

A REVIEW OF RESEARCH ON CORPORATE TAX AGGRESSIVENESS AND THE LEVERAGE PUZZLE

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ABSTRACT

This article reviews previous research on the relationship between corporate tax aggressiveness and leverage and shows that the puzzle remains unsolved. Mixed findings are reported in prior literature. Four main propositions from previous studies to explain this relationship are discussed in this paper: debt interest deductibility; non-debt tax shields; debtholders' concerns about managerial rent extraction; and uncertainty about the future cash flows of tax avoiders. This review paper suggests four main factors to account for the inconsistent results in past empirical studies: the causal or bi-directional relationship between tax aggressiveness and debt; proxies for tax aggressiveness; measures of firm leverage; and the endogeneity of corporate tax status. Suggestions are provided for future research on the tax aggressiveness and leverage puzzle with a view to reconciling the mixed findings in the existing literature.

* Keywords for this article: corporate taxation, tax aggressiveness, tax planning, leverage, cost of debt. The author may be contacted at jonathan.nguyen@student.unsw.edu.au.

I INTRODUCTION: THE PUZZLE OF CORPORATE TAX STATUS AND LEVERAGE

Researchers have long raised questions surrounding the relationship between corporate taxes and debt levels in companies' capital structure. The literature in tax, accounting and finance fields in the last four decades has proposed different theories and performed various empirical tests on this relationship. Since the early optimal capital structure theory put forward by Miller in 1977 and DeAngelo and Masulis in 1980, academics across those fields have consistently reported mixed results on the association between firms' tax aggressiveness and their leverage.¹

Myers stated in 1984, 'I know of no study clearly demonstrating that a firm's tax status has predictable, material effects on its debt policy'.² Nearly two decades later, Gordon and Lee, in their 2001 study of the impact of taxes on corporate debt policy, remark that 'economists have had great difficulty providing evidence that taxes in fact affect debt/asset ratios'.³ Since then, academics in this area have provided some significant results regarding the association between company tax status and firm's leverage (or cost of debt); however, the reported findings are mixed when it comes to the sign (ie positive or negative) and direction (ie causation) of this relationship.

Indeed, while many studies find a positive relation between tax avoidance strategies and debt holdings by firms supporting the argument that companies employ high debt structure for tax planning purposes due to the tax-deductible nature of interest expenses, a number of other papers report that corporate tax aggressiveness is negatively associated with both leverage and cost of debt; they attribute this result to the non-debt tax shields utilised by tax sheltering firms rather than tax strategies which favour high interest deductions on borrowings.

On one hand, Graham observes an 'under-leverage puzzle' phenomenon where firms' leverage level is noticeably lower than expected when they are of large size and operate with good financial performance and liquidity.⁴ Researchers, in an attempt to explain this 'under-leverage' phenomenon, propose that tax shelters act as non-debt tax shields which substitute for the use of debt and interest deductions to companies.⁵

On the other hand, an 'under-sheltering puzzle' is observed by Weisbach, who notes that some firms do not engage in tax sheltering as much as they might, given the low expected costs associated with tax avoidance for those firms.⁶ Desai and Dharmapala suggest that the explanation for this 'under-sheltering' phenomenon is

¹ Merton H Miller, 'Debt and Taxes' (1977) 32(2) *Journal of Finance* 261; Harry DeAngelo and Ronald W Masulis, 'Optimal Capital Structure under Corporate and Personal Taxation' (1980) 8 *Journal of Financial Economics* 3.

² Stewart C Myers, 'The Capital Structure Puzzle' (1984) 39(3) *Journal of Finance* 575.

³ Roger H Gordon and Young Lee, 'Do Taxes Affect Corporate Debt Policy? Evidence from U.S. Corporate Tax Return Data' (2001) 82(2) *Journal of Public Economics* 195.

⁴ John R Graham, 'How Big Are the Tax Benefits of Debt?' (2000) 55(5) *Journal of Finance* 1901.

⁵ John R Graham and Alan Tucker, 'Tax Shelters and Corporate Policy' (2006) 81(3) *Journal of Financial Economics* 563.

⁶ David A Weisbach, 'Ten Truths about Tax Shelters' (2002) 55(2) *Tax Law Review* 215.

that company shareholders tend to have concerns about managers' rent diversion, which might be concealed under opaque reporting for purposes of tax avoidance.⁷ However, many questions remain unanswered – not only in relation to under-leverage but also concerning under-sheltering. These require further examination.

Recognising this uncertainty makes it less surprising that the interaction between company tax-aggressive schemes and firm's leverage (or capital structure) remains a large puzzle. The corporate tax aggressiveness–leverage relationship is rather complicated when taking into account different sources of impacts on this relationship. Among these sources are tax deductibility of interest paid on debts (Miller); non-debt tax shields (DeAngelo and Masulis); agency costs (Crocker and Slemrod); bankruptcy costs (Bartholdy & Mateus); firm size (Stickney and McGee); and capital intensity and research and development activities (Gupta and Newberry).⁸ The empirical findings have thus been inconclusive about the relationship between tax-aggressive activities and cost of debt. This paper reviews the conflicting results reported in previous research and discusses the arguments and theories established in support of those results.

This article proceeds as follows. Part II documents studies that report positive, negative or insignificant association between corporate tax aggressiveness and debt holdings. Part III reviews the rationale underlying these empirical results, prominently the tax deductibility of debt interest, the non-debt tax shield substitution effects and tax exhaustion theory, the debtholders' concerns about managerial rent extraction, and the uncertainty about company's future cash flows. In Part IV, issues in the empirical tests will be examined, including the perception of the causal relationship between tax aggressiveness and company leverage, the differences in proxies used in previous studies, and the endogeneity concern in measuring corporate tax rates. Part V provides suggestions for potential research in this area in the future.

II REPORTED RELATIONSHIP BETWEEN CORPORATE TAX AGGRESSIVENESS AND LEVERAGE

A Studies Reporting Positive Association Between Tax Aggressiveness and Debt Holdings

This section presents previous research that documents a positive relation between tax-aggressive activities and debt levels in corporations.

⁷ Mihir Desai and Dhammika Dharmapala, 'Corporate Tax Avoidance and High-powered Incentives' (2006) 79(1) *Journal of Financial Economics* 145.

⁸ Miller, above n 1; DeAngelo and Masulis, above n 1; Keith J Crocker and Joel Slemrod, 'Corporate Tax Evasion with Agency Costs' (2005) 89(9–10) *Journal of Public Economics* 1593; Jan Bartholdy and Cesario Mateus, 'Debt and Taxes for Private Firms' (2011) 20(3) *International Review of Financial Analysis* 177; Clyde P Stickney and Victor E McGee, 'Effective Corporate Tax Rates: The Effect of Size, Capital, Intensity, Leverage, and Other Factors' (1982) 1(2) *Journal of Accounting and Public Policy* 125; Sanjay Gupta and Kaye Newberry, 'Determinants of the Variability in Corporate Effective Tax Rates: Evidence from Longitudinal Data' (1997) 16(1) *Journal of Accounting and Public Policy* 1.

First, Stickney and McGee, in their research on corporate effective tax rates (ETRs) of US firms in three years from 1978 to 1980, report – among other findings about characteristics of tax-aggressive firms – corporations that have low ETR are likely to have high debt levels in their capital structure.⁹ One of the limitations of that research, as recognised by the authors, is that the analysis does not take into the account the tax benefits from unused tax shields that are not in debt form such as tax loss carry-forward provisions. It is possible that other non-debt tax shields could have an impact on the reported association between tax avoidance and leverage.

In the same vein, Mills, Erickson and Maydew find evidence supporting the increase in debt use in tax-aggressive firms reported by Stickney and McGee.¹⁰ Mills et al use tax planning cost data obtained from confidential surveys previously collected by Slemrod and Blumenthal to conduct research on investments in tax planning by US corporations.¹¹ Mills et al report results showing that ETR is negatively associated not only with tax planning costs but also with leverage.¹² A high ETR suggests that a company has good tax compliance status, and the corollary is also true: low ETR indicates that the firm has successfully adopted a tax planning strategy to lower their tax liabilities. In other words, the findings by Mills et al demonstrate that leverage is significantly and positively related to tax aggressiveness.

Dyrenge, Hanlon and Maydew conducted a study of long-run tax avoidance for US firms over a ten-year period (1995–2004) and reported that their sample’s group of long-run tax avoiders (ie paying low taxes) on average employs more debts than the group of tax-compliant firms (ie paying high taxes).¹³ The usefulness of this research lies in its ability to capture successful tax avoiding firms in the long run; 26 per cent of the companies in the sample kept their cash ETR below 20 per cent for the ten-year period and 9 per cent of the sample firms’ cash ETRs were below 10 per cent, compared with the mean tax rate of 30 per cent for the sample. This suggests that the finding of a positive association between debt holdings and tax avoidance here reflects the debt structure of those firms that are committed to long-term sheltering strategies rather than merely having ETRs decreased in one year for some special (and likely legitimate) reasons.

Similarly Seidman, studying the difference in book income and taxable income (book–tax difference, or BTD) reported by US corporations between 1993 and 2004, produces regression results showing that BTD is positively related to cost of debt, consistent with the discussion on off-balance sheet financing by Mills and Newberry.¹⁴ When used as a proxy for company tax sheltering, higher BTD implies

⁹ Stickney and McGee, above n 8.

¹⁰ Lillian F Mills, Merle M Erickson and Edward L Maydew, ‘Investments in Tax Planning’ (1998) 20(1) *Journal of American Taxation Association* 1; Stickney and McGee, above n 8.

¹¹ Joel Slemrod and Marsha Blumenthal, ‘The Income Tax Compliance Cost of Big Business’ (1996) 24(4) *Public Finance Quarterly* 411; Mills, Erickson and Maydew, above n 10.

¹² Mills, Erickson and Maydew, above n 10.

¹³ Scott D Dyrenge, Michelle Hanlon and Edward L Maydew, ‘Long-run Corporate Tax Avoidance’ (2008) 83(1) *Accounting Review* 61.

¹⁴ Jeri K Seidman, ‘Interpreting the Book-Tax Income Gap as Earnings Management or Tax Sheltering’ (2010), *McCombs Research Paper Series* No. ACC-02-10, McCombs School of Business, The University of Texas at Austin, March; Lillian F Mills and Kaye J Newberry,

a more highly tax-aggressive position taken by the firm. In Seidman's paper, the author notes that their BTD measure may only be considered a good proxy for corporate tax avoidance once the impacts of Generally Accepted Accounting Principles (GAAP) changes have been controlled for.¹⁵ Thus, the positive relation between tax-aggressive status and leverage in Seidman's research is not as strong as the evidence provided in Dyreng et al.¹⁶

A US study conducted over a longer period (25 years, from 1982 to 2006) by Dhaliwal, Lee and Pincus finds that BTD is positively associated with cost of capital.¹⁷ Also studying US companies for a 25-year period (1985–2009), Hasan et al test the relationship between tax avoidance by corporations and cost of debt by examining loans from banks to businesses.¹⁸ In that study, evidence was produced to support the positive relation between tax sheltering and cost of bank loans.¹⁹ The result set out in Hasan et al remains robust when accounting for the impacts after the public becomes aware of a firm's involvement in tax avoidance schemes.²⁰ Further, not only are higher spreads of bank loans reported for tax-aggressive companies, but higher spreads in issuing public bonds as well as stricter collateral and covenant terms imposed on bank loans are also found in those firms.²¹ It is noted that the study by Hasan et al has focused on only bank loans and public bonds; however, these two sources do not fully represent the financial liabilities of companies. Nonetheless, as Welch points out, empirical studies of leverage and capital structure should concern not only financial liabilities but also non-financial liabilities, which could affect the overall implication about cost of debt for businesses.²²

In addition, Shevlin, Urcan and Vasvari examine the effects of tax aggressiveness on cost of debt from the perspective of debtholders, whose only way to assess their potential lending decisions is from the publicly available information.²³ Using a sample of company bonds issued in the US between 1990 and 2007, Shevlin et al find that firms' tax avoidance activities are significantly positively associated with corporate bond yields.²⁴ Further tests performed by the researchers show that the

'Firms' Off-Balance Sheet and Hybrid Debt Financing: Evidence from Their Book-Tax Reporting Differences' (2005) 43(2) *Journal of Accounting Research* 251.

¹⁵ Seidman, above n 14.

¹⁶ Seidman, above n 14; Dyreng, Hanlon and Maydew, above n 13.

¹⁷ Dan S Dhaliwal, Hye Seung G Lee and Morton Pincus, 'Book-Tax Differences, Uncertainty about Information Quality, and Cost of Capital' (Working Paper, University of Arizona, July 2009).

¹⁸ Iftekhar Hasan, Chun Hoi, Qiang Wu and Hao Zhang, 'Beauty Is in the Eye of the Beholder: The Effect of Corporate Tax Avoidance on the Cost of Bank Loans' (2014) 113(1) *Journal of Financial Economics* 109.

¹⁹ Ibid.

²⁰ Ibid.

²¹ Ibid.

²² Ivo Welch, 'Two Common Problems in Capital Structure Research: The Financial-Debt-To-Asset Ratio and Issuing Activity Versus Leverage Charges' (2011) 11(1) *International Review of Finance* 1.

²³ Terry Shevlin, Oktay Urcan and Florin Vasvari, 'Corporate Tax Avoidance and Public Debt Costs' (Working Paper, University of California, Irvine, August 2013).

²⁴ Ibid.

uncertainty of future cash flows is the main mechanism through which tax aggressiveness increases the bond offering rates.²⁵ Interestingly, although no private information is made available to public bondholders, information quality is found to not play a significant role in the positive association between tax sheltering and bond yields.²⁶

Moving outside the US setting, some Australian empirical works also produce results supporting the positive tax aggressiveness–leverage relationship. Richardson, Taylor and Lanis, in a study of 203 companies listed on the Australian Stock Exchange (ASX), document a significant positive impact of leverage on tax aggressiveness in their regression tests.²⁷ Their main finding is that tax avoidance by a business is positively associated with financial distress.²⁸ A possible explanation, taking into account the higher leverage characteristic of tax-aggressive firms, is that the high debt levels employed by those firms have induced their financial distress. The authors note that one of the limitations of their research is the possibility of omitted variables in the regression model, and suggest there is potential to incorporate the impacts of tax authorities in the tax avoidance model in future studies.²⁹

A few other Australian studies have also shown that tax aggressiveness is positively related to debt levels, although exploration of capital structure is not the overarching aim of these studies. Among those is the research by Richardson and Lanis, which examines the determinants of variability in ETR of Australian firms in the context of the Ralph Review of tax reform in 1999 in Australia.³⁰ The researchers find that leverage is negatively associated with ETRs – that is, leverage increases with the level of tax-aggressive planning by firms.³¹ In addition, the authors contend that following the Ralph tax reform, the ETRs are increased for highly leveraged Australian firms, and argue that the reason for such increase in ETRs is the reduction in tax benefits from interest payments on debts.³²

Analogously, in a later study of corporate social responsibility and tax avoidance in the Australian setting, Lanis and Richardson also obtain a result of a negative and significant relation between leverage level and ETRs – that is, companies that pay less tax have higher level of debts on their balance sheet.³³ This finding once again gives support to the suggested positive tax–debt relationship. Richardson, Taylor

²⁵ Ibid.

²⁶ Ibid.

²⁷ Grant Richardson, Grantley Taylor and Roman Lanis, 'The Impact of Financial Distress on Corporate Tax Avoidance Spanning the Global Financial Crisis: Evidence from Australia' (2015) 44 *Economic Modelling* 44.

²⁸ Ibid.

²⁹ Ibid.

³⁰ Grant Richardson and Roman Lanis, 'Determinants of the Variability in Corporate Effective Tax Rates and Tax Reform: Evidence from Australia' (2007) 26(6) *Journal of Accounting and Public Policy* 689.

³¹ Ibid.

³² Ibid.

³³ Roman Lanis and Grant Richardson, 'Corporate Social Responsibility and Tax Aggressiveness: An Empirical Analysis' (2012) 31(1) *Journal of Accounting and Public Policy* 86.

and Lanis, in their 2013 article, include leverage as one of the independent variables in their tax avoidance model, and report that leverage is positively related to the tax aggressiveness measure for Australian businesses.³⁴ In that study, of the 30 firms identified as having tax disputes with the Australian Taxation Office (ATO), utilising 'deductibility of interest expenses' is the second most common type of tax strategy, behind only schemes involving 'corporate restructuring'.³⁵

A similar result is reported in an empirical study by Taylor and Richardson which examines the incentives for Australian corporations to engage tax planning schemes from a sample of 200 Australian publicly listed firms for the period 2006–2010.³⁶ This research yields regression results showing the positive effects of leverage on tax-avoidance activities.³⁷

Nonetheless, and similar to the US literature, the Australian studies documented here are not without conflict with regard to the relationship between corporate tax aggressiveness and debt holdings. The studies that produce regression coefficients to reject the positive tax aggressiveness–leverage association are reported in (B) and (C) below.

B Studies Reporting Negative Association Between Tax Aggressiveness and Debt Holdings

This section reviews previous studies that find tax aggressiveness to be negatively associated with debt levels or with cost of debt, as opposed to the positive relationship discussed in (A) above.

First, in a study of the relationship between debt and the corporate marginal tax rate, Graham performs regression analysis on 10,000 US companies for a 13-year period, from 1980 to 1992, and simulates those firm's marginal tax rates (MTRs), taking into consideration net operating losses, investment tax credits and alternative minimum tax.³⁸ Graham's research finds evidence that firms with lower tax rates use less debt in their capital structure than firms with higher tax rates.³⁹ Since companies that have an effective marginal tax rate lower than the statutory rate are often considered successful tax planners, Graham suggests that tax aggressiveness is negatively associated with firm leverage. Nonetheless, the low R-squared of the regression means that his analysis cannot convincingly explain the larger portion of leverage decisions by corporations.⁴⁰

³⁴ Grant Richardson, Grantley Taylor and Roman Lanis, 'The Impact of Board of Director Oversight Characteristics on Corporate Tax Aggressiveness: An Empirical Analysis' (2013) 32(3) *Journal of Accounting and Public Policy* 68.

³⁵ Ibid.

³⁶ Grantley Taylor and Grant Richardson, 'Incentives for Corporate Tax Planning and Reporting: Empirical Evidence from Australia' (2014) 10(1) *Journal of Contemporary Accounting & Economics* 1.

³⁷ Ibid.

³⁸ John R Graham, 'Debt and Marginal Tax Rate' (1996) 41(1) *Journal of Financial Economics* 41.

³⁹ Ibid.

⁴⁰ Ibid.

Looking at the same period (1981–1992), Graham, Lemmon and Schallheim study debt and leases used by US firms and report that low tax rate firms are likely to have lower debt levels, supporting the negative relation between tax avoidance and debt.⁴¹ At the same time, Graham et al find an increase in use of operating leases in companies with lower MTR, but find no clear evidence of an association between capital leases and MTR.⁴² Apart from contributing evidence of the negative relationship between tax aggressiveness and debt, that article also demonstrates the different properties of debt and leases in terms of their impacts on corporate taxes.

In another US study, Gordon and Lee document similar result from their empirical tests on US companies for 37 years between 1954 and 1995 (excluding 1962 and 1966–1969) – a much longer period than the studies by Graham in 1996 and Graham et al in 1998.⁴³ That research, using US tax return data, shows a negative relation between debt financing and tax planning opportunities for companies.⁴⁴ Gordon and Lee also demonstrate that short-term borrowings are more responsive to tax incentives than are long-term borrowings; more specifically, the impact of company tax on the elasticity of short-term debt is found to be approximately triple that for long-term debt.⁴⁵ The authors here recognise that tax consequences are not the only issue considered by companies when changing their capital structure in response to potential tax benefits. Indeed, they argue that non-tax implications also play an important role in leverage decisions of corporations.

In the same research line, in 2008 Graham and Mills studied the differences between simulated MTR based on financial statement information and simulated MTR from the US tax return information, using a sample of firms from 1998 to 2000.⁴⁶ This yielded the result that simulated book MTR performs better than the simulated MTR from tax returns in respect of the ability to explain company's debt ratios. In addition, these authors document a positive association between simulated MTRs and debt ratios, supporting the notion that companies achieving low tax rates tend to use less debt.⁴⁷

In an attempt to explain the under-leverage puzzle in tax-aggressive firms (discussed by Graham in 2000), Graham and Tucker examine large corporate tax shelter cases under actual litigation in the US.⁴⁸ This use of actual tax shelter cases gives the research the advantage of using identified tax-aggressive companies compared with other forms of proxy for tax avoidance such as ETR or BTD employed in other studies. However, the authors also confirm that the limitation of their study, in using such a sample, lies in making inferences from a

⁴¹ John R Graham, Michael L Lemmon and James S Schallheim, 'Debt, Leases, Taxes, and the Endogeneity of Corporate Tax Status' (1998) 53(1) *Journal of Finance* 131.

⁴² Ibid.

⁴³ Gordon and Lee, above n 3; Graham above n 38; Graham, Lemmon and Schallheim above n 41.

⁴⁴ Gordon and Lee, above n 3.

⁴⁵ Ibid.

⁴⁶ John R Graham and Lillian F Mills, 'Using Tax Return Data to Simulate Corporate Marginal Tax Rates' (2008) 46(2–3) *Journal of Accounting and Economics* 366.

⁴⁷ Ibid.

⁴⁸ Graham and Tucker, above n 5; Graham, above n 4.

relatively small sample.⁴⁹ The research finds a reduction of 8 per cent in debt ratios in their sample of tax avoidance firms, suggesting that firms that use tax-aggressive planning as 'non-debt tax shield' tend to have lower debt levels.⁵⁰

Additionally, Wilson reports a negative association between debt holdings and tax aggressiveness for a sample of firms drawn from the data previously collected by Graham and Tucker (2006) and additional tax avoidance cases discovered from press articles from 1975 to 2000.⁵¹ Similar to Graham and Tucker, the generalisability of Wilson's results is not strong, because it does not include corporations whose tax avoidance schemes are not detected by the tax authorities (ie Wilson performs the tests only on a set of tax shelter firms successfully identified).⁵²

Lim, in his study of Korean listed companies for the period 1994–2003, investigates the relation between tax avoidance and cost of debt, and expands the examination to include the effects of shareholder activism on this relationship.⁵³ Computing the tax avoidance measure from book-tax difference, Lim finds a negative relationship between the tax avoidance variable and company's cost of debt.⁵⁴ Further tests in Lim's study indicate that tax aggressiveness is more significantly associated with cost of debt in corporations with a higher level of institutional ownership, and that this negative relationship becomes even more remarkable after 1998 as a result of the Korean corporate governance reforms allowing more powers to be exercised by institutional investors.⁵⁵ Hasan et al, who find the opposite result for US companies (discussed in (A) above) argue that the negative relation between tax avoidance and cost of debt found in Lim's research is due to the fact that tax-aggressive entities rely more heavily on loans than bonds.⁵⁶ However, the evidence supporting this argument is insufficient to be persuasive, because different tax jurisdictions are being considered: Lim (2011) studies Korean companies while Hasan et al (2014) examine US firms.⁵⁷

Another piece of evidence in support of Graham and Tucker's conclusions is found by Lim (2012) in his study of Korean listed firms in a seven-year period (2000–2006).⁵⁸ The author proposes that tax-aggressive activities could offer a partial explanation for the under-leverage puzzle.⁵⁹ The context here was a voluntary reduction in leverage after changes in government laws and companies' ETR in

49 Graham and Tucker, above n 5.

50 Ibid.

51 Ryan J Wilson, 'An Examination of Corporate Tax Shelter Participants' (2009) 84(3) *Accounting Review* 969; Graham and Tucker, above n 5.

52 Wilson, above n 51.

53 Youngdeok D Lim, 'Tax Avoidance, Cost of Debt and Shareholder Activism: Evidence from Korea' (2011) 35(2) *Journal of Banking & Finance* 456.

54 Ibid.

55 Ibid.

56 Hasan et al, above n 18; Lim, above n 53.

57 Ibid.

58 Graham and Tucker, above n 5; Youngdeok D Lim, 'Tax Avoidance and Underleverage Puzzle: Korean Evidence' (2012) 39(3) *Review of Quantitative Finance and Accounting* 333.

59 Lim, above n 58.

Korea decreased from 20.3 per cent in 2000 to 14.6 per cent in 2005.⁶⁰ Lim's 2012 paper has complemented and generalised the finding of Wilson, and the earlier finding of Graham and Tucker, by employing a larger sample for the regression analysis; however, the complementary finding from Lim should also be considered with caution because of the different jurisdictions, which may make a material difference to the analysis.⁶¹

After Lim (2012), a study by Lin, Tong and Tucker offered to resolve the concern about country differences (specifically between US and Korea) by examining US firms for the period from 2006 to 2011.⁶² Lin et al's research extends the results found in Graham and Tucker by reporting the inverse association between tax avoidance and debt levels.⁶³ In documenting the substituting characteristic of corporate tax aggressiveness and debt use, Lin et al provide justification for leverage choice as a result of tax-aggressive planning, but not the converse (where leverage structure is causally linked to tax avoidance). The authors also argue that changes in debt structure are likely to be more costly than a tax avoidance strategy.⁶⁴ If this argument is correct, it is more probable that tax aggressiveness causes impacts on leverage and cost of debt rather than that firms change their leverage policy to serve tax planning purposes. However, this is not necessarily true; anecdotally, some firms do intentionally organise their debt holdings in a manner that assists the overall tax-aggressive strategy of the companies, especially when tax planning involves international tax schemes. Besides, Lin et al highlight the interesting 'sticky debt puzzle' where rigidity is observed in companies that remain their capital structures over a long period, even when profit position and tax planning opportunities have already changed.⁶⁵

In another non-US study, Bartholdy and Mateus use Portugal as a setting for their study of the tax aggressiveness–leverage association in private firms. The authors attribute the choice of Portugal, among 'the least developed countries in the OECD', to the fact that Portuguese companies use predominantly bank financing and Portugal has a relatively small financial market.⁶⁶ Using a sample of 998 Portuguese private firms in the period 1990–2000, this study shows that company tax has a positive impact on the debt structure for private firms (ie company tax aggressiveness increases as debt level becomes lower). Bartholdy and Mateus explain that it is cheaper for small private firms to finance their debts through banks than to access funds in the financial market, due to the asymmetric information disadvantage of small entities.⁶⁷ This aspect of the problem highlights the need to control for firm size when examining the relation between tax planning activities and leverage structure. At the same time, because the focus of this paper is on small private firms, the findings here may not be generalisable to larger listed companies.

⁶⁰ Ibid.

⁶¹ Lim, above n 58; Wilson, above n 51; Graham and Tucker, above n 5.

⁶² Lim, above n 58; Shannon Lin, Naqiong Tong and Alan Tucker, 'Corporate Tax Aggression and Debt' (2014) 40(1) *Journal of Banking and Finance* 227.

⁶³ Lin, Tong and Tucker, above n 63; Graham and Tucker, above n 5.

⁶⁴ Lin, Tong and Tucker, above n 63.

⁶⁵ Ibid.

⁶⁶ Bartholdy and Mateus, above n 8.

⁶⁷ Ibid.

In addition, due to the special features of Portugal as mentioned, the negative tax aggressiveness–leverage association documented by Bartholdy and Mateus should be assessed carefully before relating the findings to other developed economies.⁶⁸ Nonetheless, those researchers suggest that the crucial factor in determining debt levels, apart from the tax consequences, is the availability of collateral, and this suggestion can be incorporated in future studies when modelling taxes and debt structure.⁶⁹

Recognising the difficulties encountered when attempting to measure precisely the tax benefit of debts to companies, Barclay, Heitzman and Smith research the tax aggressiveness–leverage relationship in the real estate industry where, the authors argue, the tax benefit of debts could be computed with less error.⁷⁰ Barclay et al attribute this advantage in measuring debt benefits to the fact that the US industry contains both taxable and non-taxable entities.⁷¹ Results of this research show a corresponding increase of 4.7 per cent in debt ratio when marginal tax rate of an entity changes from 0 per cent (non-taxable) to 35 per cent (taxable).⁷² On that basis, the authors conclude that non-taxable real estate firms in the US use less debt than the taxable real estate firms.⁷³

A naive interpretation of this result might be that there exists a negative association between tax aggressiveness and debt levels if non-tax organisation form is considered as a strategy to avoid paying taxes. However, there are two limitations in this study. First, the results are drawn solely from the real estate industry, which makes it difficult to generalise from them to other industries.⁷⁴ Second, the research by Barclay et al essentially examines the debt structure of two different types of organisations.⁷⁵ For that reason, the findings are hard to interpret because a change from a non-taxable entity (with 0 per cent tax rate) to an organisational type that is taxable (at 35 per cent in this case) is different from a change in tax aggressiveness level (eg where ETR changes from 30 per cent to 35 per cent).⁷⁶

In an Australian setting, Richardson, Lanis and Leung examine Australian-listed firms from 2001 to 2010 and draw the conclusion that tax avoidance is inversely related to leverage, consistent with the debt substitution effect discussed in Graham and Tucker (2006).⁷⁷ An extension from previous literature by Richardson et al (2014) is that their research suggests that outside directors magnify the debt substitution effect.⁷⁸ That finding is in contrast with the positive association

68 Ibid.

69 Ibid.

70 Michael J Barclay, Shane M Heitzman and Clifford W Smith, 'Debt and Taxes: Evidence from The Real Estate Industry' (2013) 20 *Journal of Corporate Finance* 74.

71 Ibid.

72 Ibid.

73 Ibid.

74 Ibid.

75 Ibid.

76 Ibid.

77 Grant Richardson, Roman Lanis, Sidney C Leung, 'Corporate Tax Aggressiveness, Outside Directors, and Debt Policy: An Empirical Analysis' (2014) 25 *Journal of Corporate Finance* 107; Graham and Tucker, above n 5.

78 Richardson, Lanis and Leung, above n 77.

between tax avoidance and leverage for Australian corporations reported in other tax aggressiveness studies (Lanis and Richardson 2012; Richardson, Taylor and Lanis 2013; Taylor and Richardson 2014).⁷⁹ The conflicting results here are worth highlighting when these studies are carried out in the same Australian context and for similar periods. Again we see mixed findings on the relationship between tax-aggressive activities and leverage levels of cost of debt, leaving the tax aggressiveness–leverage puzzle unsolved.

When quantitative research yields conflicting results, meta-analysis may help to locate the common ground in the mixed findings reported in past literature. According to Stanley, meta-regression analysis is an approach used in economic, social and medical sciences to synthesise results from previous literature and ‘can help to explain the wide study-to-study variation found among research findings and offer specific reasons, based on the studies themselves, why the evidence on a certain question may appear contradictory or overly varied’.⁸⁰

Reviewing past empirical studies of debt structure and corporate taxation, Feld, Heckemeyer and Overesch conduct a meta-analysis that synthesises findings from 48 prior studies over 25 years.⁸¹ Their meta-regression shows a negative association between corporate tax aggressiveness and debt ratio, and suggests that a reduction in a company’s MTR lowers the debt level adopted for a firm’s capital structure.⁸² The authors argue that the outcomes of previous research depend on the measure of corporate tax status used, and suggest that using the simulated MTR measure from Graham (1996) may overcome the issue of downward bias encountered in estimating the effects of tax strategies on debt structure.⁸³ Additionally, drawing on their meta-analysis, the authors caution that debt financing of multinational companies is also affected by the tax incentives brought about by profit shifting activities that occur in the international business environment. However, that analysis appears to assume that taxes cause changes in debt structure of a company.⁸⁴ Whether or not the tax aggressiveness–leverage association is a causal relationship remains to be addressed.

The literature review in this section demonstrates that previous research on one hand reports a positive relation between tax avoidance and debt holdings, and on the other hand finds that tax-aggressive activities are inversely related to leverage levels as well as to cost of debt. Moreover, some other papers in this same line of research have presented mixed or insignificant findings, adding to the puzzle observed for the tax aggressiveness–leverage relationship.

⁷⁹ Richardson, Lanis and Leung, above n 77; Lanis and Richardson, above n 33; Richardson, Taylor and Lanis, above n 34; Taylor and Richardson, above n 36.

⁸⁰ T D Stanley, ‘Wheat from Chaff: Meta-Analysis as Quantitative Literature Review’ (2001) 15(3) *Journal of Economic Perspectives* 131.

⁸¹ Lars P Feld, Jost H Heckemeyer and Michael Overesch, ‘Capital Structure Choice and Company Taxation: A Meta-Study’ (2013) 37(8) *Journal of Banking & Finance* 2850.

⁸² Ibid.

⁸³ Feld, Heckemeyer and Overesch, above n 81; Graham, above n 38.

⁸⁴ Feld, Heckemeyer and Overesch, above n 81.

C *Studies Reporting Mixed or Insignificant Findings*

This section discusses previous studies that reach a conclusion of mixed or insignificant findings in respect of the association between tax avoidance and firms' leverage.

First, Gupta and Newberry document mixed results for this association in their study of companies' ETRs using longitudinal data for the two periods, 1982–1985 and 1987–1990, omitting 1986, when the Tax Reform Act 1986 (TRA86) in the US took effect.⁸⁵ For the first ETR measure, which is calculated by dividing the income tax expense by the book income before interest and tax, these researchers find that ETR is negatively and significantly related to debt ratio for both periods, namely pre-TRA86 and post-TRA86.⁸⁶ In contrast, the results for the second ETR measure, which is the ratio of income tax expense to operating cash flows before interest and tax, show the relation between debt ratio and ETR to be positive and significant for the pre-TRA86 period, but positive and insignificant for the post-TRA86 period.⁸⁷ In discussing this ambiguous finding, the authors suggest that the relationship between capital structure and firm's ETR is sensitive to the denominator used in computation of ETR measure, and that their model of ETRs might be incomplete and may have potential biases from omitted variables.⁸⁸ Thus, the sign of this relationship remains inconclusive after this study.

Next, in a study of US companies for the period 1994–2004, Ayers, Laplante and McGuire examine firms' credit risk and how it is assessed by credit analysts using BTD information.⁸⁹ Since BTD can be a measure not only for earnings quality but also for the tax aggressiveness level of a company, an inverse association between changes in BTD and credit rating changes is insufficient to draw conclusion about the relation between tax sheltering and leverage. The research by Ayers et al attempts to shed light on this by dividing the firms into two categories, 'high tax-planning' firms and 'non tax-planning' firms.⁹⁰ The authors find that for 'non tax planners', large movements in BTD, irrespective of their sign, necessarily result in less favourable rating changes (ie higher cost of debt).⁹¹ On the contrary, for 'high tax-planning' firms, they do not find any significant relation between BTD changes and credit rating changes. On that basis, these researchers suggest that the association between BTD and credit risk is attenuated by tax planning activities.⁹² Nonetheless, it should be noted that in this paper the finding of no significant relationship between changes in BTD and credit rating changes depends on the definition of 'high tax-planning' firms. Ayers et al adopt two measures to identify

⁸⁵ Gupta and Newberry, above n 8.

⁸⁶ Ibid.

⁸⁷ Ibid.

⁸⁸ Ibid.

⁸⁹ Benjamin C Ayers, Stacie Kelley Laplante and Sean T McGuire, 'Credit Ratings and Taxes: The Effects of Book-Tax Differences on Ratings Changes' (2010) 27(2) *Contemporary Accounting Research* 359.

⁹⁰ Ibid.

⁹¹ Ibid.

⁹² Ibid.

high tax planners, the cumulative current ETR and the cumulative cash ETR, both of which are computed over a five-year period.

Besides Ayers et al, Nejadmalayeri and Singh analyse corporate bonds issued by US companies from 1994 to 2006 and report that companies with higher tax rates are likely to have smaller credit spreads, which essentially leads to lower cost-of-bond issues.⁹³ Nejadmalayeri and Singh show evidence that credit spreads, which represent for cost of corporate bonds, decrease when the amount of tax loss carried forward grows larger; in contrast, wider credit spreads (ie higher cost of borrowings) are observed when depreciation tax shields increase.⁹⁴ Additionally, the authors suggest that large unutilised tax shields may give shareholders an incentive to continue to make loan payments and to prevent the company from going bankrupt to enable the firm to access the unutilised tax benefits in the future.⁹⁵ According to Nejadmalayeri and Singh, 'at higher tax rates, equity holders would have a greater incentive to avoid defaulting on short-term debt to preserve larger tax shields'.⁹⁶ Although this argument is understandable, managers need to consider many more important issues when making decisions on whether to wind up the company. It is most likely that equity holders are less concerned about tax shields than about other operating and management considerations when it comes to deciding on liquidation of the company.

Apart from the US, a study of international corporate tax avoidance practices by Taylor and Richardson in 2012 using Australian company data yields insignificant results for most of the tax aggressiveness measures employed in their research.⁹⁷ Taylor and Richardson look at Australian-listed firms over four years, from 2006 to 2009, and their regression results show that the ratio of long-term debt over total assets is positively related to four proxies of tax avoidance, but the associations are insignificant for three out of the four proxies used.⁹⁸ The insignificant result reported by Taylor and Richardson is intriguing when the paper suggests that thin capitalisation is one of the two main drivers of tax aggressiveness (with the other one being transfer pricing).⁹⁹ If firms utilise tax havens in combination with thin capitalisation to obtain significant tax liability reductions, it is expected that those firms would have higher debt levels. Following from this argument, the expected result would be that leverage has a significantly positive association with tax avoidance. However, the insignificant coefficients of leverage documented for three out of the four tax avoidance measures in Taylor and Richardson seem inconclusive about this.¹⁰⁰

⁹³ Ali Nejadmalayeri and Manohar Singh, 'Corporate Taxes, Strategic Default, and The Cost of Debt' (2012) 36(11) *Journal of Banking & Finance* 2900.

⁹⁴ Ibid.

⁹⁵ Ibid.

⁹⁶ Ibid.

⁹⁷ Grantley Taylor and Grant Richardson, 'International Corporate Tax Avoidance Practices: Evidence from Australian Firms' (2012) 47(4) *International Journal of Accounting* 469.

⁹⁸ Ibid.

⁹⁹ Ibid.

¹⁰⁰ Ibid.

The discussion in this section, together with (A) and (B) above, clearly highlights the tax aggressiveness–leverage puzzle in past literature, where mixed findings are documented for the direction of the relationship between tax aggressiveness and leverage (or cost of debt). In Part III, the underlying reasons and explanations used in reporting the puzzle of tax aggressiveness and leverage are discussed in more detail.

III RATIONALE OF UNDERLYING RELATIONSHIPS BETWEEN TAX AGGRESSIVENESS AND LEVERAGE

Previous researchers in carrying out their empirical research also propose different theories to establish the rationale of their results of the relationship between tax-aggressive activities and debt levels, or cost of debt. This Part reviews the four most prominent arguments supporting an association, either negative or positive, between tax sheltering and leverage. The first two propositions relate to the tax benefits from interest deductions and non-debt tax shields, which are conflicting arguments frequently referred to in tax aggressiveness studies examining firms' leverage. The third and fourth propositions are, respectively, the debtholders' concern about rent extraction by managers and the uncertainty about future cash flows. These two propositions are recently stated and put forward by Shevlin, Urcan and Vasvari (2013), although the underlying arguments have appeared in the corporate tax avoidance literature prior to that.¹⁰¹

A Debt Tax Shield and Utilising of Interest Deductions

First, one long-standing proposition, frequently referred to by academics in interpreting the relationship between tax aggressiveness and leverage, is the debt tax shield and the deductibility of interest payments on debt. Stickney and McGee (1982), who document a positive relation between tax aggressiveness and debt holdings, discuss a finding by Tambini which shows that the average after-tax cost of debt capital is around half of the average cost of equity capital.¹⁰² Stickney and McGee argue that the difference between cost of debt and cost of equity is the result of the tax treatment of returns to debt holders and equity holders.¹⁰³ In particular, return to debt holders in the form of interest on debt is deductible to company for tax purposes and hence reduces the net profit upon which tax is calculated using the corporate statutory tax rate. On the other hand, return to shareholders in the form of dividend is generally not a tax deduction in calculating the firm's taxable net profit. Thus, use of debt brings tax benefits to the company because interest payments are tax deductible.

For that reason, researchers who find tax avoidance activities positively related to leverage or cost of debt often attribute that result to the debt tax shield, and propose

¹⁰¹ Shevlin, Urcan and Vasvari, above n 23.

¹⁰² Stickney and McGee, above n 8; Luigi Tambini, 'Financial Policy and The Corporation Income Tax', in A C Harberger and M J Bailey (eds), *The Taxation of Income from Capital* (The Brookings Institution, Washington, 1969) 185.

¹⁰³ Stickney and McGee, above n 8.

that corporations may engage in tax-aggressive schemes surrounding firms' leverage choice in order to make the most use of the debt structure. For instance, Lanis and Richardson argue that 'highly leveraged corporations are expected to use tax-deductible interest payments to promote tax aggressiveness in the corporation'.¹⁰⁴ In a study of thinly capitalised tax avoidance in Australia, Taylor and Richardson also argue that the debt tax shield together with those interest deductions supplies rationale for the positive association between tax avoidance activities and leverage.¹⁰⁵

The problem implicit in this argument is that it contradicts the trade-off theory of capital structure, which suggests that firms with high MTRs should use more debt than firms with low MTRs, because the benefit of interest deductions is greater for high-tax-rate firms.¹⁰⁶ The trade-off theory here implies that tax sheltering, which can effectively be represented by low MTRs, is negatively related to debt financing, contrary to the positive association between tax aggressiveness and leverage predicted by the debt tax shield proposition. Graham and Mills advanced this argument as a reason for the negative relation between tax avoidance and debt holdings found in their research.¹⁰⁷

All this points to the need to take the further step of looking at what happens after firms decide to employ more debts because of the interest tax shields, given their high MTRs. The result would most likely be that average tax rates (also ETRs) will be reduced. The larger the interest deduction becomes, the more the ETR decreases, resulting in a reduction in MTR (ie the tax benefit of interest deduction also reduces). There may therefore be an optimal point at which the tax benefit from interest deduction is not sufficient to justify a firm's increase of leverage, given the potential insolvency risks, which move in the same direction as debt levels.

A further point discussed in Hasan et al (2014) is that tax-aggressive activities can result in higher cost of bank loans, which may in turn reduce the incentive for companies to employ tax-sheltering techniques.¹⁰⁸ Nonetheless, previous research (Stickney and McGee 1982; Lanis and Richardson 2012; Taylor and Richardson 2014) would at this point argue that an increase in cost of debt means there is an incentive to further engage in tax aggressiveness by utilising any tax structure that can take advantage of the tax deductibility of interest paid.¹⁰⁹ It is observed here that although Hasan et al have rigorously documented the impacts of tax avoidance on corporations' cost of bank loans, the questions about the opposite direction of this association (ie whether debt structure impacts on the tax-sheltering decision) remain unsolved.¹¹⁰

¹⁰⁴ Lanis and Richardson, above n 33.

¹⁰⁵ Grantley Taylor and Grant Richardson, 'The Determinants of Thinly Capitalised Tax Avoidance Structures: Evidence from Australian Firms' (2013) 22(1) *Journal of International Accounting, Auditing and Taxation* 12.

¹⁰⁶ Graham and Mills, above n 46.

¹⁰⁷ Ibid.

¹⁰⁸ Hasan et al, above n 18.

¹⁰⁹ Stickney and McGee, above n 8; Lanis and Richardson, above n 33; Taylor and Richardson, above n 36.

¹¹⁰ Hasan et al, above n 18.

B Non-Debt Tax Shields: Debt Substitution and Tax Exhaustion Effects

Apart from research articles that report a positive relation between tax aggressiveness and debt holdings, a number of studies show the opposite: tax avoidance is found to be negatively associated with leverage – hence the tax aggressiveness–leverage puzzle. While the debt tax shield and interest deductibility argument supports the positive relationship of the two variables, another proposition – ‘non-debt tax shields’ – is put forward as rationale to back the findings of a negative association.

Revisiting the research study by DeAngelo and Masulis in 1980, we can see that those authors, 35 years ago, proposed that investment-related tax shields and probability of losing deductibility of debt tax shields are positively related, resulting in firms with high investment-related tax shields using less debt in their capital structure.¹¹¹ According to DeAngelo and Masulis, a ‘non-debt tax shield’ (NDTS) serves as a substitute for tax deductions from debt interest, and every firm has an optimal amount of total tax deductions.¹¹² In studying the ‘debt substitution effect’ suggested by DeAngelo and Masulis, research by MacKie-Mason a decade later showed that this substitution effect is more applicable to companies that are more likely to lose the tax benefits from interest deductions.¹¹³ The effect discussed in MacKie-Mason (1990) is referred to as the ‘tax exhaustion effect’.¹¹⁴

Strong support for both of the debt substitution effect and the tax exhaustion effect can be found in Dhaliwal, Trezevant and Wang (1992).¹¹⁵ In a further note, Dhaliwal et al also demonstrate that the tax shield substitution effect could be dominated by the ‘debt securability effect’, which suggests that a firm’s debt level is positively related to its fixed assets, which can be used as collaterals for borrowings (Scott 1977).¹¹⁶ In a separate study, Trezevant examines the debt substitution effect in a setting where a significant tax law change, introduced by the Economic Recovery Tax Act (ERTA) in the US in 1981, provides support for the debt substitution and tax exhaustion effects after controlling for the debt securability impacts.¹¹⁷

As for the studies by Dhaliwal et al and Trezevant, the reason for the reported negative relationship between tax avoidance and leverage (such as Graham and Tucker 2006; Lim 2011; Lin et al 2014) could be that companies engaging in tax-sheltering activities utilise the available NDTS, which act as substitutes for the debt

¹¹¹ DeAngelo and Masulis, above n 1.

¹¹² Ibid.

¹¹³ DeAngelo and Masulis, above n 1; Jeffrey K MacKie-Mason, ‘Do Taxes Affect Corporate Financing Decisions?’ (1990) 45(5) *Journal of Finance* 1471.

¹¹⁴ MacKie-Mason, above n 113.

¹¹⁵ DeAngelo and Masulis, above n 1; MacKie-Mason, above n 113; Dan Dhaliwal, Robert Trezevant and Shiing-Wu Wang, ‘Taxes, Investment-related Tax Shields and Capital Structure’ (1992) 14(1) *Journal of the American Taxation Association* 1.

¹¹⁶ Dhaliwal, Trezevant and Wang, above n 115; James H Scott, ‘Bankruptcy, Secured Debt, and Optimal Capital Structure’ (1977) 32(1) *Journal of Finance* 1.

¹¹⁷ Robert Trezevant, ‘Debt Financing and Tax Status: Tests of Substitution Effect and The Tax Exhaustion Hypothesis Using Firms’ Responses to The Economic Recovery Act of 1981’ (1992) 47(4) *Journal of Finance* 1557.

interest tax shields.¹¹⁸ The debt substitution effect predicts those corporations will reduce their leverage remarkably once the sufficiency of the NDTs can satisfy their demand for tax savings from aggressive activities.

Schallheim and Wells, in a study focusing on NDTs, propose three reasons why companies may prefer NDTs to debt.¹¹⁹ First, interest payments required for debt servicing make it more costly to engage in debt-related aggressive tax planning than to develop tax strategies using other forms of NDTs.¹²⁰ For that reason, Schallheim and Wells argue that the return per dollar of investment in tax shields sourced from debt is much smaller than the return from NDTs.¹²¹ Second, debt often comes with covenants that can impose high transaction costs, making companies lean towards uses of NDTs rather than debt tax shields.¹²² Third, NDTs often involve exploitation of accounting rules which allow firms to lower taxes without changing the accounting profit figures.¹²³

Apart from those three reasons detailed in Schallheim and Wells' paper, there are other costs associated with utilising debt structure as a tax-aggressive strategy, and those costs are real and significant. Insolvency risk is most likely to increase as debt level goes up. Additionally, highly leveraged structure is often not viewed favourably by debtholders, who may consequently demand higher yields on their lending to compensate for the additional risks. Graham's study in 1996 shows that a company will use less debt financing if it has sufficient amount of NDTs, compared with an identical firm without NDTs.¹²⁴ Once again, the tax exhaustion effect is supported by Graham, who contends that firms experiencing tax exhaustion tend to avoid issuing debt because the interest deductions from debt is 'crowded out' by NDTs.¹²⁵

However, it is possible that different forms of NDTs may have different impacts on leverage. Nejadmalayeri and Singh report that firms with higher depreciation expenses – which are a form of NDTs – are likely to have higher cost of issuing bonds, because such depreciation expenses limit tax benefits from loss carry-forwards and consequently increase cost of debt.¹²⁶ This finding by Nejadmalayeri and Singh suggests loss carry-forwards and depreciation expenses have opposite effects on cost of debt: the former is negatively associated with credit spreads (ie consistent with the debt substitution effect in DeAngelo and Masulis), while the latter is positively associated with cost of borrowings.¹²⁷

¹¹⁸ Dhaliwal, Trezevant and Wang, above n 116; Trezevant, above n 117; Graham and Tucker, above n 5; Lim, above n 53; Lin, Tong and Tucker, above n 63.

¹¹⁹ James Schallheim and Kyle S Wells, 'Debt and Taxes: A New Measure for Non-Debt Tax Shields' (Working Paper, University of Utah, February 2006).

¹²⁰ Ibid.

¹²¹ Ibid.

¹²² Ibid.

¹²³ Ibid.

¹²⁴ Graham, above n 38.

¹²⁵ Ibid.

¹²⁶ Nejadmalayeri and Singh, above n 93.

¹²⁷ Nejadmalayeri and Singh, above n 93; DeAngelo and Masulis, above n 1.

The finding of a positive relation between depreciation expenses and cost of debt is difficult to interpret and appears to be in contrast with the substitution effect of NDTs, which may also exist in the form of depreciation expenses, in accordance with DeAngelo and Masulis (1980) and Dhaliwal et al (1992).¹²⁸ In explaining the results of their research, Nejadmalayeri and Singh argue that the properties of depreciation expenses and tax loss carry-forwards are different, and that any 'tax shields that reduce the efficacy of loss carry provisions should increase the cost of debt'.¹²⁹

Moreover, the magnitude of the debt substitution effect may vary depending on the types of tax sheltering strategies being employed by the firms, according to Lin et al 2014.¹³⁰ In particular, Lin et al show that debt use is more weakly associated with benign tax-aggressive schemes; they argue that tax avoidance strategies must be sufficiently powerful and beneficial to justify a firm's costs of adjustment of their capital structure for tax planning purposes.¹³¹ These researchers argue that the substitution effect is evident in companies that are more heavily involved in tax sheltering, but that this effect is reduced in more benign forms of tax aggressiveness and during financial crisis time.¹³²

Therefore, although previous research that documents a negative relationship between tax aggressiveness and leverage often attributes this result to the NDTs and debt substitution effect (Graham and Tucker 2006; Lim 2011; Richardson et al 2014), there are still questions surrounding this proposition.¹³³ First, we are still unsure about whether the substitution effect varies for different forms of NDTs.¹³⁴ Second, more research is required to ascertain whether different types and degrees of tax avoidance strategies result in different magnitudes of debt substitution effect, as proposed by Lin et al.¹³⁵

C *Debtholders' Concerns About Managerial Rent Extraction*

Shevlin et al, in their study of corporate bonds issued by US firms, report that corporate tax avoidance is positively associated with bond yields.¹³⁶ These authors offer an explanation related to the possibility of wealth expropriation by managers.¹³⁷ They theorise that debtholders have concerns about potential rent extraction activities by managers, since those activities can be performed through obfuscated reporting for purposes of concealing tax sheltering from the tax authorities, as suggested by Desai and Dharmapala.¹³⁸ In respect of these concerns, they suggest that debtholders view large blockholders negatively because they not only have incentive to expropriate resources and tax-aggressive activities but are

¹²⁸ DeAngelo and Masulis, above n 1; Dhaliwal, Trezevant and Wang, above n 116.

¹²⁹ Nejadmalayeri and Singh, above n 93.

¹³⁰ Lin, Tong and Tucker, above n 63.

¹³¹ Ibid.

¹³² Ibid.

¹³³ Graham and Tucker, above n 5; Lim, above n 53; Richardson, Lanis and Leung, above n 89.

¹³⁴ Nejadmalayeri and Singh, above n 93.

¹³⁵ Lin, Tong and Tucker, above n 63.

¹³⁶ Shevlin, Urcan and Vasvari, above n 23.

¹³⁷ Ibid.

¹³⁸ Shevlin, Urcan and Vasvari, above n 23; Desai and Dharmapala, above n 7.

also capable of making it happen.¹³⁹ The debtholders' concerns about managers' rent extraction lead to demand by debtholders for higher return from lending to corporations that engage in tax avoidance.

The 'debtholders' concerns' argument is developed from Desai and Dharmapala's contention that managers may employ opaque financial reporting to facilitate the tax-aggressive activities of the firm.¹⁴⁰ In addition, Desai, Dyck and Zingales suggest that the design of the corporate tax system has certain impacts on the private rent diversion carried out by the company's managers, and that reduction of such diversion activity is the common goal of tax authorities and shareholders.¹⁴¹

However, managerial rent diversion is also argued to be a significant concern to debtholders, especially to holders of public debts who only have access to publicly available information – as opposed to banks or credit rating agencies who can obtain privileged information.¹⁴² This concern appears to be well-founded, because it has been documented by Frank, Lynch and Rego that aggressive tax reporting is accompanied by aggressiveness in financial (book) reporting.¹⁴³ Debtholders' concern about managers' rent extraction becomes more pronounced in firms heavily involved in tax sheltering schemes.

Therefore, besides the proposition of interest deductibility from debt tax shields discussed in Part III(A), managerial rent-diverting activities provide another rationale to support the positive relationship between tax aggressiveness and cost of debt. However, this argument has not taken into account the benefits from tax avoidance activities which can be viewed favourably by debtholders. It is possible that lenders evaluate tax-aggressive schemes as projects that effectively reduce tax liabilities and consequently increase cash flows and net profit position. That favourable view by debtholders may counter their concerns about potential resource expropriation by managers. For that reason, it is possible that the result of increased cost of debt for tax avoiders documented in Shevlin et al reflects that the debtholders' concerns about managerial rent extraction is stronger than their favourable view of cash savings from tax aggressiveness, rather than merely reflecting the additional risk from managers' rent diversion which induce an increase in cost of borrowings.¹⁴⁴

D Uncertainty About Future Cash Flows

Besides the 'debtholders' concerns' argument, Shevlin et al also attribute their finding of a positive relation between tax sheltering and cost of public debt to uncertainty about the firm's future cash flows.¹⁴⁵ The authors argue that tax avoidance leads to lower cash flow levels and higher cash flow volatility in the

¹³⁹ Shevlin, Urcan and Vasvari, above n 23.

¹⁴⁰ Desai and Dharmapala, above n 7.

¹⁴¹ Mihir Desai, Alexander Dyck and Luigi Zingales, 'Theft and Taxes' (2007) 84(3) *Journal of Financial Economics* 591.

¹⁴² Shevlin, Urcan and Vasvari, above n 23.

¹⁴³ Mary M Frank, Luann J Lynch and Sonjae O Rego, 'Tax Reporting Aggressiveness and Its Relation to Aggressive Financial Reporting' (2009) 84(2) *Accounting Review* 467.

¹⁴⁴ Shevlin, Urcan and Vasvari, above n 23.

¹⁴⁵ Ibid.

future, which make bond investors view corporate tax sheltering negatively.¹⁴⁶ Their research finds empirical evidence to support this argument after examining three mechanisms through which tax aggressiveness increases bond yields: future cash flow levels, future cash flow volatility, and information quality.¹⁴⁷

The findings by Shevlin et al highlight the fact that decreased cash flow levels in the future account for one-third of the total effect that tax aggressiveness has on public debt cost, but at the same time report that information quality has a very small impact on the tax aggressiveness–leverage relationship.¹⁴⁸ That is particularly interesting because Balakrishnan, Blouin and Guay find tax avoidance significantly reduces corporate transparency.¹⁴⁹ If Balakrishnan et al are right, then the minor role played by information quality, coupled with the opaque financial reporting found in tax-aggressive corporations (Desai and Dharmapala), might reasonably lead us to expect information quality to play a crucial role in debtholders' negative view about tax avoidance strategies.¹⁵⁰ However, information quality is not found to have a compelling effect in the research by Shevlin et al.¹⁵¹

Similar to concerns about managers' rent extraction, uncertainty about the future cash flows of tax-aggressive companies may be argued to result in debtholders' demands for higher bond yields in order to compensate for the additional risk from lower expected cash flows and for the greater volatility in the firm's liquidity position in the future. However, this argument seems to be in stark contrast with the common notion that debtholders view tax aggressiveness favourably due to the cash savings in tax payments required, which can be economically significant for profitable firms.

For companies in need of cash for research and development and other investment activities, their tax aggressiveness may also be viewed positively by lenders, since these firms are using tax savings to invest in future growth. Hence, although the uncertainty of future cash flows proposed by Shevlin et al is one possible explanation of the positive relation between tax avoidance and cost of debt, the way lenders evaluate corporate tax aggressiveness remains unclear.¹⁵² And the answers might differ from one type of lenders (eg banks) to another (eg public bondholders).

In summary, this article discusses four main propositions advanced by previous researchers to explain the relationship between tax aggressiveness and debt levels (or cost of debt). On the one hand, the proposition concerning interest deductibility from debt tax shields supports the finding of tax avoidance being positively associated with leverage. On the other hand, the NDTs theory, together with the

¹⁴⁶ Ibid.

¹⁴⁷ Ibid.

¹⁴⁸ Ibid.

¹⁴⁹ Karthik Balakrishnan, Jennifer L Blouin and Wayner R Guay, 'Does Tax Aggressiveness Reduce Corporate Transparency?' (Working Paper, University of Pennsylvania, September 2014).

¹⁵⁰ Balakrishnan, Blouin and Guay, above n 149; Desai and Dharmapala, above n 7.

¹⁵¹ Shevlin, Urcan and Vasvari, above n 23.

¹⁵² Ibid.

debt substitution and tax exhaustion effects, provides support for the negative relationship between tax aggressiveness and debt holdings.

In addition, the last two propositions – the debtholders' concerns about managerial rent extraction and the uncertainty about firm's future cash flows – explain the positive association between corporate tax avoidance and cost of debt. Nevertheless, interpretation of the results of prior research using those four propositions (and any others) should take account of a number of factors that could impact on the empirical tests conducted. These factors are discussed in Part IV.

IV ISSUES IN EMPIRICAL TESTS

Conflicting findings and analyses such as those already discussed naturally invites questions about the way the empirical tests were conducted. Differences in the way empirical analysis is performed can give rise to variation in the results, as in the case of the tax aggressiveness–leverage puzzle. This Part discusses four main issues in empirical studies of tax avoidance and leverage: the causal or bi-directional relationship between the two variables, the proxies used for tax aggressiveness, the leverage measures employed, and the endogeneity nature of this relationship.

A Causal or Bi-Directional Relationship Between Tax Aggressiveness and Leverage

In empirical tests of the relation between tax avoidance and debt, most studies which directly examine this relationship model leverage as the dependent variable and corporate tax status as the independent variable (Graham 1996; Graham and Tucker 2006; Lim 2011; Bartholdy et al 2011; Lin et al 2014).¹⁵³ However, it is observed that a number of other studies may use tax aggressiveness as the dependent variable, and include leverage as a regressor in their models (Gupta and Newberry 1997; Richardson and Lanis 2007; Seidman 2010; Lanis and Richardson 2012).¹⁵⁴ It is worth noting that the way the regression model is constructed does not necessarily mean that research using such model assumes a causal relationship in which the dependent variable is a result of variation in the regressor of interest.

Many of the prior tax aggressiveness studies seem to view the relationship between corporate tax avoidance and leverage as a causal relationship in which companies' debt policy changes under the impacts of tax-aggressive activities. For instance, Richardson, Lanis and Leung argue that corporate tax aggressiveness and corporate governance mechanism affect debt financing.¹⁵⁵ In the same vein, Feld, Heckemeyer and Overesch, in their mega-analysis, contend that an increase in marginal tax rate, which implies a lower level of tax aggressiveness, causes an increase in debt ratio.¹⁵⁶

However, some other researchers advocate the idea that the relationship between tax avoidance and debt holdings should be bi-directional. Graham and Tucker take

¹⁵³ Graham, above n 38; Graham and Tucker, above n 5; Lim, above n 53; Bartholdy and Mateus, above n 8; Lin, Tong and Tucker, above n 63.

¹⁵⁴ Gupta and Newberry, above n 8; Richardson and Lanis, above n 35; Seidman, above n 16; Lanis and Richardson, above n 30.

¹⁵⁵ Richardson, Lanis and Leung, above n 77.

¹⁵⁶ Feld, Heckemeyer and Overesch, above n 81.

the perspective that it is difficult to prove the direction of this relationship, as in the case of most corporate finance research, and suggest that the coefficients reported in their study should be interpreted as correlation rather than as causality.¹⁵⁷

In addition, Hasan et al suggest that firms with higher cost of debt have incentives to use alternative ways to fund operations and engaging in tax sheltering is one of the alternatives, making it challenging to conclude about the causal inference in research findings.¹⁵⁸ Hasan et al's view is consistent with the contention by Graham and Tucker, supporting the argument that the association between tax-aggressive strategies and leverage should be a two-way, rather than causal, relationship.¹⁵⁹

Quite often higher leverage is interpreted as higher cost of debt; however, this review does not find a convincing argument to infer a relationship between tax aggressiveness and debt levels from a documented association between tax aggressiveness and cost of debt, and vice versa. For instance, Shevlin et al (2013) contend that they find evidence consistent with the debt substitution effect in Graham and Tucker (2006) and Wilson (2009), who produce results of a negative relation between tax sheltering and leverage.¹⁶⁰ The authors advance the explanation that 'tax avoidance makes borrowing more expensive thus incentivizing the firms to have lower leverage'.¹⁶¹ However, this view is not clearly supported by the findings in Shevlin et al's paper, because what the researchers find is only a positive impact that tax sheltering has on bond yields, not a direct negative relationship between tax sheltering and debt levels.¹⁶²

Although the incentive for tax-aggressive firms to reduce borrowings (or bond rates, in the case of public bonds) is a legitimate and highly likely explanation, this argument might have not captured the complete picture of a firm's capital structure, and there are many other important factors that could alter the firm's decision to increase or decrease their debt levels:¹⁶³ cash flows, liquidity position, bankruptcy costs and agency costs will enter this leverage puzzle. It is possible that the high cost of debt found in the research is a result of a heavily leveraged structure, regardless of whether that structure is related to tax avoidance strategies; therefore, companies may not be able to cut down on their committed borrowings in spite of their awareness of the high interest rates on debts, at least in the short or medium term.

Another possibility is that the firm's engagement in tax avoidance involves uses of debt interest deductibility, and hence high debt ratio (or high amount of debt holdings in general) is part of such a tax-aggressive scheme. This makes it challenging to conclude whether the association between tax aggressiveness and

¹⁵⁷ Graham and Tucker, above n 5.

¹⁵⁸ Hasan et al, above n 18.

¹⁵⁹ Hasan et al, above n 18; Graham and Tucker, above n 5.

¹⁶⁰ Shevlin, Urcan and Vasvari, above n 23; Graham and Tucker, above n 5; Wilson, above n 51.

¹⁶¹ Shevlin, Urcan and Vasvari, above n 23.

¹⁶² Ibid.

¹⁶³ Ibid.

leverage (or cost of debt) is a causal relationship. Most likely this relationship is a two-sided correlation, as suggested by Graham and Tucker.¹⁶⁴

B Proxies for Corporate Tax Status

Since tax avoidance is a sensitive issue to corporations and tax-aggressive activities are not directly observable, prior studies use a number of different measures as a proxy for tax avoidance. There is a possibility that previous mixed findings on the association between tax aggressiveness and leverage are due to the proxies employed in tax-aggressiveness research. Some proxies may capture tax aggressiveness in its broad meaning of 'reduction in tax liabilities', whereas the others may represent tax sheltering at the extreme level of aggressiveness.

First, in tax aggressiveness research, a number of academics use book-tax difference (BTD) as their proxy for corporate tax avoidance (Lim 2011; Richardson, Lanis and Leung 2014; Taylor and Richardson 2014; Lin et al 2014 and so on).¹⁶⁵ Taylor and Richardson in their 2013 paper propose that companies that are successful at avoiding taxes are likely to sustain large difference between book income and taxable income.¹⁶⁶ Meanwhile, Frank et al, in studying corporations' aggressiveness in both financial reporting and tax reporting, suggest that BTD may reflect not only tax-aggressive activities but also earnings management.¹⁶⁷

In order to isolate the component of BTD that is attributable to earnings management, Lim uses discretionary accruals from BTD in his study of tax avoidance by Korean firms.¹⁶⁸ The author suggests that firms avoid tax liability by using both permanent and temporary difference components while managing earnings using mostly temporary difference component.¹⁶⁹ An interesting point in the Korean setting of Lim's study is that the taxable income data of Korean companies are disclosed in the notes to their financial statements, and such disclosure avoids errors arising from estimating taxable income from financial reports, which is an important problem encountered in most US studies.¹⁷⁰

Wilson reported in 2009 that BTD is positively associated with tax sheltering cases, suggesting that BTD could be an appropriate proxy for tax aggressiveness.¹⁷¹ If that is the case, the bias produced from studies using BTD, if any, may not be strong enough to impact the overall results in those papers. Furthermore, Seidman, who examines the interpretation of BTD, adjusts the BTD for three factors: changes in the GAAP, macroeconomic conditions, and earnings management.¹⁷² Seidman finds that BTD adjusted for the GAAP changes can provide a better proxy for tax sheltering in most contexts, although the BTD measure, which is not adjusted for any of the

¹⁶⁴ Graham and Tucker, above n 5.

¹⁶⁵ Lim, above n 53; Richardson, Lanis and Leung, above n 77; Taylor and Richardson, above n 36; Lin, Tong and Tucker, above n 63.

¹⁶⁶ Taylor and Richardson, above n 105.

¹⁶⁷ Frank, Lynch and Rego, above n 143.

¹⁶⁸ Lim, above n 53.

¹⁶⁹ Ibid.

¹⁷⁰ Ibid.

¹⁷¹ Wilson, above n 51.

¹⁷² Seidman, above n 14.

three factors, is generally a reasonable proxy for earnings management.¹⁷³ Overall, it is concluded in Seidman's paper that LTD can be a reasonable proxy for tax avoidance, although care is to be taken when the variable of interest of the research is likely to be affected under macroeconomic conditions.¹⁷⁴

Second, some studies explore MTRs as a measure of corporate tax status (Graham 1996; Graham and Mills 2008; Bartholdy and Mateus 2011; Barclay et al 2013).¹⁷⁵ A firm with lower MTR may be interpreted as successful tax avoidance compared with a higher MTR firm. In Graham's paper, MTR is explicitly calculated, using an expanded version of the method by Shevlin (1990), who simulated MTR while also accounting for carry-forward and carry-back tax opportunities.¹⁷⁶ Graham proposes that the true tax rate to reflect the tax benefit of interest deductibility should be an average of the future expected MTRs and should account for the effects of the total amount of interest deduction available.¹⁷⁷

In another study by Graham and Mills, the research shows that the simulated MTR based on financial statements is highly correlated with the MTR simulated from tax return information, which supports the reasonableness of using book-simulated MTR as a proxy of companies' dynamic tax status.¹⁷⁸ Besides, Graham and Mills provide a summary of suggestions of MTR measures to be used for domestic and international studies.¹⁷⁹ However, since MTR mainly reflects future tax benefits, as discussed by Nejadmalayeri and Singh, MTR may not be a good proxy for tax-aggressive strategies, which are associated with past decisions but lead to the existing leverage structure.¹⁸⁰

Third, ETR is probably the most commonly used proxy for corporate tax aggressiveness (Richardson and Lanis 2007; Dyreng et al 2008; Minnick and Noga 2010; Lanis and Richardson 2012; Lin et al 2014 and so on).¹⁸¹ An ETR value that is lower than the corporate statutory tax rate is a strong indicator that the firm engages in at least some tax-aggressive planning. In spite of its frequent use in tax avoidance studies, there is no consensus about how to compute ETR. In calculating the ETR measure, the numerator is often either the income tax expense recorded in the financial report or the cash taxes paid, whereas the denominator is often a choice between the pre-tax book income or the operating cash flows.

¹⁷³ Ibid.

¹⁷⁴ Ibid.

¹⁷⁵ Graham, above n 38; Graham and Mills, above n 46; Bartholdy and Mateus, above n 8; Barclay, Heitzman and Smith, above n 70.

¹⁷⁶ Graham, above n 38; Terry Shevlin, 'Estimating Corporate Marginal Tax Rates With Asymmetric Tax Treatment of Gains and Losses' (1990) 11(1) *Journal of the American Taxation Association* 51.

¹⁷⁷ Graham, above n 38.

¹⁷⁸ Graham and Mills, above n 46.

¹⁷⁹ Ibid.

¹⁸⁰ Nejadmalayeri and Singh, above n 93.

¹⁸¹ Richardson and Lanis, above n 30; Dyreng, Hanlon and Maydew, above n 13; Kristina Minnick and Tracy Noga, 'Do Corporate Governance Characteristics Influence Tax Management' (2010) 16(5) *Journal of Corporate Finance* 703; Lanis and Richardson, above n 33; Lin, Tong and Tucker, above n 63.

In the research by Richardson and Lanis (2007), two ETR measures are employed for their research: the first proxy ETR1 is the income tax expense divided by the pre-tax book income; the second proxy ETR2 is the ratio of income tax expense over the operating cash flows.¹⁸² Hasan et al compute their cash ETR measure as the cash taxes paid divided by the pre-tax book income less special items.¹⁸³

Dyreng et al prefer cash ETR to book ETR, arguing that cash ETR is not affected by accounting rules, whereas cash taxes paid across all jurisdictions can reflect global tax-aggressive activities in multinational firms.¹⁸⁴ In their study, Dyreng et al calculate the long-run cash ETR over a ten-year period (1995–2004) in order to examine long-run corporate tax avoidance.¹⁸⁵ Some other studies, however, use a shorter period (ie average ETR over five years rather than ten years, as do Minnick and Noga) when analysing long-term tax measures.¹⁸⁶ Nevertheless, ETR is often viewed as a rather static proxy, and an important drawback of using ETR lies in the fact that ETR cannot take into account the interaction between tax advantage of debt and the firm's future profitability.¹⁸⁷

Fourth, recent studies in the US take advantage of the Financial Accounting Standards Board Interpretation No. 48 (referred to as FIN 48), which requires US companies to disclose their tax reserve for uncertain tax positions.¹⁸⁸ The amount of tax reserve reported under FIN 48 disclosure requirement is used as a proxy for tax avoidance activities. A larger reserve generally indicates a highly uncertain tax position due to involvement in aggressive tax planning. Lin et al also use FIN 48 tax reserve as one of the proxies for tax aggressiveness in their research, and find significant association between this measure and leverage.¹⁸⁹ The problem with this proxy is that it depends largely on the level of firms' compliance with the FIN 48 requirement. If corporate aggressiveness in financial reporting is indeed positively correlated to tax-aggressive reporting as documented in Frank et al (2009), FIN 48 reserve may not be a reliable measure to capture firms that are aggressive in both tax and financial reporting.¹⁹⁰

Fifth, some researchers use actual tax shelter cases in the form of dummy variable in their tax avoidance studies (Graham and Tucker 2006; Wilson 2009; Hasan et al 2014).¹⁹¹ For instance, Graham and Tucker examine the under-leverage phenomenon in tax-aggressive firms by analysing 44 actual tax shelters, which are used later on by Wilson, who adds to this sample additional tax avoidance cases identified by himself.¹⁹² In another study of the relation between tax avoidance and bank loan cost, Hasan et al perform two quasi-experimental settings, one of which

¹⁸² Richardson and Lanis, above n 30.

¹⁸³ Hasan et al, above n 18.

¹⁸⁴ Dyreng, Hanlon and Maydew, above n 13.

¹⁸⁵ Ibid.

¹⁸⁶ Minnick and Noga, above n 181.

¹⁸⁷ Feld, Heckemeyer and Overesch, above n 81.

¹⁸⁸ See, eg, Hasan et al, above n 18.

¹⁸⁹ Lin, Tong and Tucker, above n 63.

¹⁹⁰ Frank, Lynch and Rego, above n 143.

¹⁹¹ Graham and Tucker, above n 5; Wilson, above n 51; Hasan et al, above n 18.

¹⁹² Graham and Tucker, above n 5; Wilson, above n 51.

uses tax avoidance news announced to the public, while the other uses FIN 48 disclosure.¹⁹³

Like any other measure of tax aggressiveness, utilising actual tax avoidance cases has both advantages and disadvantages. The advantage of this method is that the sheltering schemes are already identified with a high degree of certainty, and thus there is no need to indirectly infer the propensity for sheltering, such as using BTD or ETR. The disadvantages include the small samples used for observations (eg Graham and Tucker 2006; Wilson 2009) and the inability to generalise the results due to the extreme degree of tax avoidance captured in the sheltering cases that are detected, prosecuted and announced to the public.¹⁹⁴ This comes back to the definition of tax aggressiveness, which generally refers to activities that result in tax liability reduction, whereas the tax shelter cases caught under litigation reflect the higher end of the tax-aggressiveness scale.

This section reviews the five proxies of tax aggressiveness frequently used in the accounting and tax literature: BTD-sourced proxy, MTR, ETR, FIN 48 tax reserve, and actual tax avoidance cases. Further, on the topic of measuring tax avoidance, Hanlon and Heitzman provide a comprehensive discussion in their review of prior tax research in accounting.¹⁹⁵

C Measures of Company Debt Levels and Cost of Debt

Not only measures of corporate tax status but also measures of leverage are likely to cause variation in the previously reported mixed findings in the relationship between tax aggressiveness and debt. As mentioned above, while some studies explicitly test debt holding levels (or debt ratios) and the way they are related to tax avoidance, the others examine the tax aggressiveness and leverage puzzle through cost of debt in the tax-aggressive firms. It is observed that prior literature employs a variety of methods to measure debt; therefore, the previous results that may seem prima facie conflicting are indeed not directly comparable.

First, in respect of using debt holdings as a variable representing a firm's debt structure, a number of issues concern researchers in carrying out the empirical tests. These include the forms of debt holding measure used (ie absolute value or ratio), length to maturity (short-term vs long-term), and differences in debtholder types. For example, Bartholdy and Mateus use three debt measures: short-term bank loans, long-term bank loans, and total bank loans, being the sum of the short-term and long-term loans.¹⁹⁶ Lin et al, among others, employ debt variables in the form of ratios, including: debt to assets ratio, long-term-debt to assets ratio, debt over debt-and-equity ratio, and industry-adjusted leverage ratio.¹⁹⁷ In both examples, length to maturity is an explicit concern when the researchers examine the impact of liabilities of both short and long terms on taxes.

¹⁹³ Hasan et al, above n 18.

¹⁹⁴ Graham and Tucker, above n 5; Wilson, above n 51.

¹⁹⁵ Michelle Hanlon and Shane Heitzman, 'A Review of Tax Research' (2010) 50(2-3) *Journal of Accounting and Economics* 127, 139-46.

¹⁹⁶ Bartholdy and Mateus, above n 8.

¹⁹⁷ Lin, Tong and Tucker, above n 63.

In discussing the potential effects of the different maturities on the results, Feld et al argued:

On the one hand, a smaller tax response of long-term debt can be expected because it can hardly adjust to yearly fluctuations in the tax rate. On the other hand, long-term debt is associated with higher interest deductions relative to short-term debt, containing also trade payables that do not carry any interest deductions.¹⁹⁸

Also, according to Feld et al, long-term debt might be more tax-responsive since tax deductions from interest payments are the main tax advantage of debt over equity.¹⁹⁹

Besides, book and market values of the firm are also taken into account in the computation of debt ratio. In the studies by Graham and Tucker (2006) and Richardson et al (2014), leverage is measured in both forms: (a) debt over book value of total assets, and (b) debt over market value of total assets.²⁰⁰ However, in Nejadmalayeri and Singh's paper, the two measures of debt ratio used by the authors are the ratio of total liabilities to market value of equity, and the ratio of long-term debt to total book value of assets.²⁰¹

Further, Graham, in his 1996 study, focuses his examination on incremental financing by testing changes in debts rather than using debt levels as the leverage variable.²⁰² In addition to examining debt levels as well as changes in debt levels, previous literature in this area also tests the relationship between tax avoidance and cost of debt. The measure for cost of debt varies from study to study, depending on the focus of the authors' analysis. While Ayers et al look at credit rating changes, Hasan et al focus on cost of bank loans.²⁰³ Quite different from these two papers, Dhaliwal et al measure cost of capital by averaging the four cost of capital estimates adopted from previous studies (Gebhart et al (2001), Claus and Thomas (2001), Gode and Mohanram (2003), and Easton (2004)).²⁰⁴

In addition, Shevlin et al, in their study of the association between tax avoidance and public debt cost, highlight the differences between the types of debtholders.²⁰⁵ More specifically, these authors pay attention to corporate bond issues and argue that public lenders only have access to publicly available information, not the private

¹⁹⁸ Feld, Heckemeyer and Overesch, above n 81.

¹⁹⁹ Ibid.

²⁰⁰ Graham and Tucker, above n 5; Richardson, Lanis and Leung, above n 77.

²⁰¹ Nejadmalayeri and Singh, above n 93.

²⁰² Graham, above n 38.

²⁰³ Ayers, Laplante and McGuire, above n 89; Hasan et al, above n 18.

²⁰⁴ Dhaliwal, Lee and Pincus, above n 17; William R Gebhardt, Charles M C Lee and Bhaskaran Swaminathan, 'Toward an Implied Cost of Capital' (2001) 39(1) *Journal of Accounting Research* 135; James Claus and Jacob Thomas, 'Equity Premia as Low as Three Percent? Evidence from Analysts' Earnings Forecasts for Domestic and International Markets' (2001) 56(5) *Journal of Finance* 1629; Dan Gode and Partha Mohanram, 'Inferring the Cost of Capital Using the Ohlson-Juettner Model' (2003) 8(4) *Review of Accounting Studies* 399; Peter D Easton, 'PE Ratios, PEG Ratios, and Estimating the Implied Expected Rate of Return on Equity Capital' (2004) 79(1) *The Accounting Review* 73.

²⁰⁵ Shevlin, Urcan and Vasvari, above n 23.

information about the firms that only credit analysts or banks can gain access to.²⁰⁶ Thus, when contrasting the research focus in Shevlin et al against that in Ayers et al, who study the credit ratings imposed by credit analysts, or the focus in Hasan et al, who analyse loan rates determined by banks, it is worth noting that the results in those studies are not directly comparable.²⁰⁷

This section demonstrates that the wide variety of debt measures used in the literature may partly account for the puzzle observed in the relationship between tax aggressiveness and debt. Section (D) discusses the endogeneity issue in studying this relationship.

D Endogeneity of Corporate Tax Status

Another concern of empirical research on the tax aggressiveness and leverage puzzle is the endogeneity of corporate tax status, because it can influence the reliability of the results reported in prior research. The company tax rate is considered endogenous because when a firm increases its debt financing, taxable income is reduced as a result of interest payments, leading to a reduction in MTR. The more highly leveraged a firm is, the more obvious this reduction in MTR becomes.

Graham et al (1998) document evidence showing that company tax rate is endogenous to financing decisions of the firms and that this endogeneity can potentially result in a spurious relation between corporate tax proxies and measures of debt policy.²⁰⁸ In a discussion on this issue, these researchers contend: 'If not properly addressed, this endogeneity of the tax rate can bias an experiment [...] against finding a positive relation between debt and taxes.'²⁰⁹ The authors conclude that the endogeneity problem can have real, substantial impacts on the interpretation of associations with tax variables reported in previous research.²¹⁰ Additionally, the endogeneity issue may affect all forms of tax proxies, including tax variable based on net operating losses or average tax rate (Graham 2003).²¹¹

This endogeneity issue is addressed in Graham et al (1998) by constructing a measure of a company's MTR based on before-financing taxable income in order to take out the interaction between interest expenses and MTR.²¹² Following this approach, Bartholdy and Mateus compute the MTR variable in their research as before financing (ie using net income before interest deductions instead of net taxable profit after interest).²¹³

²⁰⁶ Ibid.

²⁰⁷ Shevlin, Urcan and Vasvari, above n 23; Ayers, Laplante and McGuire, above n 89; Hasan et al, above n 18.

²⁰⁸ Graham, Lemmon and Schallheim, above n 41.

²⁰⁹ Ibid.

²¹⁰ Ibid.

²¹¹ John R Graham, 'Taxes and Corporate Finance: A Review' (2003) 16(4) *Review of Financial Studies* 1075.

²¹² Graham, Lemmon and Schallheim, above n 41.

²¹³ Bartholdy and Mateus, above n 8.

In a review of research on taxes and corporate finance, Graham (2003) suggests lagging the estimated MTR by one period as another method to account for endogeneity issue (following MacKie-Mason), in addition to using before-financing taxable income.²¹⁴ Richardson et al, in their 2013 study, control for endogeneity by lagging independent variables, as opposed to lagging the MTR variable as suggested by Graham.²¹⁵

In another study of corporate taxes and debt, Gordon and Lee (2001) deal with the endogenous nature of corporate tax rate by employing an instrumental variable which uses average profit rate before interest deductions to correct for any potential bias from endogeneity.²¹⁶ In order to directly address the endogeneity concern of corporate tax avoidance, Hasan et al use instrumental variable two-stage regressions.²¹⁷

In summary, researchers can use a number of methods to account for the endogeneity concern in examining tax-related effects. It is emphasised here that addressing the endogeneity problem is necessary when studying the relationship between tax aggressiveness and leverage. Studies of the puzzle of tax avoidance and debt relationship which do not control for endogeneity must therefore be interpreted with caution, as the potential bias arising from endogeneity can be material.

V CONCLUSION AND SUGGESTIONS FOR FUTURE RESEARCH

The relationship between tax aggressiveness and leverage has been a topic of research to academics in tax, accounting and finance in the last four decades, especially after the discussion of debt, taxes and equilibrium in company's capital structure by Miller (1977).²¹⁸ A review of prior literature on this topic shows that the relationship between tax aggressiveness and leverage remains a puzzle in spite of nearly forty years of research.

There appear to be two lines of conflicting conclusions. The first line reports corporate tax avoidance to be positively associated with debt holdings. The explanations include the interest deductibility from debt tax shields, the debtholders' concerns about rent extraction by managers, and the uncertainty about the firm's future cash flows. The second line reports a negative association between tax-aggressive activities and leverage. A number of researchers attribute this finding to NDTs and the documented effects of debt substitution and tax exhaustion. Besides, some other studies show mixed or insignificant findings in respect of the tax aggressiveness–leverage relationship.

The inconsistent results of research on the association between corporate tax avoidance and debt have puzzled researchers in this area. Since several conflicting propositions and arguments have been offered as explanations of the signs and

²¹⁴ Graham, above n 211; MacKie-Mason, above n 113.

²¹⁵ Richardson, Taylor and Lanis, above n 34; Graham, above n 211.

²¹⁶ Gordon and Lee, above n 3.

²¹⁷ Hasan et al, above n 18.

²¹⁸ Miller, above n 1.

directions of the relation between tax aggressiveness and corporate debt policy, a framework is now needed to systematically tease out the factors that drive this relationship.

This review suggests that four main issues, and some minor others, in large part account for the contrary findings in empirical tests: (1) the causal or bi-directional relationship between tax avoidance and debt; (2) the proxies used for firm's engagement in tax-aggressive activities; (3) the measures of debt levels and cost of debt; and (4) the endogeneity of corporate tax status.

A number of issues contributing to the puzzle of tax aggressiveness and leverage require further examination in future research. First, since many competing theories and arguments support negative and positive relations between tax avoidance and debt, it is crucial to determine which proposition is the most relevant, or has the most dominating effect.

Second, although several previous studies have analysed in depth the tax shields arising from debt interest and the NDTs under the debt substitution and tax exhaustion effects, we are still unsure about whether the substitution effect varies for different forms of NDTs (Nejadmalayeri and Singh 2012).²¹⁹ There is a possibility that different types and degrees of tax avoidance strategies result in different magnitude of debt substitution effect, as suggested in the study by Lin et al.²²⁰ Future research can examine the way each type of tax-aggressive scheme (eg debt restructuring, transfer pricing, use of tax havens, etc.) may relate to the debt substitution effect, and subsequently to the firm's decision on its debt structure.

Third, future research may also attempt to document the association between tax avoidance and debt for each level of tax aggressiveness. For instance, a firm which has an average tax rate 5 per cent below the company statutory tax rate can have different properties in respect of debt structure compared with its counterpart, which has successfully achieved an average tax rate 15 per cent or 20 per cent below the statutory rate.

Fourth, it is important to recognise that while debtholders' concerns about managerial rent extraction and uncertain future cash flows are real in firms that are aggressive in both tax reporting and financial reporting, debtholders may at the same time view tax sheltering favourably, due to the tax savings yielded from tax sheltering. There is potential to employ other research methods, perhaps interviews or surveys, to obtain insights about how debtholders view tax avoidance by corporations. Interviews might be conducted with either the bank managers who make decisions about companies' bank loans, or with senior credit analysts. Surveys can potentially help researchers understand how the general public perceives the tax-aggressive activities by companies, and what level of risks (returns) is accepted (demanded). When traditional archival research consistently reports mixed findings, research using qualitative methods or mixed methods can provide opportunities to explore the inconsistency in previous findings and to triangulate the new results.

²¹⁹ Nejadmalayeri and Singh, above n 93.

²²⁰ Lin, Tong and Tucker, above n 63.

Fifth, agency cost in tax is another aspect that may impact the association between tax avoidance and leverage, and CEOs, when making decisions about level of tax aggressiveness as well as the debt structure of firms, will take into consideration not only the real and perceived benefits to shareholders but also their personal interests. Thus, future research can make further inquiries into how CEOs make decisions about tax aggressiveness and leverage structure by using interviews, surveys or a combination of both. As an example, Lavermicocca and McKerchar (2013) previously conducted interviews with tax managers and directors in large Australian companies, followed by surveys, in their study of tax compliance behaviour of large corporations.²²¹ Mixed methodology can meaningfully inform researchers in these areas.

Finally, heavy use of debt is often associated with a company's risk of insolvency, which becomes higher when the economy experiences a financial crisis. Nejadmalayeri and Singh, in their US study of company taxes and cost of debt, observe that during the global financial crisis (GFC) large losses had greater impact on reduction in credit spread (ie lower cost of debt) through tax subsidies.²²² Future studies can potentially provide further insights into the relationship between tax avoidance and leverage by examining this relationship not only during stable macroeconomic environments but also during an economic downturn, with the GFC being a good setting for this experiment.

²²¹ Catriona Lavermicocca and Margaret McKerchar, 'The Impact of Managing Tax Risk on the Tax Compliance Behaviour of Large Australian Companies' (2013) 28(4) *Australian Tax Forum* 707.

²²² Nejadmalayeri and Singh, above n 93.

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