interaction term between the year and industry dummies.

After running the probit model regression, we predict a loss probability p for each affiliate-year observation in the sample. We denote the predicted variable as $\hat{L}_{it}$ in the main regression specification function 5.2. From the regression, shown in table 5.1 below, we find the loss binary variables for both year t_{-1} and t_{-2} to be positive and significant at a 1 percent level. The coefficient values of 1.186 and 0.509 respectively, imply that a loss in any of the past two years will lead to an increase in the loss probability. However, the impact of the coefficient is smaller in year t_{-2} than t_{-1}. Correspondingly, this is in line with previous literature (e.g. Hopland et al. (2018)), suggesting that previous years are good predictors for the following year's performance. Further, we find that both coefficients concerning the tax rate difference is significant at a 1 percent level. The variables effect on the loss probability is however hard to explain with economic reasoning, as the two coefficients are presented with opposite signs. The total parental debt-to-asset ratio is, along with the fixed asset ratio, statistically significant at a 10 percent level in t_{-1}. This suggests a positive relationship between the loss probability and the latter explanatory variables. The variables are however, insignificant in t_{-2}. Lastly, ROTA is not statistically significant at any level.

Table 5.1: Probit Model Regression

The table presents estimates from a probit model with a binary loss variable as the dependent variable. This variable takes the value of 1 if the affiliate reports loss in year t, and 0 otherwise. The independent variables included are loss dummies for year t_{-1} and t_{-2}, taking the value of 1 if the affiliate is running losses the given year, and 0 otherwise. Secondly, the tax rate difference in year t and t_{-1} are included. Further, the lagged value of total parental debt-to-asset ratio, fixed asset ratio and ROTA for year t_{-1} and t_{-2} is included. Parent industry and time dummies are included in the regression, but not reported in the table. We included clustered standard errors on affiliate level, as well as robust standard errors, to control for serial correlation and heteroscedasticity, respectively.

	Probit Model Regression
Loss in t_{-1}	1.186***
	(0.025)
Loss in t_{-2}	0.509***
	(0.026)
Tax difference t	-1.527***
	(0.544)
Tax difference t_{-1}	1.407***
	(0.537)
Total parental debt-to-asset ratio t_{-1}	0.125*
	(0.075)
Total parental debt-to-asset ratio t_{-2}	0.095
	(0.076)
Fixed asset ratio t_{-1}	0.106*
	(0.060)
Fixed asset ratio t_{-2}	-0.080
	(0.060)
ROTA t_{-1}	-0.001
	(0.001)
ROTA t_{-2}	0.000
	(0.000)
Constant	-1.224***
	(0.468)
N	18212

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.2 Main Regression

In chapter 2, we found limited documentation and research on debt shifting strategies in the event of loss-making affiliates. Moreover, the use of parental debt in circumstances where the parent is located in a high tax country is not studied in a proper matter. To examine whether the use of parental debt in loss-making affiliates could be a debt shifting strategy, we need to execute an econometric analysis. The analysis is meant to confirm or reject the following hypotheses, discussed in chapter 3:

Hypothesis 1: *The incentive for the MNC to increase the parental debt-to-asset ratio in the affiliate increases with the probability of the subsidiary running losses.*

Hypothesis 2: *If MNCs use parental debt to minimise their global tax payments, affiliate's parental debt-to-asset ratio should be positively correlated with the Norwegian tax rate.*

In order to carry out the analysis and discuss the above-mentioned hypotheses, we need to define an empirical strategy. We use the OLS method as a strategy to estimate the main regression. This is a method that can be used for estimating parameters of a multiple linear regression model. The data sample used in our regression has the characteristics of panel data (longitudinal data), meaning that we have observations on the same objects across time. In a panel data analysis, we distinguish between time-constant variables and variables that vary over time (Wooldridge, 2015, p. 360).

The main regression specification is:

$$b_{Pit} = \beta_0 + \beta_1(t_{2t} - t_{1t}) + \beta_2 x_{1Pt} + \beta_3 \mathbf{Z}_{it} + \beta_4 \hat{L}_{it} + \sigma_{ct} + \lambda_t + \mu_P + v_{it} \qquad (5.2)$$

The dependent variable, b_{Pit}, is the parental debt-to-asset ratio in affiliate i at year t. As mentioned in section 4.3.1, the variable is measured as the affiliate's total, long-term or short-term parental debt over total assets. The estimate of β_1 returns the tax rate difference. The coefficient could give an indication on how the depended variable is affected by relative changes in the statutory tax rates.[19]

[19]The Norwegian statutory tax rate is constant at 28% throughout the sample period, and relative

We estimate β_2 for fixed assets in the parent company. A significant and positive coefficient could imply that it is easier for the parent to access external debt, and thus reroute this as parental debt to the affiliate. The vector $\mathbf{Z}_{it}$ contains several affiliate characteristics, including the fixed asset ratio, ROTA and affiliate size (logarithm of affiliates assets). These explanatory variables could give an indication of how variation of balance sheet components affects the parental debt-to-asset ratio. A decrease in any of the coefficients could lead to more rerouted parental debt, as lower assets could imply a high interest rate due to default risk. We estimate the logarithm of assets to control for a non-linear relationship between the parental debt-to-asset ratio and the size of the affiliate. The variable will control for any percentage point changes in the affiliate size, and how this affect the dependent variable. A interpretation of a percentage point increase and a $\beta_k < 0$, suggests that the affiliate could get a hold of external funds easier, and the parental debt-to-asset ratio would therefore decrease (all else equal).[20]

The variable of main interest and our key independent variable is $\hat{L}_{it}$, making the estimation of β_4 important. As discussed above, we interpret this coefficient as the probability of loss in the current period and in a given affiliate. A coefficient where $\beta_4 > 0$ and significant, suggests that an increase in the loss probability increases the parental debt to asset ratio in the affiliate.

Further, we estimate σ_{ct}, controlling for inflation in country c. Variable λ_t and μ_P control for the same effects as explained in the probit model above. Lastly, we have the error term, v_{it}, consisting of a_i and u_{it}. Where a_i captures all unobserved, time-constant factors that affect b_{Pit}. The idiosyncratic error, u_{it}, represents the unobserved factors that change over time and affect b_{Pit}. Finally, we control for serial correlation[21] and heteroskedasticity[22] by including clustered standard errors on affiliate level and robust standard errors respectively (Wooldridge, 2015).

changes in host countries' tax rates drives the variable.

[20] A one percentage point change in $\beta_k log(Size)$ leads to a $\frac{\beta_k}{100}$ change in the parental debt-to-asset ratio.

[21] Serial correlation means that there is correlation in the error terms in different time periods.

[22] Heteroskedasticity occur when the variance of the error term, given the explanatory variables, is not constant.

Before we continue with the empirical analysis, we caution that due to lack of variable variation in the Norwegian tax rate the analysis of hypothesis 2 is interrupted. During our sample period (1992 to 2006), the Norwegian statutory tax rate had a constant rate of 28% (Aarbakke, 2015). Consequently, we cannot analyse the correlation between the parent country's tax rate and the parental debt-to-asset ratio. The analysis is therefore limited to a examination of hypothesis 1.

6 Empirical Analysis

A firm will, based on our assumptions in chapter 3, choose a weighted ratio of internal debt from the financial centre and parental debt, based on the probability of success and the probability of loss, respectively. The main goal of our regressions is to examine whether multinationals use parental debt to minimise their global tax payments. More specifically, we investigate whether the use of parental debt in an affiliate increases with the probability of the subsidiary running losses. To investigate this issue, we use the main regression specification stated by function 5.2.

As mentioned in chapter 4.3.1, our three dependent variables are total, long-term, and short-term parental debt. The results from running the regressions on the total parental debt-to-asset ratio are presented in table 6.1. The table reports estimated coefficients, where the explanatory variable of main interest is the estimation of the loss probability, $\Pr(\text{loss})_{it}$. The other explanatory variables are included to estimate their effect on the dependent variable, and to increase the explanatory power of the model. In addition to those shown in the table, we include year dummies, dummies for parent industry, and an interaction between the latter two as control variables. These variables are all explained in detail in section 4.3.1 and 4.3.2.

The first column in table 6.1, reports the result before testing how the loss probability affects the dependent variable. This means that the loss probability variable is not yet included in the first regression. The following columns report estimations for our main specification. The regression in column (2) is carried out on the same sample as the regression presented in column (1), but in addition includes the variable for the loss probability. Comparing the results from the latter columns, not only enables us to examine the loss probability's impact on the parental debt ratio, but also how it affects the impact that the rest of the explanatory variables have on the dependent variable. We assume that in a setting where the probability of the affiliate running losses is high, the MNC has an incentive to use loans from the entity facing the highest tax rate. The parent firm is usually located in a high-tax country, and we therefore assume it to be the highest taxed entity within the group. Following the tax rate assumption made in our hypothesis, we

exclude observations where the statutory tax rate of the affiliate exceeds the statutory tax rate of the Norwegian parent company. This regression is reported in column (3). To test the assumption of our hypothesis stating that the affiliate is a producing affiliate, we also exclude all affiliates located in a tax haven[23]. Affiliates located in tax havens are rarely characterised as producing affiliates, as they tend to act as financial centres. Hence, the last regression in column (4) controls for all assumptions taken in the development of the hypothesis.

[23]The countries defined as tax havens in the data set are Bahamas, Bermuda, British Virgin Islands, Cayman Islands, Costa Rica, Cyprus, Faroe Islands, Gibraltar, Hong Kong, Luxembourg, Netherlands Antilles and Panama. The mentioned countries are all characterised as tax havens by the European Parliament and OECD (Cécile Remeur, 2018; OECD, 2010)

Table 6.1: Main Regression: Total Parental debt

The table presents OLS regression results for the affiliate's total parental debt-to-asset ratio, which is the dependent variable. Definitions on the dependent and the explanatory variables are provided in section 4.3.1 and 4.3.2. Column (1) shows the results from running a regression on the data set before controlling for the loss probability, $\Pr(\text{loss})_{it}$. Column (2) shows our main specification where $\Pr(\text{loss})_{it}$ is included. Column (3) shows our main specification where we also control for tax rates by excluding all observations where the tax rate difference is negative. Column (4) shows the main specification where we in addition exclude all affiliates located in tax havens. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	(1) Sample before predicted loss included	(2) Predicted loss variable included	(3) Controlling for tax rates	(4) Excluding tax havens
Tax rate difference	-0.067*	-0.067	-0.011	0.045
	(0.037)	(0.044)	(0.122)	(0.143)
Fixed assets (affiliate)	-0.033***	-0.040***	-0.030*	-0.041**
	(0.006)	(0.007)	(0.018)	(0.020)
Fixed assets (parent)	-0.056***	-0.070***	-0.076**	-0.080**
	(0.011)	(0.013)	(0.031)	(0.031)
Log of assets	0.008***	0.008***	0.011***	0.012***
	(0.001)	(0.001)	(0.003)	(0.003)
Inflation	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
ROTA	-0.000***	0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_{it}$		0.138***	0.146***	0.142***
		(0.011)	(0.029)	(0.032)
Constant	-0.041**	0.025	0.051	0.052
	(0.018)	(0.037)	(0.101)	(0.103)
N	28489	18212	2744	2236
R^2	0.111	0.141	0.216	0.240

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In addition to finding the estimated coefficients for the total parental debt-to-asset ratio, we also run the regression on long-term and short-term parental debt, separately. As short-term debt is debt which is due within a 12-month period, it is usually not interest bearing and rather related to operations. Short-term debt is therefore not as commonly used for tax saving. Running regressions on the two types of debt separately, allows us to examine whether the loss probability and the rest of the explanatory variables have greater effects on either of the two types of debt. The regression results for the long-term parental

debt-to-asset ratio and the short-term parental debt-to-asset ratio are presented in table 6.2 and table 6.3, respectively. The four columns in the tables present the same four regressions as in table 6.1, but with the new dependent variables. Hence, the regression results in the three tables will therefore be comparable. In the following paragraphs, we will discuss the results and study the comparable coefficients against each other and our expectations presented in 4.3.2.

Table 6.2: Main Regression: Long-term Parental Debt

The table presents OLS regression results for the affiliate's long-term parental debt-to-asset ratio, which is the dependent variable. Definitions on the dependent and the explanatory variables are provided in section 4.3.1 and 4.3.2. Column (1) shows the results from running a regression on the data set before controlling for the loss probability, $\Pr(\text{loss})_{it}$. Column (2) shows our main specification where $\Pr(\text{loss})_{it}$ is included. Column (3) shows our main specification where it is also controlled for tax rates by excluding all observations where the tax rate difference is negative. Column (4) shows the main specification where we in addition exclude all affiliates located in tax havens. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	(1) Sample before predicted loss included	(2) Predicted loss variable included	(3) Controlling for tax rates	(4) Excluding tax havens
Tax rate difference	-0.029	-0.012	0.035	0.081
	(0.024)	(0.027)	(0.065)	(0.080)
Fixed assets (affiliate)	0.034***	0.036***	0.029**	0.025*
	(0.005)	(0.006)	(0.012)	(0.014)
Fixed assets (parent)	0.034***	0.033***	0.016	0.009
	(0.007)	(0.008)	(0.018)	(0.020)
Log of assets	0.004***	0.004***	0.005***	0.005***
	(0.001)	(0.001)	(0.002)	(0.002)
Inflation	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
ROTA	-0.000***	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_{it}$		0.089***	0.099***	0.113***
		(0.008)	(0.020)	(0.023)
Constant	-0.054***	-0.079***	-0.063	-0.063
	(0.006)	(0.025)	(0.058)	(0.060)
N	28489	18212	2744	2236
R^2	0.065	0.091	0.204	0.193

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.3: Main Regression: Short-term Parental Debt

The table presents OLS regression results for the affiliate's short-term parental debt-to-asset ratio, which is the dependent variable. Definitions on the dependent and the explanatory variables are provided in section 4.3.1 and 4.3.2. Column (1) shows the results from running a regression on the data set before controlling for the loss probability, $\Pr(\text{loss})_{it}$. Column (2) shows our main specification where $\Pr(\text{loss})_{it}$ is included. Column (3) shows our main specification where it is also controlled for tax rates by excluding all observations where the tax rate difference is negative. Column (4) shows the main specification where we in addition exclude all affiliates located in tax havens. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	(1) Sample before predicted loss included	(2) Predicted loss variable included	(3) Controlling for tax rates	(4) Excluding tax havens
Tax rate difference	-0.039	-0.055*	-0.046	-0.036
	(0.024)	(0.032)	(0.097)	(0.106)
Fixed assets (affiliate)	-0.067***	-0.076***	-0.059***	-0.066***
	(0.004)	(0.005)	(0.013)	(0.015)
Fixed assets (parent)	-0.090***	-0.103***	-0.093***	-0.089***
	(0.007)	(0.009)	(0.022)	(0.022)
Log of assets	0.004***	0.005***	0.006***	0.007***
	(0.001)	(0.001)	(0.002)	(0.002)
Inflation	0.000	-0.000*	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
ROTA	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_{it}$		0.049***	0.047**	0.029
		(0.007)	(0.020)	(0.020)
Constant	0.013	0.105***	0.114	0.115
	(0.019)	(0.028)	(0.080)	(0.081)
N	28489	18212	2744	2236
R^2	0.155	0.163	0.223	0.264

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

According to our hypothesis, parental debt is rerouted external debt, and thus they work as perfect substitutes in the affiliate. Parental debt should therefore have many of the same determinants as external debt. In the following paragraphs, we consider the implications that all the explanatory variables have on the parental debt-to-asset ratio. In addition, we discuss how the coefficients vary in the different regressions and for the different types of parental debt.

The *tax rate difference* is in most of the regressions not statistically different from zero. For the total parental debt ratio, it is only statistically significant at the 10 percent level in the first regression, before including the variable for loss probability. This may imply that the difference between the tax rate of the Norwegian parent company and the foreign affiliate has no significant impact, and does not explain the decision concerning the use of parental debt, and especially not when the loss probability is taken into account. Although we would assume that a higher tax rate at the parent would increase the incentive for the MNC to use parental debt, the specific tax rate difference does not seem to be of great importance.

As expected, the *affiliate fixed asset ratio* enters the regressions for the total parental debt-to-asset ratio negatively and statistically significant. The negative coefficients suggest that a high fixed asset ratio leads to the affiliate choosing to finance it self with other types of debt. A lower ratio on the other hand, increases the amount of parental debt. This is in line with our expectation, which is formed based on that a lower fixed asset ratio may make it harder for the affiliate to access external debt. This would give them the incentive to rather choose parental debt as a financing option.

When we include the loss probability, the variable seems to affect the relationship between the fixed asset ratio and the total parental debt-to-asset ratio. The coefficient becomes more negative when the loss probability is included. It becomes even more negative when we in addition exclude all negative tax rate differences and tax haven affiliates. We would, however, expect the fixed asset ratio to be less important when the firms in the data sample reflect the assumptions of our hypothesis. As the significance is lower when controlling for these assumptions, it may seem as though the ratio is not of the same importance for these affiliates. Although an explanation for this may be that the harder access to external debt gives the MNC more incentive to finance the affiliate with parental debt, it is difficult to make economic sense of why the ratio affects the use of parental debt more in some of the regressions. Looking at the regressions on short-term and long-term parental debt separately may explain which type of debt these effects are driven by. Additionally, it may also give a better insight in the values of the coefficients in each regression on total parental debt.

In the regressions on long-term parental debt, the coefficient suggests that a higher affiliate fixed asset ratio increases the use of long-term parental debt, which is the opposite of the effect it has on total parental debt. A reason for this could be that fixed assets are assets with a long useful life time. These assets are optimally financed with long-term debt, to match the life span of the assets. When we control for tax rates in the third regression and, in addition exclude tax haven affiliates in the fourth regression, we see that the coefficients are smaller, and significant at a lower level. This may imply that the fixed asset ratio has a smaller and less significant impact on the use of long-term parental debt, when taking loss probabilities and taxes into consideration. In the regression on short-term debt, the effect is the opposite, suggesting that an increase in the affiliates fixed assets is related to a decrease in the use of short-term debt. Again, the reason may be that firms wish to finance their assets with funds of the same nature. A higher fixed asset ratio will therefore increase the long-term financing, whereas it would decrease the short-term financing.

The *parent fixed asset ratio* enters the regression on the total parental debt and the short-term parental debt negatively, and significant. In contrast, it enters the regression on long-term parental debt positively, but it is only significant in the first two regressions. This suggests that the parent's fixed assets have a greater effect on the short-term parental debt ratio when all assumptions are controlled for. As given in chapter 4, we would expect there to be a positive relationship between the parents fixed assets and the parental debt-to-asset ratio. A possible explanation for why the output from the regressions implies the opposite, may be that tangibility could be associated with more depreciation in fixed assets. These depreciations are tax deductible, which might crowd out the value of the debt tax shield (Møen et al., 2018, p. 19). This would reduce the incentive to use parental debt to save taxes. Based on our assumptions, the parent could, in a case where it has no depreciable assets, use external debt and forward it to its loss-making affiliate. This would result in the parent company paying interest on the external debt, which is deductible from the tax base. However, if the parent has a relatively high fixed asset ratio, it can deduct the depreciation from its tax base, which could reduce the incentive to have tax deductible interest payments. As the variable is not significant in the last two regressions on long-term parental debt, it may imply that when all the assumptions for the examined

channel are controlled for, the parent fixed asset ratio has no impact on the choice of using long-term parental debt.

The measure for *affiliate size* only has a small, yet positive effect on all the dependent variables. Prior to the analysis, we postulated that the affiliate size would have a small, but negative effect on the parental debt-to-asset ratio, as larger sized affiliates are expected to have easier access to external debt. Thus, the positive relationship observed is not as expected. However, the coefficients are quite small, which implies that the affiliate size only has a minimal effect on all types of parental debt, which does to some degree coincide with our expectations. As the size of the affiliate is measured as the log of assets, it may imply that the effect we observe in the regressions, comes from the reasoning that an increase in assets indicates higher demand of debt financing in general, as given in Møen et al. (2018, p. 25).

The variables measuring *inflation* and *return on total assets* have little to no impact in all regressions and for all types of parental debt. This implies that the inflation and the return on total assets have no significant effect on the decision of using parental debt. There are already conflicting views on how inflation affects the financing decisions of a firm. Huizinga et al. (2008), Mintz and Weichenrieder (2010) and Desai et al. (2004) all have different opinions on its impact. Møen et al. (2018) do, as in our regression, not find inflation to have a very large impact on the parental debt-to-asset ratio.

The loss probability is the explanatory variable of main interest, and the aim of the analysis is to examine its effect on the parental debt-to-asset ratio. The variable is not included in the first regression, but from regression (2), (3), and (4) we estimate coefficients on the variable. From all three of the tables, we can see that an increase in the loss probability is associated with an increase in the parental debt-to-asset ratios.

The coefficient has a value of 0.138 in the second regression on total parental debt, presented in column (2). This suggests that when the probability of the investment not being successful increases, the affiliate will increase its parental debt-to-asset ratio. This would be in line with our hypothesis. If we control for the tax rates, as in column

(3), the coefficient increases. When we, in addition, exclude all tax haven affiliates, the coefficient decreases again. This suggests that the loss probability has the largest impact on total parental debt for all affiliates who face lower tax rates than their Norwegian parent companies. In chapter 3, we assumed that if the affiliate has a positive probability of running losses, the MNC has an incentive to use loans from an entity located in a high-tax country. The results are thus in line with our assumptions, however, we would expect the effect to hold or be larger when excluding all tax haven affiliates. To reason why we observe this reduction, we look at how the coefficients change for long-term and short-term debt, separately. This enables us to analyse whether the reduction is driven by one of the two parental debt ratios.

From the regression results in table 6.2 and 6.3, we see that the loss probability has a significant effect only in the second and third regression for short-term parental debt. The coefficient is, on the other hand, significant in all regressions for long-term parental debt. This makes sense based on the assumption that MNCs use long-term debt more frequently for debt shifting. In column (3) on long-term parental debt, we find that a 1 percentage point increase in the loss probability results in a 0.00099 increase in the debt ratio, all else equal. In column (4), where all assumptions are controlled for, we get a coefficient of 0.113. This suggests that a 1 percentage point increase in the loss probability increases the long-term parental debt ratio with 0.00113, all else equal. Hence, we find the effect to be higher in the latter regression. For an affiliate with an average long-term parental debt-to-asset ratio in the sample of 4.48%, an increase of 10 percentage points in the loss probability will increase the debt ratio by 25%, to 5.61%. As mentioned, the last two regressions are the ones that can be used to examine our hypothesis and its predictions the best. For long-term debt, the coefficient is at its lowest in the second regression, and increases in the third and fourth regression. This is in line with our expectations and can potentially confirm our hypothesis and its assumptions. The coefficient may be at its highest in the last regression as tax haven affiliates often act as financial centres. Hence, the internal bank does not tend to use much parental debt as the interest income would be taxed at a higher rate in the parent compared to in the tax haven affiliate. Nor do they tend to run losses, as they have no real business operations, but only receive financial income. The regression results therefore suggest that when producing affiliates who are

facing lower tax rates than their parents have high probabilities of loss, they tend to increase their long-term parental debt-to-asset ratio.

We also find that when the estimation sample reflects all the assumptions of the hypothesis, the loss probability has no significant effect on the short-term parental debt-to-asset ratio. This suggests that parental debt with a maturity date of less than 12 months is not as frequently used for the analysed channel. Thus, this implies that the affiliates using the strategy tend to use long-term parental debt rather than short-term parental debt.

In addition to the analysed regressions above, we run regressions with supplementary dummies to analyse whether the within-group or within-affiliate variation has an effect on the relationship between the loss probability and the parental debt-to-asset ratio. Table 6.4 presents the regression results for the long-term parental debt-to-asset ratio when adding parent firm dummies, in addition to the already included explanatory and binary variables. The regression results on total and short-term parental debt are tabulated and presented in table A1.2 and A1.3 in the appendix, respectively. Table 6.5 shows the regression results for the long-term parental debt-to-asset ratio when adding affiliate fixed effects instead. The results on total and short-term parental debt are presented in table A1.4 and A1.5 in the appendix, respectively.

Table 6.4: Main Regression with Parent Dummies: Long-term Parental Debt

The table presents regression results for the affiliate's long-term parental debt-to-asset ratio, which is the dependent variable. Definitions on the dependent and the explanatory variables are provided in section 4.3.1 and 4.3.2. Column (1) shows the results from running a regression on the data set before controlling for the loss probability $\Pr(\text{loss})_{it}$. Column (2) shows our main specification where $\Pr(\text{loss})_{it}$ is included. Column (3) shows our main specification where it is also controlled for tax rates by excluding all observations where the tax rate difference is negative. Column (4) shows the main specification where we in addition exclude all affiliates located in tax havens. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Parent dummies are in addition included to control for within-group variation, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	(1) Sample before predicted loss included	(2) Predicted loss variable included	(3) Controlling for tax rates	(4) Excluding tax havens
Tax rate	-0.049**	-0.041	0.073	0.112
difference	(0.025)	(0.027)	(0.083)	(0.100)
Fixed assets	0.042***	0.039***	0.042***	0.037**
(affiliate)	(0.006)	(0.007)	(0.015)	(0.017)
Fixed assets	0.021**	0.005	0.071**	0.087**
(parent)	(0.010)	(0.011)	(0.031)	(0.037)
Log of assets	0.004***	0.004***	0.005***	0.005**
	(0.001)	(0.001)	(0.002)	(0.002)
Inflation	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.001)	(0.001)
ROTA	-0.000**	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_{it}$		0.070***	0.056***	0.067***
		(0.008)	(0.019)	(0.022)
Constant	0.030	-0.100***	-0.112	-0.111
	(0.070)	(0.032)	(0.081)	(0.090)
N	28489	18212	2744	2236
R^2	0.268	0.305	0.504	0.511

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.5: Main Regression with Affiliate-specific Fixed Effects: Long-term Parental Debt

The table presents regression results for the affiliate's long-term parental debt-to-asset ratio, which is the dependent variable. Definitions on the dependent and the explanatory variables are provided in section 4.3.1 and 4.3.2. Column (1) shows the results from running a regression on the data set before controlling for the loss probability $\Pr(\text{loss})_{it}$. Column (2) shows our main specification where $\Pr(\text{loss})_{it}$ is included. Column (3) shows our main specification where it is also controlled for tax rates by excluding all observations where the tax rate difference is negative. Column (4) shows the main specification where we in addition exclude all affiliates located in tax havens. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Affiliate fixed-effects are in addition controlled for, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	(1) Sample before predicted loss included	(2) Predicted loss variable included	(3) Controlling for tax rates	(4) Excluding tax havens
Tax rate difference	-0.073**	-0.077*	0.205	0.195
	(0.034)	(0.041)	(0.148)	(0.170)
Fixed assets (affiliate)	0.023***	0.020***	0.051**	0.060**
	(0.005)	(0.007)	(0.023)	(0.025)
Fixed assets (parent)	0.015*	0.013	0.019	0.035
	(0.009)	(0.011)	(0.029)	(0.028)
Log of assets	0.005***	0.003**	0.007**	0.007
	(0.001)	(0.001)	(0.004)	(0.004)
Inflation	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.001)	(0.001)
ROTA	-0.000	-0.000***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_i t$		0.032***	0.022	0.029
		(0.007)	(0.016)	(0.019)
Constant	0.028	-0.011	-0.096	-0.117
	(0.056)	(0.028)	(0.064)	(0.072)
N	28489	18212	2744	2236
R^2	0.049	0.059	0.219	0.252

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

From table 6.4, we find that when including the group-specific dummies, the loss probability is still positive and significant. The coefficients are, however, smaller than the coefficients from the regressions shown in table 6.2. As the loss probability has a larger effect on the long-term debt ratio when the parent dummies are not included, it could suggest that the variation within each group is smaller. While the overall variation in the independent

variable may be large, the within-unit variation used to estimate the long-term parental debt-to-asset ratio may be much smaller (Mummolo and Peterson, 2018). Although it is smaller, it is interesting to see that the effect still holds when controlling for within-group variation. The coefficients from the regressions on the total parental debt-to-asset ratio also hold the positive and significant values, but the effects are somewhat smaller here as well. From the regressions on the short-term parental debt-to-asset ratio we find that the coefficient for the loss probability loses its significance in the third regression. Hence, only the second regression, where no assumptions are controlled for, holds a statistically significant coefficient. This could confirm the already discussed findings, suggesting that short-term parental debt is not as frequently used in the analysed debt shifting strategy.

Table 6.5 shows that the loss probability turns statistically insignificant in column (3) and (4), which reflect the analysed channel the best. This means that when controlling for within-affiliate variation, the loss probability no longer has a statistically significant effect on the long-term parental debt-to-asset ratio. A reason for this may be that the variable loses its significance when there is little within-affiliate variation. We find that the coefficients for the loss probability also loses their significance in the third and fourth regression on total and short-term parental debt. This may be explained by the same reasoning as for long-term parental debt.

Overall, the results suggest that the income shifting channel we investigate in this thesis is mostly used in affiliates expected to face losses. The underlying reason for making use of the strategy seems to be based on the incentive to save taxes. Also, it implies that the affiliates using the strategy tend to use long-term parental debt, rather than short-term parental debt. This may be because long-term debt is more interest bearing, and therefore results in a higher total debt tax shield. Another interesting finding is that almost no coefficients for the long-term parental debt are statistically significant for the regressions reflecting our main specification the best. It seems as if only the variables which are measures with the basis in the affiliates' assets stay significant for all regressions. However, these coefficients are less significant than the coefficients for the loss probability. As the loss probability enter the regression most significant, this may be interpreted as though the MNCs emphasise the loss probability the most when making use of the

strategy. The explanatory variables are in previous research found to have significant effects on the tax-optimal financing structure of MNCs. However, it seems as if they are not as important when affiliates face losses. This could make sense as the use of parental debt in a setting with losses does not really depend on for example the size of the tax rate difference or the fixed assets of the parent, but presumably only on how likely it is that the affiliate runs losses. This is probably the main focus because the strategy ends up being less profitable if the affiliates using parental debt are successful.

Our findings provide evidence that MNCs tend to use the analysed strategy when there is a high probability of running losses. It seems as though the affiliates using parental debt when expecting to run losses, face lower tax rates than their parent company and are considered to be producing. These findings could suggest that the MNCs are able to avoid the arm's length principle, as the MNCs would probably not want to use the strategy if they were not able to set an internal interest rate lower or equal to the arm's length interest rate. When an affiliate is expected to run losses it is perceived as riskier by external creditors. This will often result in the creditors giving higher interest rates to compensate for the risk. The parent company will probably get a better interest rate in the external market as it is perceived as less risky. Thus, if the MNC is able to set a desirable internal interest rate, it must be because it has been able to avoid the arm's length principle. The central policy implications of our research suggests that the anti-tax avoidance rules are relaxed when firms are in financial distress.

7 Robustness

In this chapter, we perform several robustness checks to investigate whether the results in chapter 6 are solid. We do this by estimating the main regression on more restricted sample characteristics. First, we estimate thresholds to test if the magnitude of the loss probability determines to what extent the debt shifting strategy is utilised. Further, we use sample restrictions to examine whether the tax base of the parent firm has an impact on the relationship between the loss probability and the use of parental debt.

7.1 Loss Probability Threshold

The regressions in the foregoing chapter include a predicted loss probability variable taking all probabilities within the sample into account. We find that the loss probability has a significantly positive impact on the parental debt-to-asset ratio. However, a consideration is that the probability of loss is interpreted differently within the MNC, depending on the *magnitude* of how likely it is that losses occur.

Based on the analysis results in chapter 6, we expect that a MNC with an affiliate facing a relatively high loss probability would be more likely to make use of parental debt, relative to an affiliate with a low probability of loss. We test this in two different ways. First, we generate quantiles based on the loss probability. Each quantile is a binary variable generated with a 20 percentage point interval. The variable takes the value of 1 if it has a loss probability within the given threshold, and 0 otherwise. We would expect the threshold coefficient's magnitude to be higher, the higher the quantile. Second, we define sample thresholds. This is done by running the main regression on a given interval of the data sample, for example a restricted sample containing only observations with loss probabilities between 10% and 90%. The regression results for the long-term parental debt ratio are reported in table 7.1 below. The same regressions are, in addition, carried out for total parental debt and short-term. We find, in chapter 6, that the strategy is mostly used for long-term parental debt, while the loss probability coefficient is not of particular meaning nor significance for short-term parental debt. Consequently, the results for total

and short-term parental debt, are stated in table **??** and table **??** in appendix A3.

Table 7.1: Loss Probability Threshold: Long-term Parental Debt

The table represents OLS regression results for the affiliate's long-term parental debt-to-asset ratio, which is the dependent variable. The regressions are based on the main specification, shown in function 5.2. Column (1) and (2) include quantile binary variable thresholds for the loss probability, where the quantile from 0 to 0.20 is the base category. A variable is given the value 1 if the affiliate faces a loss probability within the quantile, and 0 otherwise. Column (3) to (6) report loss probability thresholds, from 10% to 90% and 20% to 80%. Column (3) and (5) include all affiliates, whereas column (4) and (6) exclude the tax haven affiliates. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	BINARY THRESHOLDS		SAMPLE THRESHOLDS			
	(1)	(2)	(3)	(4)	(5)	(6)
	All affiliates	Producing affiliates	10% - 90%	10% - 90%	20% - 80%	20% - 80%
Tax rate difference	0.101	0.113	-0.005	0.050	-0.143	-0.151
	(0.071)	(0.083)	(0.071)	(0.090)	(0.107)	(0.136)
Fixed assets (affiliate)	0.021**	0.013	0.047***	0.048***	0.038**	0.034
	(0.010)	(0.011)	(0.015)	(0.018)	(0.019)	(0.023)
Fixed assets (parent)	0.010	0.001	0.013	-0.002	0.027	0.012
	(0.016)	(0.016)	(0.023)	(0.026)	(0.030)	(0.034)
Log of assets	0.005***	0.005***	0.004**	0.004**	0.005*	0.005*
	(0.001)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Inflation	-0.000	-0.000*	-0.000	-0.000	-0.001	-0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
ROTA	0.000	0.000	0.000	0.000*	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
20% - 40%	0.016*	0.022**				
	(0.009)	(0.011)				
40% - 60%	0.027***	0.030***				
	(0.010)	(0.011)				
60% - 80%	0.034***	0.042***				
	(0.011)	(0.013)				
80% - 100%	0.141***	0.163***				
	(0.051)	(0.056)				
$\Pr(\text{loss})_{it}$			0.079***	0.091***	0.046	0.055
			(0.022)	(0.026)	(0.033)	(0.041)
Constant	-0.022	-0.004	-0.084	-0.078	-0.078**	-0.067
	(0.051)	(0.051)	(0.055)	(0.059)	(0.036)	(0.042)
N	3994	3301	2126	1738	1069	883
R^2	0.184	0.184	0.258	0.257	0.364	0.362

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Column (1) and (2) in table 7.1 represent the same regressions as column (3) and (4) in our empirical analysis. Hence, in this chapter, regression (1) includes all affiliates with a positive tax rate difference, and regression (2) also excludes affiliates located in tax havens. The variables of main interest are the loss probability thresholds. The quantile reporting loss probabilities between 0 to 0.2 is the base group. This means that all the other threshold dummy variables will be lower or greater in comparison. The binary coefficients in column (1) return increasing values the higher the threshold interval, compared to the base category. The first interval is statistically significant at a 10 percent level, and the last three at a 1 percent level. When examining the effect on producing affiliates only, it suggests the same outcome as regression (1), returning a higher value the higher the binary threshold. The results from regression (2) are however, relatively higher than the results from regression (1), when comparing each threshold. The first threshold in column (2) is significant at a 5 percent level, and the last three at a 1 percent level. In both regressions, the coefficients of the interval containing loss probabilities between 0.8 and 1 (80% - 100%) have remarkably high values, compared to the coefficients of the lower thresholds. This estimation suggests that the strategy of increasing parental debt in the event of loss is used more when the MNC is quite certain that a loss will occur (i.e. a loss probability between 0.8 and 1). Analysing the quantiles exclusively, the results are in line with the expectations and the empirical analysis in chapter 6, suggesting that a higher loss probability implies a higher long-term parental debt-to-asset ratio.

Furthermore, column (3) to (6) in table 7.1 report the second robustness test, where we examine whether *narrower* loss probability intervals have an effect on our results. Table A2.1 in appendix A2 show loss probability deciles and exhibits that over 56% of our sample observations return loss probabilities *below* 0.2, while no more than 0.39% of the affiliates have probabilities of loss greater than 0.80. This is not surprising, however, as we in table 4.2 established that only 29.8% of the affiliates in the data sample are running losses. Based on this, we estimate the main regression on a loss probability interval between 10% and 90%, and 20% and 80%, respectively. We conduct the same sample classification as the first test, where column (3) and (5) represent all affiliates in the sample, whereas (4) and (6), in addition, exclude tax havens. Similarly to the first test, the variable of prime interest is the loss probability's impact on the parental debt-to-asset ratio.

The regression on the sample consisting of affiliates with loss probabilities within the interval 10% and 90% is presented in column (3) and (4). The output from both regressions indicate positive coefficients for the loss probability significant at the 1 percent level. The marginal effect of the loss probability on the dependent variable in producing affiliates is higher than the sample where all affiliates are included. A reason for this may be that affiliates located in tax havens usually function as financial centres, and the analysed strategy would therefore not be utilised to the same degree. By sampling the data, we find that an unsubstantial part of the affiliates located in tax havens are financed by parental debt, and an even smaller share are running losses, supporting the latter statement. We see that the loss probability coefficients from this test are relatively close to the coefficient from our base line results found in the empirical analysis. The coefficients show lower values compared to the estimation in the previous chapter, however this is to be expected as the lowest and highest loss probabilities are excluded.

Affiliates with loss probabilities within the interval 20% to 80% are reported in column (5) and (6). This excludes the deciles with the most and the least amount of observations (see appendix A2). The coefficients are positive and increasing when the tax haven affiliates are excluded from the sample, similar to column (3) and (4). However, it does not return significant results, and is therefore difficult to interpret. The imprecise result imply that it is not clear whether the analysed strategy is used by affiliates that have loss probabilities between 0.2 and 0.8. These findings suggest that the sample must include observations with loss probabilities of more extreme values for us to be able to consider the use of the analysed strategy. It is unlikely that *all* MNCs practice the strategy of increasing the parental debt-to-asset ratio in the event of loss-making affiliates. When constricting this sample, we are left with fewer observations compared to the main sample, and thereby less affiliates that have reported obligations to their parents and losses. The insignificant results could therefore be driven by the lower number of observations, and that the variation in the data is not large enough to indicate the effect the loss probability has on the parental debt-to-asset ratio.

To underline the discussions in the latest paragraphs, it suggests that the estimated outcomes are according to our expectation. Therefore, both tests explained above imply

the use of a strategy in line with our original analysis in chapter 6, where the parental debt-to-asset ratio is increased in the probability of loss. From the robustness tests, we can interpret that the strategy is more likely to be used in affiliates that have very high probabilities of loss, and where the MNC with high confidence expects the affiliate to be unprofitable. This could be explained in line with our hypothesis, where the use of the strategy would not be profitable if the affiliate is not loss-making. Hence, the MNC would only proceed with rerouted external debt if it is very certain that the overall tax payments are reduced.

7.2 Profitability of the Parent Company

According to our hypothesis, the overall tax payments are reduced when the parent company takes advantage of the external debt tax shield. The interest burden is shifted from the loss-making affiliate to the parent and is deductible from the parents tax base. In is the case, the strategy would only be profitable if the parent company has positive net earnings before interest and taxes (EBIT). A negative tax base at the parent level would imply that a deduction of external debt interest payments would not be feasible. The strategy of rerouting external debt to its affiliate would correspondingly not reduce the overall tax savings. Taking this into consideration, we presume that only a MNC with a profitable parent company would reroute external debt to its affiliates, for the purpose of reducing worldwide tax payments. Therefore, a possibility is that the tax base of the parent company will have an effect on our original regression, and thus the relationship between the loss probability and the parental debt-to-asset ratio can be strengthened by controlling for the parent company's profitability. If the strategy of increasing parental debt is still utilised by unprofitable parent firms, it could be for other reasons than reducing the MNCs' overall tax payments.

Based on the reasoning above, we expect a parent company with a *positive* tax base to have higher tax motivated incentives to provide rerouted external debt, relative to a parent company with a *negative* tax base. To analyse how the profitability of the parent company affects the relationship between the loss probability and the use of parental debt, we run regressions on four restricted data samples based on the tax bases of the

parent companies. In the estimation of the parent's net earnings, we continue with the assumption of inflexibility. The inflexibility assumption states that the MNCs have to make an approximation of the financial performance of the parent company ex ante, when deciding the debt shifting strategies (Hopland et al., 2018). Thus, we restrict our samples based on a one year lagged value of the parent company's tax base (i.e. in t_{-1}), which is measured as EBIT. Column (1) and (2) present the results from running the regression on the first sample, which consists of affiliates with parent companies who have reported tax bases below -1,000. The second sample only includes affiliates with parent companies who have reported tax bases below -10,000. The regressions on this sample are presented in column (3) and (4). Column (5) and (6) include regression results from a sample consisting only of affiliates with parent companies who have reported tax bases greater than or equal to the -1,000 limit, whereas column (7) and (8) consist of affiliates with parent companies who have reported tax bases greater than or equal to the -10,000 limit. All tax bases are reported in thousand NOK. We assume that the expectation of the parent company running losses increases if the losses the previous year are of a substantial amount, and therefore we set the limit of the tax bases to negative values. As in the previous sub chapter, we only include the results estimated on long-term parental debt. The outcomes are reported in table 7.2. The results from total and short-term parental debt are tabulated in appendix A4.

Table 7.2: Profitability in Parent Companies: Long-term Parental Debt

The table represents OLS regression results for the affiliate's long-term parental debt-to-asset ratio, which is the dependent variable. The regressions presented in column (1), (3), (5) and (7) include all affiliates, while column (2), (4), (6) and (8) exclude tax haven affiliates. The data sample in column (1) and (2) include affiliates of Norwegian parent companies with a one year lagged tax base less than -1,000, and column (3) and (4) include affiliates of Norwegian parent companies with a one year lagged tax base less than -10,000. Column (5) and (6) restrict the sample to include affiliates of Norwegian parent companies with tax bases greater than or equal to -1,000, while column (7) and (8) include affiliates of Norwegian parent companies with tax bases greater than or equal to -10,000. All tax bases are reported in thousand NOK. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	< -1,000		< -10,000		>= -1,000		>= -10,000	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tax rate	0.064	-0.042	0.133	0.050	0.036	0.126	0.005	0.007
difference	(0.094)	(0.106)	(0.123)	(0.149)	(0.085)	(0.106)	(0.079)	(0.096)
Fixed assets	0.036*	0.026	0.040*	0.033*	0.032**	0.032*	0.024*	0.022
(affiliate)	(0.022)	(0.021)	(0.022)	(0.020)	(0.016)	(0.019)	(0.014)	(0.016)
Fixed assets	0.000	0.016	-0.002	0.017	0.020	0.009	0.030	0.022
(parent)	(0.039)	(0.040)	(0.070)	(0.072)	(0.023)	(0.026)	(0.022)	(0.026)
Log of assets	0.005**	0.004*	0.004*	0.003	0.005***	0.006***	0.005***	0.005**
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Inflation	-0.001	-0.004**	-0.000	-0.002	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.002)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
ROTA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
$\Pr(\text{loss})_{it}$	0.091***	0.092***	0.067***	0.063***	0.101***	0.123***	0.107***	0.132***
	(0.032)	(0.035)	(0.025)	(0.025)	(0.024)	(0.029)	(0.024)	(0.029)
Constant	-0.035	-0.020	-0.125**	-0.082	-0.103*	-0.113*	-0.072	-0.079
	(0.147)	(0.140)	(0.050)	(0.059)	(0.049)	(0.053)	(0.064)	(0.068)
N	891	785	626	550	1853	1451	2118	1686
R^2	0.305	0.328	0.302	0.301	0.223	0.213	0.214	0.204

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The variable of main interest in this test is, as in the empirical analysis, the loss probability, $Pr(loss)_{it}$. We compare the estimated coefficients on this variable from column (1) and (2) with the coefficients in column (5) and (6). We find that the loss probability has the largest effect on the long-term parental debt-to-asset ratio for the affiliates of Norwegian parent companies with tax bases above -1,000. The coefficient from the regression shown in column (6) is larger than the one from the regression results in the empirical analysis (presented in table 6.2). This may imply that when the parent company does not have a

preponderance of running losses, the loss probability has a larger effect on the parental debt ratio.

By comparing the estimated coefficients from column (3) and (4) with the ones from column (7) and (8), we see that the difference between the coefficients for the affiliates of parent companies with tax bases below and above the limit of -10,000 is even larger. This supports our reasoning, as the coefficients are substantially larger for the affiliates with parent companies reporting tax bases above -10,000, than for parent companies reporting tax bases below the limit. This may imply that when the parent affiliate expects to run in surplus, the loss probability of the affiliate will have a greater effect on the long-term parental debt ratio. It also suggests that the larger the deficits of the parent the previous year, the smaller the relationship between the loss probability and the long-term parental debt ratio.

8 Conclusions

The main objective of our thesis is to examine whether multinationals use parental debt in a setting with losses to minimise global tax payments. More specifically, we investigate the relationship between an affiliate's loss probability and the parental debt-to-asset ratio. For the purpose, we first propose a theory model which explains the choice between the use of parental debt and internal debt from a financial centre, located in a low tax jurisdiction. While previous research has provided insight on the determinants of debt financing through an internal bank and debt financing from the parent company, none of the earlier studies have provided evidence on debt financing from the parent company, specifically in a setting with losses.

In the empirical part we find the following: First, that parental debt is responsive to loss probabilities of the affiliate, which is implied from the positive and significant relationship between the loss probability and the parental debt-to-asset ratio. Second, the affiliates increasing their parental debt as a result of an increasing loss probability tend to use long-term parental debt, rather than short-term parental debt. Third, we find evidence suggesting that the determinant of the long-term parental debt-to-asset ratio in our main specification to a great extent is the loss probability of the affiliate. The other explanatory variables have little to no significant effects on the parental debt ratio when the estimation sample excludes all affiliates facing a higher tax rate than the parent company and all tax haven affiliates. Based on these findings and the robustness checks, we can conclude that our theoretical predictions are supported by the regression results and that the use of long-term parental debt is positively related to the probability of running losses. This confirm our hypothesis and the use of the analysed debt shifting channel in a setting with losses.

Our findings suggest that MNCs do consider loss probabilities when deciding upon the use of parental debt, and the incentive seems to be minimisation of global tax payments. This may suggest that policy makers should not only focus on profitable affiliates when trying to prevent tax avoidance. Our results indicate that anti-tax avoidance rules such as the arm's length principle seem to be relaxed for firms in financial distress. Also, as the

thin-capitalisation rule was not yet introduced in Norway during our sample period, the non-existing rule may have given more leeway to make use of the strategy for Norwegian MNCs.

In terms of future research, an interesting extension of the thesis would be to study a sample consisting of observations from a period after the thin-capitalisation rules and the Base Erosion and Profit Shifting project (BEPS) were introduced. This could possibly have given different results, as they may limit the MNCs possibility to be highly leveraged. Secondly, it would be interesting to run the model on data consisting of European multinationals. This would allow to investigate whether variations in the tax rates of the parent companies host country also has an effect on the use of parental debt when affiliates are expected to run losses. Lastly, an extension of our thesis could be to study the financing decisions on a data set consisting of internal debt between all affiliates in the multinational, in addition to the debt between the parent and the affiliates. This would make it possible to examine how the MNCs choose to weigh the use of parental debt and internal debt from the financial centres based on loss probabilities.

References

Aarbakke, M. (2015). *Skatt*. Store Norske Leksikon. Retrieved 08.05.19 from https://snl.no/skatt.

Aldridge, Ø., Dahl, C. A., and Ørvik, C. (2017). Facebook har trolig milliardoverskudd i norge - betalte under 500.000 kroner i skatt. Retrieved 04.03.19 from https://www.aftenposten.no/okonomi/i/jqOAA/Facebook-har-trolig-milliardoverskudd-i-Norge---betalte-under-500000-kroner-i-skatt.

Berner, E., Mjøs, A., and Olving, M. (2014). Norwegian corporate accounts. *Working Paper*, 14(10):1–73.

Bjørnestad, S. (2016). *EU trapper opp kampen mot Google og Facebook*. Aftenposten. Retrieved 04.03.19 from https://www.aftenposten.no/okonomi/i/6933/EU-trapper-opp-kampen-mot-Google-og-Facebook.

Booth, L., Aivazian, V., Demirgüç-Kunt, A., and Maksimovic, V. (2001). Capital structures in developing countries. *Journal of Finance*, 56(1):87–130.

Chowdhry, B. and Coval, J. D. (1998). Internal financing of multinational subsidiaries: Debt vs. equity. *Journal of Corporate Finance*, 4(1):87–106.

Cooper, M. and Knittel, M. (2006). Partial loss refundability: How are corporate tax losses used? *National Tax Journal*, 59(3):651–663.

Cécile Remeur (2018). *Listing of tax havens by the EU*. European Parliament. Retrieved 10.04.19 from http://www.europarl.europa.eu/cmsdata/147404/7%20-%2001%20EPRS-Briefing-621872-Listing-tax-havens-by-the-EU-FINAL.PDF.

Desai, M. A., Foley, C. F., and Hines, J. R. (2004). A multinational perspective on capital structure choice and internal capital markets. *Journal of Finance*, 59(6):2451–2487.

Egger, P., Eggert, W., Keuschnigg, C., and Winner, H. (2010). Corporate taxation, debt financing and foreign-plant ownership. *European Economic Review*, 54(1):96–107.

Gertner, R. H., Scharfstein, D. S., and Stein, J. C. (1994). Internal versus external capital markets. *The Quarterly Journal of Economics*, 109(4):1211–1230.

Graham, J. R. (2000). How big are the tax benefits of debt? *Journal of Finance*, 55(5):1901–1941.

Hopland, A., Lisowsky, P., Mardan, M., and Schindler, D. (2015). Flexibility in income shifting under losses. *Discussion Paper; 21/15*.

Hopland, A., Lisowsky, P., Mardan, M., and Schindler, D. (2018). Flexibility in income shifting under losses. *The Accounting Review*, 93(3):163–183.

Huizinga, H., Laeven, L., and Nicodeme, G. (2008). Capital structure and international debt shifting. *Journal of Financial Economics*, 88(1):80–118.

Kemsley, D. and Nissim, D. (2002). Valuation of the debt tax shield. *The Journal of Finance*, 57(5):2045–2073.

Klassen, K., Lang, M., and Wolfson, M. (1993). Geographic income shifting by multinational corporations in response to tax rate changes. *Journal of Accounting Research*, 31(3):141–173.

KPMG (2017). *Tax Facts Norway 2017. A Survey of the Norwegian Tax System*. KPMG, Oslo, Norway.

KPMG (2019). *Corporate tax rates table*. KPMG. Retrived 19.02.2019 from https://home.kpmg/kh/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html.

Leary, M. T. and Roberts, M. R. (2010). The pecking order, debt capacity, and information asymmetry. *Journal of Financial Economics*, 95(3):332–355.

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

Modigliani, F. and Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, 48(3):261–297.

Modigliani, F. and Miller, M. H. (1963). The cost of capital, corporation finance and the theory of investment: A correction. *The American Economic Review*, 53(3):433–443.

Mummolo, J. and Peterson, E. (2018). Improving the interpretation of fixed effects regression results*. *Political Science Research and Methods*.

Myers, S. C. and Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2):187–221.

Møen, J., Schindler, D., Schjelderup, G., and Tropina, J. (2011). International debt shifting: Do multinationals shift internal or external debt? *IDEAS Working Paper Series*, No. 3519.

Møen, J., Schindler, D., Schjelderup, G., and Wamser, G. (2018). The tax-efficient use of debt in multinational corporations. *IDEAS Working Paper Series*, No. 7133.

NTB (2013). *Store selskaper - lite skatt*. Dagens Næringsliv. Retrieved 23.05.19 from https://e24.no/naeringsliv/store-selskaper-lite-skatt/20327477.

OECD (2010). *Promoting transparency and exchange of information for tax purposes*. OECD. Retrieved 10.04.19 from http://www.oecd.org/newsroom/44431965.pdf.

OECD (2013). *Action Plan on Base Erosion and Profit Shifting, OECD Publishing*. OECD.

OECD (2018). *Statutory corporate income tax rate*. OECD. Retrieved 14.03.19 from https://stats.oecd.org/index.aspx?DataSetCode=Table_II1#.

OECD (2019). *Statutory corporate income tax rate - Historical table II (1981 - 1999)*. OECD. Retrieved 19.03.19 from http://www.oecd.org/tax/tax-policy/tax-database.htm#CorpTaxStatsEtr.

PwC (2019). *Norway, Corporate - Group Taxation*. PwC. Retrived 25.02.2019 from http://taxsummaries.pwc.com/ID/Norway-Corporate-Group-taxation.

Riddervold, E. (2018). *Changes to the Norwegian interest deduction limitation rules.* PwC. Retrived 01.03.19 from https://blogg.pwc.no/skattebloggen-en/changes-to-the-norwegian-interest-deduction-limitation-rules.

Schjelderup, G. (2016). The tax sensitivity of debt in multinationals: A review. *Journal of the American Statistical Association*, 23(1):109–121.

Statistics Norway (2008). *Direkteinvesteringer i utlandet, beholdninger, 1998-2006.* Statistics Norway. Retrieved 13.04.19 from https://www.ssb.no/utenriksokonomi/statistikker/diu/aar/2008-06-25#content.

The World Bank (2019). *Inflation, consumer prices (annual %).* The World Bank. Retrived 10.04.19 from https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG.

Trading Economics (2019). *Corporate tax rates table.* Trading Economics. Retrieved 19.03.19 from https://tradingeconomics.com/countries.

Visma (2019). *Avkastning.* Visma. Retrieved 25.05.19 from https://www.visma.no/eaccounting/regnskapsordbok/a/avkastning/.

Wilson, J. D. (2014). Tax havens in a world of competing countries. *CESifo DICE Report*, (4):32–39.

Wooldridge, J. M. (2015). *Introductory Economics.* CENGAGE Learning.

Appendix

A1 Variable Definition and Data Source

Table A1.1: Variable definitions and data sources

Variable	Definition	Source
Total parental debt-to-asset ratio	Ratio of total parental debt to total assets in affiliate i	The Survey of Outward FDI
Long-term parental debt-to-asset ratio	Ratio of long-term parental debt to total assets in affiliate i	The Survey of Outward FDI
Short-term parental debt-to-asset ratio	Ratio of short-term parental debt to total assets in affiliate i	The Survey of Outward FDI
Tax rate difference	Difference between the statutory tax rate faced by a Norwegian parent, P and the tax rate faced by an affiliate i	OECD's statutory corporate income tax rates table; KPMG's corporate tax rate table; Trading Economics' tax rate table
Affiliate fixed asset ratio (tangibility)	Ratio of fixed assets to total assets in affiliate i	The Survey of Outward FDI
Parent fixed asset ratio (tangibility)	Ratio of fixed assets to total assets in parent P	Norwegian Corporate Accounts
Affiliate size	Logarithm of total assets in affiliate i	The Survey of Outward FDI
Inflation	The consumer price index	World Development Indicator of the World Bank
ROTA	The ratio of net earnings before interest and taxes to total assets in affiliate i	The Survey of Outward FDI
Loss probability	Probability of an affiliate i incurring losses within a given year	Predicted with variables from The Survey of Outward FDI and the tax rate data
Loss in t_{-1}	Loss position dummy equal to one if a firm incurs losses in year t_{-1}	The Survey of Outward FDI
Loss in t_{-2}	Loss position dummy equal to one if a firm incurs losses in year t_{-2}	The Survey of Outward FDI

Table A1.2: Main Regression with Parent Dummies: Total Parental Debt

The table presents regression results for the affiliate's total parental debt-to-asset ratio, which is the dependent variable. Definitions on the dependent and the explanatory variables are provided in section 4.3.1 and 4.3.2. Column (1) shows the results from running a regression on the data set before controlling for the loss probability $\Pr(\text{loss})_{it}$. Column (2) shows our main specification where $\Pr(\text{loss})_{it}$ is included. Column (3) shows our main specification where it is also controlled for tax rates by excluding all observations where the tax rate difference is negative. Column (4) shows the main specification where we in addition exclude all affiliates located in tax havens. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Parent dummies are in addition included to control for within-group variation, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	(1) Sample before predicted loss included	(2) Predicted loss variable included	(3) Controlling for tax rates	(4) Excluding tax havens
Tax rate difference	-0.065*	-0.082*	0.056	0.001
	(0.036)	(0.044)	(0.155)	(0.192)
Fixed assets (affiliate)	-0.007	-0.025***	-0.009	-0.009
	(0.007)	(0.009)	(0.021)	(0.025)
Fixed assets (parent)	-0.019	-0.052***	0.061*	0.040
	(0.013)	(0.015)	(0.036)	(0.041)
Log of assets	0.007***	0.008***	0.010***	0.009***
	(0.001)	(0.001)	(0.003)	(0.003)
Inflation	0.000	0.000	0.001	0.001
	(0.000)	(0.000)	(0.001)	(0.001)
ROTA	-0.000**	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_i t$		0.108***	0.086***	0.077***
		(0.010)	(0.027)	(0.030)
Constant	-0.001	-0.036	-0.120	-0.090
	(0.095)	(0.044)	(0.103)	(0.111)
N	28489	18212	2744	2236
R^2	0.332	0.381	0.522	0.556

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A1.3: Main Regression with Parent Dummies: Short-term Parental Debt

The table presents regression results for the affiliate's short-term parental debt-to-asset ratio, which is the dependent variable. Definitions on the dependent and the explanatory variables are provided in section 4.3.1 and 4.3.2. Column (1) shows the results from running a regression on the data set before controlling for the loss probability $\Pr(\text{loss})_{it}$. Column (2) shows our main specification where $\Pr(\text{loss})_{it}$ is included. Column (3) shows our main specification where it is also controlled for tax rates by excluding all observations where the tax rate difference is negative. Column (4) shows the main specification where we in addition exclude all affiliates located in tax havens. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Parent dummies are in addition included to control for within-group variation, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	(1) Sample before predicted loss included	(2) Predicted loss variable included	(3) Controlling for tax rates	(4) Excluding tax havens
Tax rate	-0.016	-0.041	-0.018	-0.111
difference	(0.023)	(0.032)	(0.123)	(0.148)
Fixed assets	-0.049***	-0.064***	-0.051***	-0.046**
(affiliate)	(0.005)	(0.006)	(0.016)	(0.019)
Fixed assets	-0.040***	-0.057***	-0.009	-0.048
(parent)	(0.009)	(0.013)	(0.034)	(0.038)
Log of assets	0.003***	0.004***	0.005**	0.004
	(0.001)	(0.001)	(0.002)	(0.002)
Inflation	-0.000	-0.000	0.001	0.001
	(0.000)	(0.000)	(0.001)	(0.001)
ROTA	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_i t$		0.039***	0.030	0.010
		(0.007)	(0.020)	(0.021)
Constant	-0.031	0.064**	-0.008	0.021
	(0.058)	(0.026)	(0.054)	(0.058)
N	28489	18212	2744	2236
R^2	0.348	0.395	0.499	0.558

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A1.4: Main Regression with Affiliate-specific Fixed Effects: Total Parental Debt

The table presents regression results for the affiliate's total parental debt-to-asset ratio, which is the dependent variable. Definitions on the dependent and the explanatory variables are provided in section 4.3.1 and 4.3.2. Column (1) shows the results from running a regression on the data set before controlling for the loss probability $\Pr(\text{loss})_{it}$. Column (2) shows our main specification where $\Pr(\text{loss})_{it}$ is included. Column (3) shows our main specification where it is also controlled for tax rates by excluding all observations where the tax rate difference is negative. Column (4) shows the main specification where we in addition exclude all affiliates located in tax havens. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Affiliate fixed-effects are in addition controlled for, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	(1) Sample before predicted loss included	(2) Predicted loss variable included	(3) Controlling for tax rates	(4) Excluding tax havens
Tax rate difference	-0.098*	-0.066	0.331	0.413
	(0.052)	(0.068)	(0.261)	(0.314)
Fixed assets (affiliate)	-0.019**	-0.040***	0.011	0.030
	(0.008)	(0.011)	(0.029)	(0.032)
Fixed assets (parent)	-0.025**	-0.031**	-0.053*	-0.063*
	(0.012)	(0.015)	(0.032)	(0.032)
Log of assets	0.011***	0.010***	0.025***	0.021***
	(0.002)	(0.002)	(0.006)	(0.007)
Inflation	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.001)	(0.001)
ROTA	-0.000	-0.000***	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_i t$		0.059***	0.008	0.004
		(0.010)	(0.025)	(0.030)
Constant	0.049	0.009	-0.161	-0.098
	(0.060)	(0.064)	(0.098)	(0.100)
N	28489	18212	2744	2236
R^2	0.086	0.080	0.223	0.263

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A1.5: Main Regression with Affiliate-specific Fixed Effects: Short-term Parental Debt

The table presents regression results for the affiliate's short-term parental debt-to-asset ratio, which is the dependent variable. Definitions on the dependent and the explanatory variables are provided in section 4.3.1 and 4.3.2. Column (1) shows the results from running a regression on the data set before controlling for the loss probability $\Pr(\text{loss})_{it}$. Column (2) shows our main specification where $\Pr(\text{loss})_{it}$ is included. Column (3) shows our main specification where it is also controlled for tax rates by excluding all observations where the tax rate difference is negative. Column (4) shows the main specification where we in addition exclude all affiliates located in tax havens. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Affiliate fixed-effects are in addition controlled for, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	(1) Sample before predicted loss included	(2) Predicted loss variable included	(3) Controlling for tax rates	(4) Excluding tax havens
Tax rate difference	-0.025	0.011	0.126	0.218
	(0.038)	(0.053)	(0.226)	(0.295)
Fixed assets (affiliate)	-0.042***	-0.059***	-0.040	-0.031
	(0.006)	(0.009)	(0.030)	(0.034)
Fixed assets (parent)	-0.039***	-0.044***	-0.072**	-0.098***
	(0.009)	(0.013)	(0.031)	(0.036)
Log of assets	0.006***	0.006***	0.017***	0.014**
	(0.001)	(0.002)	(0.006)	(0.006)
Inflation	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.001)
ROTA	-0.000	-0.000	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_i t$		0.027***	-0.014	-0.025
		(0.007)	(0.019)	(0.022)
Constant	0.021	0.020	-0.065	0.018
	(0.017)	(0.057)	(0.089)	(0.080)
N	28489	18212	2744	2236
R^2	0.116	0.085	0.229	0.287

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A2 Size Deciles of Loss Probability

Table A2.1: Size Deciles of Loss Probability

The table reports loss probability deciles with an interval of 10 percentage points, and includes the number of affiliate observations within every decile. The third column reports the percentage of the total number of observations within each decile threshold.

Loss Probability Decile	Number of Observations	Percentage of Total Observations
$>$ 0% - $<$ 10%	3,077	16.90%
$>$ 10% - $<$ 20%	7,315	40.02%
$>$ 20% - $<$ 30%	1,839	10.01%
$>$ 30% - $<$ 40%	768	4.22%
$>$ 40% - $<$ 50%	812	4.46%
$>$ 50% - $<$ 60%	1,063	5.84%
$>$ 60% - $<$ 70%	1,410	7.74%
$>$ 70% - $<$ 80%	1,531	8.41%
$>$ 80% - $<$ 90%	361	0.20%
$>$ 90% - $=$ 100%	36	0.19%
Total	18,212	100%

A3 Loss Probability Threshold: Total and Short-term parental debt

Table A3.1: Loss Probability Threshold: Total Parental Debt

The table represents OLS regression results for the affiliate's total parental debt-to-asset ratio, which is the dependent variable. The regressions are based on the main specification, shown in function 5.2. Column (1) and (2) include quantile binary variable thresholds for the loss probability, where the quantile from 0 to 0.20 is the base category. A variable is given the value 1 if the affiliate faces a loss probability within the quantile, and 0 otherwise. Column (3) to (6) report loss probability thresholds, from 10% to 90% and 20% to 80%. Column (3) and (5) include all affiliates, whereas column (4) and (6) excludes the tax haven affiliates. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	BINARY THRESHOLDS		SAMPLE THRESHOLDS			
	(1)	(2)	(3)	(4)	(5)	(6)
	All Affiliates	Producing Affiliates	10% - 90%	10% - 90%	20% - 80%	20% - 80%
Tax rate difference	0.139	0.170	-0.065	-0.052	-0.250	-0.490**
	(0.114)	(0.129)	(0.142)	(0.166)	(0.219)	(0.244)
Fixed assets (affiliate)	-0.034**	-0.048***	-0.021	-0.026	-0.005	-0.003
	(0.014)	(0.016)	(0.023)	(0.026)	(0.033)	(0.038)
Fixed assets (parent)	-0.090***	-0.095***	-0.083**	-0.100**	-0.074	-0.095
	(0.026)	(0.026)	(0.037)	(0.040)	(0.054)	(0.060)
Log of assete	0.010***	0.010***	0.011***	0.011***	0.010**	0.010*
	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)	(0.005)
Inflation	-0.000	-0.000*	-0.000	-0.000	-0.004	-0.003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)
ROTA	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
20% - 40%	0.052***	0.058***				
	(0.016)	(0.017)				
40% - 60%	0.022	0.030*				
	(0.014)	(0.016)				
60% - 80%	0.053***	0.052***				
	(0.017)	(0.018)				
80% - 100%	0.207***	0.216***				
	(0.059)	(0.062)				
$\Pr(\text{loss})_{it}$			0.101***	0.090***	0.017	0.011
			(0.031)	(0.034)	(0.050)	(0.056)
Constant	0.010	0.024	0.022	0.036	0.031	0.069
	(0.058)	(0.058)	(0.109)	(0.111)	(0.060)	(0.066)
N	3994	3301	2126	1738	1069	883
R^2	0.204	0.225	0.247	0.277	0.325	0.367

Robust t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3.2: Loss Probability Threshold: Short-term Parental Debt

The table represents OLS regression results for the affiliate's short-term parental debt-to-asset ratio, which is the dependent variable. The regressions are based on the main specification, shown in function 5.2. Column (1) and (2) include quantile binary variable thresholds for the loss probability, where the quantile from 0 to 0.20 is the base category. A variable is given the value 1 if the affiliate faces a loss probability within the quantile, and 0 otherwise. Column (3) to (6) report loss probability thresholds, from 10% to 90% and 20% to 80%. Column (3) and (5) include all affiliates, whereas column (4) and (6) exclude the tax haven affiliates. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	BINARY THRESHOLDS		SAMPLE THRESHOLDS			
	(1)	(2)	(3)	(4)	(5)	(6)
	All Affiliates	Producing Affiliates	10% - 90%	10% - 90%	20% - 80%	20% - 80%
Tax rate difference	0.038	0.057	-0.059	-0.102	-0.107	-0.339**
	(0.082)	(0.089)	(0.113)	(0.120)	(0.170)	(0.167)
Fixed assets (affiliate)	-0.055***	-0.062***	-0.068***	-0.075***	-0.044*	-0.037
	(0.010)	(0.012)	(0.017)	(0.020)	(0.022)	(0.026)
Fixed assets (parent)	-0.100***	-0.096***	-0.096***	-0.098***	-0.101***	-0.107**
	(0.018)	(0.018)	(0.027)	(0.028)	(0.038)	(0.042)
Log of assets	0.005***	0.005***	0.006**	0.007**	0.005	0.005
	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
Inflation	-0.000	-0.000	-0.000	-0.000	-0.003	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)
ROTA	-0.000	-0.000	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
20% - 40%	0.036***	0.037***				
	(0.012)	(0.013)				
40% - 60%	-0.006	0.000				
	(0.010)	(0.011)				
60% - 80%	0.019	0.011				
	(0.012)	(0.012)				
80% - 100%	0.067*	0.053				
	(0.036)	(0.037)				
$\Pr(\text{loss})_{it}$			0.022	-0.002	-0.029	-0.044
			(0.021)	(0.021)	(0.034)	(0.036)
Constant	0.032	0.027	0.106	0.113	0.109**	0.135***
	(0.031)	(0.032)	(0.092)	(0.093)	(0.043)	(0.047)
N	3994	3301	2126	1738	1069	883
R^2	0.216	0.241	0.247	0.292	0.320	0.370

Robust t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A4 Profitability in Parent Companies: Total and Short-term parental debt

Table A4.1: Profitability in Parent Companies: Total Parental Debt

The table represents OLS regression results for the affiliate's total parental debt-to-asset ratio, which is the dependent variable. The regressions presented in column (1), (3), (5) and (7) include all affiliates, while column (2), (4), (6) and (8) exclude tax haven affiliates. The data sample in column (1) and (2) include affiliates of Norwegian parent companies with a one year lagged tax base less than -1,000, and column (3) and (4) include affiliates of Norwegian parent companies with a one year lagged tax base less than -10,000. Column (5) and (6) restrict the sample to include affiliates of Norwegian parent companies with tax bases greater than or equal to -1,000, while column (7) and (8) include affiliates of Norwegian parent companies with tax bases greater than or equal to -10,000. All tax bases are reported in thousand NOK. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	< -1,000		< -10,000		>= -1,000		>= -10,000	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tax rate	0.647**	0.291	-0.136	0.007	-0.157	-0.052	0.354	0.082
difference	(0.307)	(0.400)	(0.149)	(0.174)	(0.139)	(0.161)	(0.235)	(0.267)
Fixed assets	-0.052	-0.045	-0.018	-0.031	-0.029	-0.041*	-0.042	-0.032
(affiliate)	(0.035)	(0.034)	(0.022)	(0.027)	(0.020)	(0.023)	(0.031)	(0.030)
Fixed assets	-0.130	-0.100	-0.069*	-0.068*	-0.065*	-0.061*	-0.103*	-0.094*
(parent)	(0.093)	(0.093)	(0.038)	(0.040)	(0.035)	(0.037)	(0.061)	(0.055)
Log of assets	0.014***	0.012***	0.010***	0.011***	0.010***	0.012***	0.013***	0.012***
	(0.004)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)
Inflation	0.001	0.001	-0.000	-0.000	-0.000	-0.000	-0.001	-0.005
	(0.001)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.003)
ROTA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_{it}$	0.074*	0.057	0.153***	0.147***	0.169***	0.171***	0.124***	0.119***
	(0.041)	(0.041)	(0.035)	(0.040)	(0.035)	(0.039)	(0.044)	(0.045)
Constant	-0.151**	-0.091	0.027	0.005	0.063	0.042	-0.073	0.023
	(0.075)	(0.086)	(0.112)	(0.117)	(0.111)	(0.116)	(0.066)	(0.070)
N	626	550	1853	1451	2118	1686	891	785
R^2	0.322	0.302	0.248	0.279	0.234	0.263	0.297	0.315

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A4.2: Profitability in Parent Companies: Short-term Parental Debt

The table represents OLS regression results for the affiliate's short-term parental debt-to-asset ratio, which is the dependent variable. The regressions presented in column (1), (3), (5) and (7) include all affiliates, while column (2), (4), (6) and (8) exclude tax haven affiliates. The data sample in column (1) and (2) include affiliates of Norwegian parent companies with a one year lagged tax base less than -1,000, and column (3) and (4) include affiliates of Norwegian parent companies with a one year lagged tax base less than -10,000. Column (5) and (6) restrict the sample to include affiliates of Norwegian parent companies with tax bases greater than or equal to -1,000, while column (7) and (8) include affiliates of Norwegian parent companies with tax bases greater than or equal to -10,000. All tax bases are reported in thousand NOK. Year dummies, parent industry dummies and the interaction between the two are also included in the regression, but not reported in the table. Clustered standard errors on affiliate level and robust standard errors, are estimated to control for serial correlation and heteroscedasticity respectively.

	$<$ -1,000		$<$ -10,000		$>=$ -1,000		$>=$ -10,000	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tax rate	0.290	0.040	0.514*	0.240	-0.172	-0.119	-0.161	-0.122
difference	(0.200)	(0.219)	(0.264)	(0.336)	(0.117)	(0.127)	(0.108)	(0.116)
Fixed assets	-0.078***	-0.058**	-0.092***	-0.077***	-0.050***	-0.063***	-0.053***	-0.063***
(affiliate)	(0.023)	(0.023)	(0.028)	(0.028)	(0.014)	(0.016)	(0.013)	(0.016)
Fixed assets	-0.103**	-0.110***	-0.128**	-0.117**	-0.089***	-0.077***	-0.095***	-0.084***
(parent)	(0.044)	(0.037)	(0.059)	(0.059)	(0.027)	(0.028)	(0.025)	(0.025)
Log of assets	0.008**	0.008**	0.009***	0.008**	0.005**	0.005**	0.006**	0.006**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)
Inflation	0.000	-0.001	0.001	0.003	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.002)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
ROTA	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$\Pr(\text{loss})_{it}$	0.033	0.027	0.007	-0.006	0.052**	0.024	0.062***	0.040*
	(0.034)	(0.036)	(0.033)	(0.033)	(0.022)	(0.023)	(0.023)	(0.024)
Constant	-0.039	0.003	-0.025	-0.009	0.130	0.118	0.135	0.121
	(0.046)	(0.048)	(0.057)	(0.061)	(0.093)	(0.096)	(0.089)	(0.091)
N	891	785	626	550	1853	1451	2118	1686
R^2	0.272	0.256	0.312	0.272	0.274	0.343	0.254	0.309

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$