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What's BEPS got to do with it? Exploring the effectiveness of thin capitalisation rules

Ann Kayis-Kumar[1]

Abstract

In October 2015, the OECD made a best practice recommendation in Action 4 of its BEPS project, suggesting a Fixed Ratio Rule in place of thin capitalisation rules. This review was almost 3 decades in the making, with the most recent OECD report on thin capitalisation rules published in 1986, which omitted guidance on how these rules could best be designed.

Thin capitalisation rules' strong emphasis on revenue base protection has resulted in their exponentially increasing popularity internationally since the 1960s. However, there is a growing body of literature critiquing the effectiveness of thin capitalisation rules. Accordingly, this paper approaches the issue of thin capitalisation from a novel perspective by conceptualising the cross-border debt bias as the 'disease' and thin capitalisation as merely the 'symptom'. Grounded in the tax principle of efficiency, the overarching question guiding this paper is whether, given the opportunity to start over, the tax-induced cross-border debt bias would be better addressed by retaining thin capitalisation rules in their current form or whether an alternative reform would be more suited to dealing with this 'disease'.

The optimisation model developed in this paper shows that the OECD's Fixed Ratio Rule is more effective than the current regime of thin capitalisation rules at protecting the tax revenue base from the most tax-aggressive multinational enterprises (MNEs). However, the model also indicates that it is ultimately more effective to align the tax treatment of intercompany funding to eliminate the 'underlying disease' (the tax incentive for thin capitalisation), rather than adopting rules that mitigate the 'symptom' (such as the OECD's Fixed Ratio Rule).

This research presents a unique contribution to the literature by simulating complex cross-border intercompany tax planning strategies. This facilitates a formal analysis of one of the most significant challenges presented by the mobility and fungibility of capital; namely, anticipating how an MNE structures its internal affairs in a tax-optimal manner given the current tax regime and suggesting tax administrative responses to BEPS accordingly.

Keywords: Corporate Taxes; BEPS; Tax Competition; Mathematical Programming; Optimisation

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1. INTRODUCTION

For nearly a century, tax authorities have been developing international principles for tax treaties in attempts to address the problem of international tax coordination, with their focus evolving into designing international principles to prevent both the double taxation and double non-taxation of MNE income.[2]

In October 2015, the OECD made a best practice recommendation in Action 4 of its BEPS project, suggesting a Fixed Ratio Rule in place of thin capitalisation rules. This review was almost 3 decades in the making, with the most recent OECD report on thin capitalisation rules published in 1986,[3] which omitted guidance on how these rules could best be designed.[4]

In response to whether the Australian Government has actioned the OECD's BEPS Recommendation on Action 4, the Treasury noted that: 'Australia has already tightened its Thin Capitalisation rules'.[5] However, this position is contrary to commentary from both practitioners[6] and academics,[7] who note that tightening the safe harbour rule should not be conflated with strengthening the overall effectiveness of the thin capitalisation regime and, in turn, the ability of a jurisdiction to protect its tax revenue base.

While the OECD makes a distinction between combating BEPS and reducing distortions between the tax treatment of debt and equity,[8] it is clear that both the OECD's BEPS project and the thin capitalisation rules' raisons d'être is primarily concerned with protecting national tax revenue bases. However, it is the decision of

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[2] 'The issue of international tax coordination has often been seen mainly as a problem of alleviating double taxation. This problem arises because most countries insist on their right to tax all income originating within their borders as well as all income earned by their residents. However, since some countries have found it in their interest to play the role of "tax havens", the international tax coordination problem may often be one of preventing tax evasion rather than a problem of double taxation': PB Sørensen, 'Issues in the Theory of International Tax Coordination' (Bank of Finland Discussion Papers No 4/90, 20 February 1990), 7–8.

[3] OECD, *Report on 'Thin Capitalisation'* (OECD 1986), adopted by the OECD Committee on Fiscal Affairs on 26 November 1986 (the 'Thin Capitalisation Report'); Similarly, the OECD's survey of thin capitalisation regimes currently remains in draft form only, with no indication of when it will be finalised: OECD, *Thin Capitalisation Legislation: A Background Paper For Country Tax Administrations*, (draft paper), <http://www.oecd.org/ctp/tax-global/5.%20Thin_Capitalization_Background.pdf>.

[4] E. Traversa E, 'Interest Deductibility and the BEPS Action Plan: Nihil Novi Sub Sole?' [2013] 5 *British Tax Review* 607.

[5] Department of the Treasury (Cth), 'OECD Report Supports Australian Government Action on Multinational Tax Avoidance' (Media Release, 6 October 2015) <http://sjm.ministers.treasury.gov.au/media-release/003-2015/>.

[6] J Dunne et al., *Limiting Base Erosion Via Interest Deductions—OECD finalises BEPS Action 4* (MinterEllison Alert, 12 October 2015) <http://www.minterellison.com/publications/minterellison-alert-limiting-base-erosion-via-interest-deductions-oecd-finalises-beps-action-410122015/>.

[7] A Joseph, 'Discussion Paper on Arm's Length Debt Test' (2014) 21(3) *International Transfer Pricing Journal* 177, 177–78; see further: 'With the expectation that most businesses would turn to the arm' s length debt test now that the thin capitalization safe harbours are due to become tighter on 1 July 2014, the Discussion Paper suggests that the arm' s length debt test may have to be limited in its application … The Discussion Paper also suggests consideration of introducing further safe harbour tests on earnings such as EBITDA, so that businesses need not resort to using the arm's length debt test … Finally, unlike under transfer pricing rules, thin capitalization rules do not allow consideration of related-party credit support when determining the arm' s length debt amount', 179.

[8] OECD, *BEPS Action 4: Interest Deductions and Other Financial Payments* (Final Report, 5 October 2015), 47.

the revenue authorities to create a cross-border tax-induced debt bias which actually results in said tax base erosion.[9]

The current international tax framework incentivises the location of expenses in higher-tax jurisdictions and income in low- or no-tax jurisdictions as it can result in significant tax minimisation. Multinational enterprises (MNEs) can shift expenses to, and income from, source countries to minimise tax payable with relative ease.[10] This is a particularly pressing issue for small, open economies such as Australia and New Zealand, which are net capital importers of capital. This can be achieved by interposing subsidiaries in low-tax jurisdictions such as Ireland or the Netherlands, and then utilise tax treaties to shift income onto tax havens such as Bermuda or the British Virgin Islands,[11] where profits can be stored for years. This is further exacerbated by the plethora of jurisdictions for MNEs to choose from, many of which are engaged in a 'race to the bottom' on corporate income tax rates. Of course, broader based corporate taxes with lower rates promote efficiency, investment and growth. However, if governments narrow their tax bases to attract the rerouting of flows of capital through, rather than to, their economies then this risks exiting the realm of productive competition and instead may result in harmful tax competition.

Given that cross-border intercompany transactions account for more than 60 per cent of global trade in terms of value,[12] remain largely absent from a group's consolidated accounts (and therefore beyond public scrutiny), and can be readily determined by corporate treasury centres,[13] there is an urgent imperative for a strong conceptual basis in the tax treatment of cross-border intercompany transactions, grounded in the tax principle of efficiency.

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[9] D Hanlon, 'Thin Capitalisation Legislation and the Australia/United States Double Tax Convention: Can They Work Together?' (2000) 3(1) *Journal of Australian Taxation* 4.

[10] 'the relative ease with which MNE groups can allocate capital to lowly taxed minimal functional entities (MFEs). This capital can then be invested in assets used within the MNE group, creating base eroding payments to these MFEs.': see further, OECD, *Public Discussion Draft, BEPS Action 8, 9 and 10: Discussion draft on revisions to Chapter I of the Transfer Pricing Guidelines (Including Risk, Recharacterisation and Special Measures)*, 1 December 2014–6 February 2015, 38. For completeness, residence issues are beyond the scope of this paper.

[11] Somewhat relevantly, one of the British Virgin Islands is reputedly the model for Stevenson's 'Treasure Island'. More recently, the 'Panama Papers' exemplify the scale and scope of these structures: see further, Chittum R and Boland-Rudder B, 'Investigations, Protest, and Call For Election in Iceland as World Responds to Panama Papers', *The International Consortium of Investigative Journalists* (5 April 2015<https://panamapapers.icij.org/blog/20160405-global-response.html>.

[12] ICC Commission on Taxation and the ICC Committee on Customs and Trade Regulations, *Transfer Pricing and Customs Value*, Policy Statement, Document No. 180/103–6–521, (February 2012) 2.

[13] This is exemplified in the following extract from *Chevron Australia Holdings Pty Ltd v Federal Commissioner of Taxation (No 4)* [2015] FCA 1092, [152]–[155]:

> Ms Taherian accepted, by reference to an email dated 19 November 2002 from Mr Lewis, on which she was copied, that she was told that the profit in CFC from the interest rate margin within CFC, being a reference to the interest expense and the interest derived, would not be subject to tax either in the United States or in Australia … She agreed that one of ChevronTexaco's key objectives was to maximise sustainable leverage. She also agreed that an objective was to repatriate cash to the United States: a general goal, as corporate treasury, was to centralise cash holdings in the United States because it was more efficient … She also agreed that the effect of not granting security was to make the interest rate on a loan higher rather than lower … She said in general no Chevron intercompany loans had CVX guarantees and agreed there would not be any need to guarantee an inter-company loan:

The overarching question guiding this paper is whether, given the opportunity to start over, the tax-induced cross-border debt bias would be better addressed by retaining thin capitalisation rules in their current form or whether an alternative reform would be more suited to dealing with this 'disease'. Accordingly, the concept of the tax-induced cross-border 'funding bias' developed by the author is explored in section 2.

Section 3 begins by observing that linear programming using optimisation modelling is a relatively underutilised technique in analysing MNEs potential behavioural responses to international tax laws and proposed reforms. In particular, this section explores the literature on whether optimisation modelling is suitable in the context of international tax planning by an MNE.

Section 4 of this paper introduces and explores the optimisation model, specifically: developing the objective function; defining and applying constraints; and overlaying additional parameters in Section 4.3.

Section 5 presents the results of modelling the following four variations: first, Australia's tightening of the safe harbour ratio from 3:1 to 1.5:1, which the Federal Treasury has noted constitutes an adequate response to the OECD's BEPS recommendation. Second, Section 5.2 presents the results of simulating the unilateral implementation by Australia of the OECD's BEPS recommendation for a fixed ratio rule operating at 30 per cent of Earnings Before Interest, Taxes, Depreciation and Amortisation (EBITDA). Third, Section 5.3 presents the multilateral implementation of the OECD's BEPS recommendation. Fourth, this paper proposes an 'extended thin capitalisation rule' as an alternative reform, the results of which are presented in Section 5.4. This proposal constitutes the first of three reform proposals developed by the author.

Finally, Section 6 summarises the findings of this paper and includes areas for further research.

2. ADDRESSING THE TAX-INDUCED CROSS-BORDER 'FUNDING BIAS'

Integrity rules that deal with charactering and taxing 'passive' income are general considered to include, inter alia, controlled foreign company (CFC), foreign investment fund (FIF), transfer pricing and thin capitalisation rules. However, as observed by Devereux and Vella, the allocation of primary taxing rights between 'active' and 'passive' income is ill-suited to dealing with modern MNE operations, particularly in the intercompany setting. This results in 'a system which is easily manipulated, distortive, often incoherent and unprincipled'.[14]

More specifically, in the context of thin capitalisation rules, which is the focus of this paper, '[t]here is no historical evidence that the OEEC gave any attention to thin capitalization when working on the dividend or interest articles'.[15]

[14] M Devereux and J Vella, 'Double Trouble: Why Landmark OECD Tax Reform is Doomed Before it Starts', *The Conversation* (5 October 2015), <https://theconversation.com/double-trouble-why-landmark-oecd-tax-reform-is-doomed-before-it-starts-48115>.

[15] JF Avery Jones et al., 'The Definitions of Dividends and Interest in the OECD Model: Something Lost in Translation?' (2009) 1(1) *World Tax Journal* 5, 27.

In the economic literature analysing intercompany funding distortions, much attention has been directed towards the debt bias.[16] Given their focus on restricting debt deductions, there a general assumption in the literature that thin capitalisation rules are an effective anti-avoidance measure that eliminates the debt bias. This is exemplified in statements from policymakers such as the Board of Taxation, who have observed,'… thin capitalisation rules address this "debt bias' by limiting the allowable level of debt deductions for the taxpayer's borrowings based on the level of debt'.[17]

The perceived effectiveness of thin capitalisation rules is similarly reflected in empirical studies by commentators such as Buettner et al.[18] and Blouin et al.[19] suggesting that thin capitalisation rules remove tax incentives related to debt financing. Key commentators such as Weichenrieder and Windischbauer,[20] Overesch and Wamser,[21] Wamser,[22] and Ruf and Schindler[23] form part of a substantial body of empirical analysis, in particular in the context of the German thin capitalisation rules, consistently finding that thin capitalisation rules are effective in reducing the debt-to-asset ratio of MNEs. The inference has been that thin capitalisation rules are therefore effective.

However, it is important not to conflate reducing debt-to-asset ratios of MNEs with eliminating the debt bias. As highlighted by Weichenrieder and Windischbauer[24] and noted by Ruf and Schindler,[25] the ostensible effectiveness of thin capitalisation rules could also be explained by the fact that MNEs may utilise loopholes in regulations allowing them to bypass thin capitalisation rules and leading to the false impression that the reform has been very effective. However, it is also necessary to acknowledge the two-fold limitations of this analysis: first, Weichenrieder and Windischbauer[26] focussed on the German context; and second, the thin capitalisation regime analysed (which utilised a safe harbour debt/equity ratio of 3:1) has since been replaced by the so-called 'interest ceiling rules' ('Zinsschranke') which restrict interest relief based on an EBITDA ratio.

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[16] See, for example, RA De Mooij, *Tax Biases to Debt Finance: Assessing the Problem, Finding Solutions* (IMF Staff Discussion Note SDN/11/11, 3 May 2011); IMF Fiscal Affairs Department, *Debt Bias and Other Distortions: Crisis-related Issues in Tax Policy* International Monetary Fund Study (12 June 2009); PH Blessing, 'The Debt-Equity Conundrum—A Prequel' (2012) 66(4–5) *Bulletin for International Taxation* 198.

[17] Board of Taxation (Cth) *Review of the Thin Capitalisation Arm's Length Debt Test: A Report to the Assistant Treasurer* (December 2014), 5.

[18] T Buettner, M Overesch, U Schreiber and G Wamser, 'The Impact of Thin-Capitalization Rules on the Capital Structure of Multinational Firms' (2012) 96 *Journal of Public Economics* 930.

[19] J Blouin, H Huizinga, L Laeven and G Nicodème, 'Thin Capitalization Rules and Multinational Firm Capital Structure' (IMF Working Paper WP/14/12, January 2014).

[20] AJ Weichenrieder and H Windischbauer, 'Thin-capitalization Rules and Company Responses—Experience From German Legislation' (CESifo Working Paper Series No 2456, CESifo Group Munich, November 2008).

[21] M Overesch and G Wamser, 'Corporate Tax Planning and Thin -capitalization Rules: Evidence From a Quasi-experiment' (2010) 42 *Applied Economics* 563.

[22] G Wamser, 'The Impact of Thin-capitalization Rules on External Debt Usage—A Propensity Score Matching Approach' (2014) 76(5) *Oxford Bulletin of Economics & Statistics* 764.

[23] M Ruf and D Schindler, 'Debt Shifting and Thin-Capitalization Rules—German Experience and Alternative Approaches' (2015) 1 *Nordic Tax Journal* 17.

[24] Weichenrieder and Windischbauer ,above n 20.

[25] Ruf and Schindler, above n 23.

[26] Weichenrieder and Windischbauer, above n 20, 3.

A significant gap in the literature is that thin capitalisation rules' impact on tax planning has only been analysed on a piecemeal basis, and studies have not yet adequately considered the impact of thin capitalisation rules on MNEs' investment decisions. Notably, Ruf and Schindler observe that there are '… too few empirical studies investigating the effect of thin capitalisation rules on investment'.[27] Similarly, Merlo, Riedel and Wamser noted, 'the question of how thin capitalisation rules are related to real investment activities of MNEs has been widely neglected in the literature'.[28]

However, investments by an MNE can be grouped as either real or 'pure paper'. In this context, despite the literature already analysing the isolated impacts of 'pure paper' profit shifting induced by international tax differences,[29] the literature has not yet focussed on the behavioural responses induced by thin capitalisation rules on MNEs 'pure paper' investment decisions. This analysis would likely form a key litmus test of whether a particular reform eliminates or encourages distortions between debt and equity financing.

Further, there is little emphasis on eliminating distortions in the tax treatment of cross-border intercompany passive income.[30] This paper posits that an unequal tax treatment of passive income involving certain categories of otherwise fungible intercompany debt and equity financing, licensing and finance leasing activities, can distort economic choices about commercial activities and encourage tax planning behaviours.

The reasoning for this is two-fold; first, intercompany dealings are fungible and mobile.[31] Second, a parent company would likely be neutral to these different funding options[32] particularly if they constitute purely financing activities that are determined and allocated by corporate treasury centres and eliminated on consolidation for accounting purposes.[33]

An underlying assumption in this paper is that as long as an MNEs can benefit from tax planning opportunities presented by existing rules including, inter alia, the arm's length standard, thin capitalisation rules, debt/equity rules, withholding taxes and

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[27] Ruf and Schindler, above n 23,18.

[28] V Merlo, N Riedel and G Wamser, 'The Impact of Thin Capitalization Rules on the Location of Multinational Firms' Foreign Affiliates' (CESifo Working Paper Series No 5449, CESifo Category 1: Public Finance, July 2015), 2.

[29] JH Heckemeyer and M Overesch, 'Multinationals' Profit Response to Tax Differentials: Effect Size and Shifting Channels' (ZEW Discussion Paper No 13–045, July 2013), 13.

[30] See further, A Kayis-Kumar, 'Taxing Cross-border Intercompany Transactions: Are Financing Activities Fungible?' (2015) 30(3) *Australian Tax Forum* 627–61; A Kayis-Kumar, 'Thin Capitalisation Rules: A Second-best Solution to the Cross-border Debt Bias?' (2015) 30(2) *Australian Tax Forum* 299–355.

[31] For completeness, the OECD defines financial payments economically equivalent to interest as 'those which are linked to the financing of an entity and are determined by applying a fixed or variable percentage to an actual or notional principal over time': OECD, *BEPS Action 4: Interest Deductions and Other Financial Payments*' (Final Report, 5 October 2015), 17.

[32] C Burnett, 'Intra-Group Debt at the Crossroads: Stand-Alone versus Worldwide Approach' (2014) 6(1) *World Tax Journal* 40, 45, 64.

[33] For example, a leading US consulting company recently advised that 'multinationals corporations need to view the intercompany payments as part of its cash repatriation strategy': PG Chen, 'Intercompany Payments Between Multinational Corporations and Their Affiliated Companies in China', in Charles River Associates, 'Insights: Transfer Pricing', 11.

foreign tax relief, there is a tax incentive to adjust its behaviour to maximise overall deductions in higher-tax jurisdictions to minimise the group-wide tax liability and, in turn, the overall net profit after tax.

The author recognises that not all MNEs will fall within this category in practice. Accordingly, this study is only concerned with MNEs that are responsive to cross-border tax-induced distortions.

Assuming that MNEs which exhibit tax planning behaviour make tax decisions as a global group with the objective of minimising total tax payable worldwide. Such tax planning is generally encouraged by tax professionals [34] and is statutorily, administratively and judicially condoned.[35] In other words, such an MNE is 'tax-minimising', albeit with varying degrees of aggressiveness.

Accordingly, the behaviourally distortive effects of existing and proposed tax rules relating to cross-border intercompany activities are of primary concern in this study. Specifically, the focus of this paper is on MNE's cross-border intercompany transactions relating to passive or highly mobile income; specifically how tax distortions affect MNE decisions on the funding mix between intercompany financing, licensing and finance leasing activities.

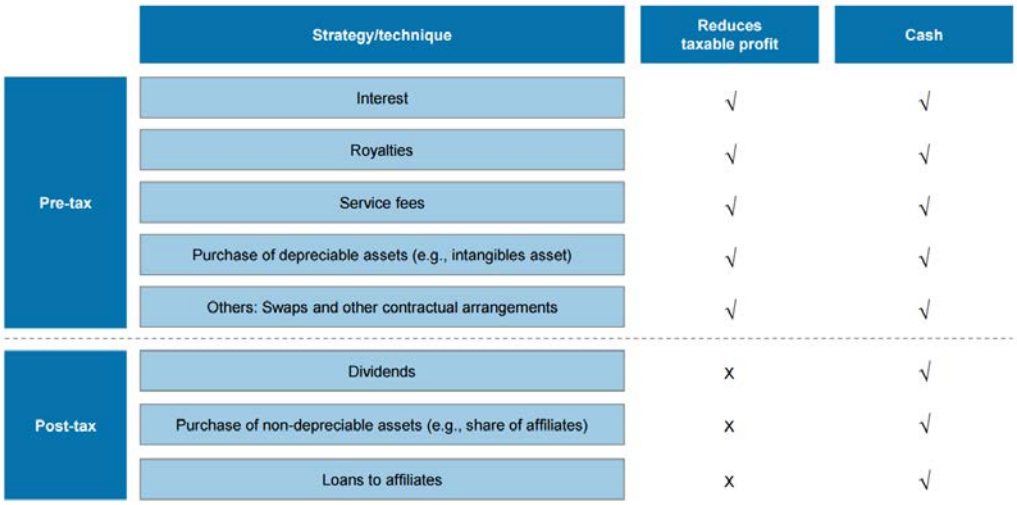
As such, this paper proposes restricting the tax deductibility of these otherwise fungible cross-border intercompany financing payments.[36] For completeness, other categories of intercompany payments also exist which may be included within the scope of the funding bias in future research. An analytical framework for this broader category of intercompany payments is extracted in Figure 1 below.

[34] TP Seto, 'Four Principles of Optimal Tax System Design' (Legal Studies Paper No 2008–36, Loyola Law School, March 2013), 10–11.

[35] 'Any one may so arrange his affairs that his taxes shall be as low as possible; he is not bound to choose that pattern which will best pay the Treasury; there is not even a patriotic duty to increase one's taxes': *Helvering v. Gregory*, 69 F.2d 809, 810 (2d Cir. 1934), aff'd, 293 U.S. 465 (1935) (Hand J). In so stating, Judge Hand was reflecting on the appropriate role of judges in enforcing existing law, not on principles of sound tax design.

[36] This paper builds on earlier work by the author, see A Kayis-Kumar A, 'A Multinational Multiverse: Simulating Tax-optimal Intercompany Funding Structures' (Paper presented at the 28th Australasian Tax Teachers' Association Conference, Sydney: UNSW Business School, 20 January 2016); Kayis-Kumar, above n 30.

Figure 1: Various types of intercompany payments



Perhaps the most controversial aspect of the funding bias concept is that royalties are fungible. However, this paper does not suggest that all intercompany royalties are equivalent and fungible with other financing activities. Rather, the scope is limited to some categories of licenses or royalty financing ostensibly similar in their capacity to provide access to an underlying asset with the ability to provide a revenue stream (termed 'royalties') but not dissimilar in operation to intercompany debt or equity financing or a finance lease.

It is noteworthy that, as observed by Vann, '[h]istorically, excess royalties were assumed by some OEEC delegates to be classified as dividends but it was decided to leave the question to domestic law'.[37] At a theoretical level, Benshalom provides an analysis on the fungibility of these intercompany financing activities, observing that 'almost every type of tax reduction plan that uses affiliated financial transactions could be executed via other types of affiliated transactions'.[38] The fungibility and mobility of these intercompany financial flows means that attempts to allocate ownership to any one entity within an MNE is an arbitrary exercise.[39] However, Benshalom's research is limited to separately and distinctly analysing the taxation of intercompany financing[40] and licensing, briefly mentioning leasing activities but distinguishing them as separate from financing transactions,[41] despite acknowledging that 'it is impossible to draw a perfect line between financial transactions and non-

[37] R Vann, 'The History of Royalties in Tax Treaties 1921–61: Why?' in JF Avery Jones, P Harris and D Oliver (eds), *Comparative Perspectives on Revenue Law* (Cambridge University Press, 2008), 166, 186 and 193; see further, JF Avery Jones et al., 'The Definitions of Dividends and Interest in the OECD Model: Something Lost in Translation?' (2009) 1(1) *World Tax Journal* 5, 36.

[38] I Benshalom, 'The Quest to Tax Financial Income in a Global Economy: Emerging to an Allocation Phase' (2008) 28 *Virginia Tax Review* 165, 193–95; see also I Benshalom, 'Taxing the Financial Income of Multinational Enterprises by Employing a Hybrid Formulary and Arm's Length Allocation Method' (2009) 28 *Virginia Tax Review* 619.

[39] I Benshalom, 'Taxing the Financial Income of Multinational Enterprises by Employing a Hybrid Formulary and Arm's Length Allocation Method' (2009) 28 *Virginia Tax Review* 619, 660–61.

[40] Benshalom I,above n 38; see also, Benshalom, above n 39, 647.

[41] Ibid, 647.

financial transactions … affiliated leasing transactions could replicate the consequences of related lending'.[42] Nonetheless, Benshalom observes that the mobility of intercompany activities erodes the source jurisdiction's tax base from both the perspective of intangible and tangible manufacturing and merchandise activities.[43]

So, while the literature implicitly contains support for the proposition that cross-border intercompany financing, licensing and finance leasing activities are fungible, there is very little literature that directly studies the taxation implications of this observation. This is also typified in practice. However, there is some guidance from, for example, the US Treasury which defined a 'financing arrangement' as:

> as a series of transactions by which one person (the financing entity) advances money or other property, or grants rights to use property, and another person (the financed entity) receives money or other property, or the right to use property, if the advance and receipt are effected through one or more other persons (intermediate entities) and there are financing transactions linking the financing entity, each of the intermediate entities, and the financed entity.[44]

Similarly, the term 'financing transaction' was defined to include:

> any other advance of money or property pursuant to which the transferee is obligated to repay or return a substantial portion of the money or other property advanced or the equivalent in value.[45]

The following sections explore whether adopting this characterisation in the design of thin capitalisation rules would constitute a valuable step in equalising the playing field between MNEs and tax authorities. On one hand, MNEs are largely indifferent to the structuring of their internal financial flows because these are fungible and mobile with no substantial economic cost. In contrast, tax authorities generally do not have adequate resources to audit the increasing volumes of intercompany activities. Administrative complexity is further exacerbated by the arm's length standard requirement of finding the proper market comparables of specifically tailored financial flows.[46]

3. APPLYING OPTIMISATION MODELLING TO INTERNATIONAL TAX PLANNING PROBLEMS

As observed by Markle and Shackelford:

> We cannot observe how a firm structures its internal affairs in a tax-optimal manner. For example, we can observe firms' using leverage to lower their

[42] Ibid, 642.

[43] Ibid, 647.

[44] On August 10, 1993, US Congress enacted section 7701(1) of the Internal Revenue Code; Section 1.881–3(a)(2) of the final regulations provides definitions of certain terms used throughout the regulations; see further, <http://www.irs.gov/pub/irs-regs/td8611.txt; see further, DM Ring, 'Risk-Shifting Within a Multinational Corporation: The Incoherence of the U.S. Tax Regime' (1997) 4(4) *Boston College Law Review* 667, 712

[45] Ibid.

[46] I Benshalom, above n 38; see also, Benshalom, above n 39.

> global tax liabilities through external debt financing, but we cannot observe their using internal debt to generate interest deductions in high-tax countries and interest income in low-tax countries … intrafirm transactions are nontrivial and may even exceed the avoidance opportunities with third parties.[47]

In the absence of a requirement to fully disclose their intercompany transactions in financial statements, cross-referencing the information reported to taxing authorities and reported in financial statements is a highly challenging task.[48] Further, if a subsidiary is a private company it does not even need to disclose comprehensive financial statements in the source jurisdiction.[49] Accordingly, this presents a gap in the literature.

Generally, quantitative evaluations are conducted utilising regression based evaluation methods and general equilibrium modelling. For example, there is a growing theoretical literature on the relationship between tax planning and investment locations, and its implications for tax policies.[50] There is also a rich literature which utilises empirical data in this context, extensively considering the relationship between MNE leverage and taxation with US, Canadian and European Union (particularly German) data.[51]

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[47] KS Markle and DA Shackelford, 'Cross-Country Comparisons of the Effects of Leverage, Intangible Assets, and Tax Havens on Corporate Income Taxes' (2012) 65 *Tax Law Review* 415, 417-432.

[48] Commentators such as De Simone and Stomberg observe that '[f]inancial reporting for income taxes is so complex that even sophisticated financial statement users often ignore detailed tax disclosures' and 'taxation is often viewed by the market as beyond meaningful analysis': De Simone L and Stomberg B, 'Do Investors Differentially Value Tax Avoidance of Income Mobile Firms?' (Working Paper, University of Texas at Austin, June 2012), 2. Consolidated accounts undergo intercompany eliminations so are not helpful in this regard. While some MNEs provide some detail regarding their intercompany transactions in their segment reports, this is not a requirement across the board. See further, 'this large shift in pre-tax income without any corresponding change in revenues suggests the presence of significant intercompany payments—likely royalty payments attributable to the transfer of intellectual property into Ireland': K Balakrishnan, J Blouin and W Guay, 'Does Tax Aggressiveness Reduce Financial Reporting Transparency?' (Working Paper, Wharton School, University of Pennsylvania, 20 September 2011), 29.

[49] For example, in the financial year ending 2014, Google Australia Pty Ltd's disclosure omitted itemising over $35 million in expenses from its financial statement and the corresponding notes, not even categorising these expenses as 'COGS' and/or 'Other expenses'. Further, Google Australia Pty Ltd's intercompany financing activities were presumably classified as 'operating' activities, as the 'financing' section of the cash flow statement was entirely blank, with no details afforded in the notes.

[50] Q Hong and M Smart, 'In Praise of Tax Havens: International Tax Planning and Foreign Direct Investment' (2010) 54(1) *European Economic Review* 82; see references cited therein, including: H Grubert and J Slemrod, 'The Effect of Taxes on Investment and Income Shifting to Puerto Rico' (1998) 80 *Review of Economics and Statistics*, 365–73; A Haufler and G Schjelderup, 'Corporate Tax Systems and Cross-country Profit Shifting' (2000) 52 *Oxford Economic Papers*, 306–25; J Mintz and M Smart M, 'Income Shifting, Investment, and Tax Competition: Theory and Evidence from Provincial Taxation in Canada' (2004) 88 *Journal of Public Economics* 1149–168; S Bucovetsky and A Haufler, Tax Competition When Firms Choose Their Organizational Form: Should Tax Loopholes For Multinationals Be Closed? (Technical Report 1625, CESifo, 2005); J Slemrod and JD Wilson, 'Tax Competition with Parasitic Tax Havens' (Technical Report, University of Michigan 2006).

[51] Substantial literature review by H Huizing, L Laeven and G Nicodème, 'Capital Structure and International Debt Shifting' (Economic Paper No 263, European Economy, December 2006), 3; see further references cited therein.

Substantially less developed is the literature on the effect of taxation on leverage in a multilateral context, with 'nxn countries'.[52] Huizinga, Laeven and Nicodème present the primary exploration of whether MNEs make multilateral capital structure decisions based on the tax rates faced by various subsidiaries. Under their model, the MNE's objective is to maximize its overall firm value.[53]

Even less attention has been directed to economic modelling frameworks beyond general equilibrium modelling. While many types of mathematical models can be utilised in practice to solve 'real-world' problems,[54] the focus of this research is optimisation modelling. Optimisation modelling using linear programming remains largely unexplored in the context of anticipating MNE behaviour; specifically, observing how an MNE may structure its internal affairs in a tax-optimal manner.

This is particularly surprising because some literature does exist suggesting that international tax planning decisions can be approximated as linear programming problems. Specifically, only two papers have been authored in this area: first, Brada and Buus, and second, Vasarhelyi and Moon. Each are briefly summarised below.

Brada and Buus focus on cross-border intercompany transfer pricing issues; specifically, whether it is possible to identify subsidiaries within an MNE which engage in profit shifting. They note that empirical studies are rare in this area since transfer pricing is considered to be a confidential issue for most MNEs.[55] Further, they observe that the extensive literature modelling optimal tax systems does not deal with MNEs utilising transfer pricing to profit shift.[56] Nonetheless, Brada and Buus provide a mathematical proof that the basic tax optimisation task of MNEs can be conceptualised as a linear programming problem.[57]

Vasarhelyi and Moon also presented the suitability of linear programming for solving international tax planning problems. This was on the basis that international tax planning problems are concerned with the optimal allocation of tax, subject to relevant tax laws and other limitations; thereby echoing linear programming problems:

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[52] 'unlike previous research, our modeling and our empirical work take a fully multilateral approach and is the first to study the effect of taxation on leverage in a nxn countries context. The main contribution of our paper is to explore in an international context the possibility that multinationals set the capital structure of individual subsidiaries by taking into account the tax rate faced by all other subsidiaries of the firm. Our finding that subsidiary leverage within a multinational firm responds to bilateral tax rate differences vis-à-vis both the parent firm and other foreign subsidiaries provides direct support for this multilateral approach': H Huizinga, L Laeven and G Nicodème, 'Capital Structure and International Debt Shifting' (Economic Paper No 263, European Economy, December 2006), 3–4.

[53] H Huizinga, L Laeven and G Nicodème, 'Capital Structure and International Debt Shifting' (Economic Paper No 263, European Economy, December 2006), 8. For a further discussion of limitations,see A Kayis-Kumar, 'International Tax Planning By Multinationals: Simulating a Tax-minimising Intercompany Response to the OECD's Recommendation on BEPS Action 4' (2016) 31(2) *Australian Tax Forum* (forthcoming).

[54] E Castillo, AJ Conejo, P Pedregal, R García and N Alguacil, *Building and Solving Mathematical Programming Models in Engineering and Science* (New York, United States: John Wiley and Sons Ltd, 2001).

[55] J Brada and T Buus, 'Detection of Possible Tax-Evasive Transfer Pricing in Multinational Enterprises' (2009) 4(2) *European Financial and Accounting Journal* 65.

[56] T Buus and J Brada, 'VAT and Tax Credits: A Way to Eliminate Tax-Evasive Use of Transfer Prices?' (2010) 5(1) *European Financial and Accounting Journal* 28, 45.

[57] Brada and Buus, above n 55, 75; Brada and Buus note that further mathematical proofs and more detailed specification conditions of validity have not been conducted: Brada J and Buus, above n 55, 73–74.

> International tax planning optimisation problems can be formulated as linear functions to maximize or minimize a particular objective function. [58]

However, Buus and Brada's research in this area remains untested[59] and Vasarhelyi and Moon's work has also since ceased.[60]

Accordingly, this paper presents a unique contribution to the literature by developing a tax optimisation model which simulates complex cross-border intercompany tax planning strategies by considering MNEs use of four forms of fungible intercompany financing across four jurisdictions. This facilitates a formal analysis of one of the most significant challenges presented by the mobility and fungibility of capital.

4. DEVELOPING THE OPTIMISATION MODEL

Given the focus of this paper on pure paper shifting by a tax-minimising MNE through intercompany financing, the optimisation model developed by the author simulates the behavioural responses of a hypothetical 'tax-minimising' MNE engaging in cross-border intercompany tax planning through the use of alternative—otherwise fungible—categories of intercompany financing.

This paper reflects results of optimisation modelling of 4 variations (or 'multiverses') simulating for each variation 20 different increments of MNEs tax aggressiveness, to model a range of 'tax minimising' MNEs' behavioural responses to different tax regimes and reform alternatives.

In doing so, this model demonstrates the tax effects of an MNE utilising various cross-border intercompany instruments at different rates of return and degrees of leverage to examine both: (a) the vulnerability to base erosion and, (b) the extent of cross-border funding neutrality (or lack thereof) across the existing tax system, variations to the existing system and proposed reform alternatives.

For completeness, further research by the author extends the analysis to 50 variations, each with 20 different increments of MNEs tax aggressiveness, to reflect other tax regimes and reform alternatives. This is illustrated in Figure 2 below.

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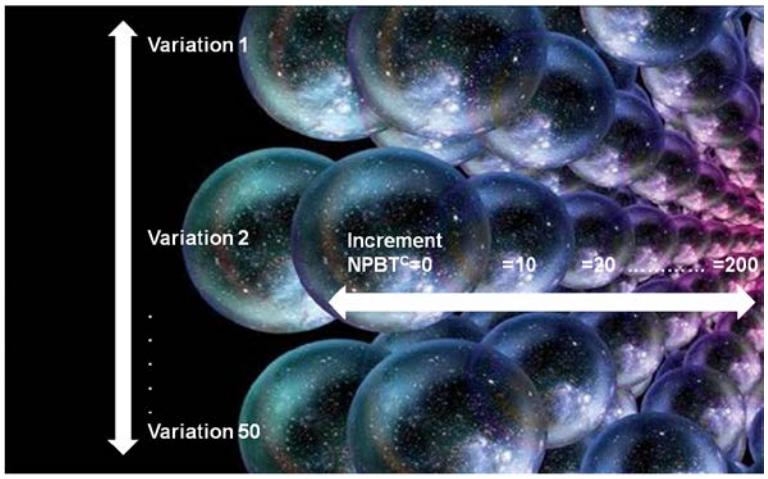
[58] MA Vasarhelyi and D Moon, 'Optimizing Tax Allocation Among Countries in the Multinational Entity: A Tale Of Many Contingencies' (Presentation delivered at the TTN Taxation Seminar New York 2011, Morgan Lewis Bockius LLP: New York, NY, 16 May 2011), 6.

[59] For completeness, in a subsequent paper, Brada and Buus proposed that VAT be used as a solution to reach a Pareto-optimal state that would prevent harmful tax competition and tax-evasive transfer pricing; see: Buus and Brada, above n 56; see also, Kayis-Kumar, above n 53.

[60] Vasarhelyi and Moon developed a single-period model, with a 6-jurisdiction MNE subject thin capitalisation rules with 2 constraint functions only. Withholding taxes were assumed zero, foreign tax relief was not considered, none of the parameters were flexed and the model focussed on optimal firm policy only, not considering the government perspective. See further: Kayis-Kumar, above n 53.

Figure 2: The modelled 'multiverse' of policy iterations and MNE tax aggressiveness



This hypothetical approach is preferable due to the accessibility issues associated with collecting various revenue authorities' corporate tax return data and the limitations of using accounting data. Even if accounting data was gathered through annual reports this approach is problematic given the difference between accounting profit and taxable income. Specifically, MNEs start with accounting profit and then make adjustments to accounting profit[61] to reach their taxable profit.[62] Accordingly, it is difficult to glean intercompany tax-related information from financial statements.

Further, these difficulties are exacerbated by recent amendments to the *Corporations Act 2001*, enacted 28 June 2010, which have removed the requirement for companies to include full unconsolidated parent entity financial statements in their group annual financial reports under Chapter 2M of the *Corporations Act 2001* where consolidated financial statements are required.[63] This renders it even more difficult to discern intercompany tax-related information. Also, there is currently no requirement to produce 'general purpose' financial reports in subsidiary locations where the MNE determines that that subsidiary is not a 'reporting entity'. Further, given the gaps in reporting requirements and the fact that some items are off-balance sheet to begin with, it is highly difficult to undertake a meaningful analysis of data from financial statements in this context. This is made more problematic by the absence of official data about MNEs' non-portfolio investment activities, despite their significance to the Australian economy.[64]

[61] Net profit before tax pursuant to the relevant accounting standards.

[62] This is discerned through applying the relevant tax regulations.

[63] APRA requests that 'APRA reporting' MNEs continue producing their general purpose financial reports to them, though this is on a voluntary basis: see further, <http://www.apra.gov.au/GI/Documents/Letter-for-Website_Parent-Entity-Financial-Statements-September-2010.pdf>.

[64] A McDonnell et al. (2011) 'A Profile of Human Resource Management in Multinational Enterprises Operating in Australia', University of South Australia, University of Newcastle, Victoria University, La Trobe University and Curtin University <http://www.unisa.edu.au/Global/business/centres /chrm/docs/projects/intrepid/Australia11_MNE_Report_Final.pdf>.

The remainder of this section outlines and justifies the optimisation model. Specifically, it expresses MNEs' decisions to utilise various conduit financing structures to minimise taxation for the overall group in the form of an algorithmic expression.

The optimisation model is developed using the IBM ILOG CPLEX for Microsoft Excel ('CPLEX') software.[65] Microsoft Excel is utilised to generate the data, delineate the parameters and display the solution in a multidimensional format, while the CPLEX software is used to express and solve the optimisation problem. Quantitative analysis facilitates a deeper understanding of the interplay of effects determining tax-induced distortions than may not be observable with a qualitative analysis alone.

The 'objective function' is to minimise the total tax payable by the MNE on global operations. The 'constraints' are the four groups of otherwise fungible intercompany debt and equity financing, licensing and finance leasing activities. The model can then be fine-tuned by overlaying various parameters.

Specifically, the hypothetical MNE modelled by this paper has entities in four jurisdictions; two high-tax jurisdictions (one capital-exporter and one capital-importer; specifically, a US parent and Australian subsidiary) and two lower-tax jurisdictions (one non-treaty country and one treaty country, in Hong Kong and Singapore, respectively).[66]

Given its focus on intercompany funding options, this optimisation model focusses on funding constraints and regulatory limitations directly relevant to intercompany funding decisions; namely, withholding taxes, thin capitalisation rules and foreign tax credits. This ensures the model is complex and flexible enough to represent both funding structure decisions and regulations influencing those behavioural responses.

The baseline model in the optimisation problem consists of the current global tax framework and its treatment of fungible funding options. It is necessary to develop a baseline model because modelling in this area has not yet focussed on the fungibility of intercompany funding options. So far, the predominant focus in the literature has been on an economy-wide scale[67] with firms identified with, for example, one unit of

[65] CPLEX is a sophisticated software appropriate for both building and solving optimisation problems, and for interfacing with Microsoft Excel; 'IBM® ILOG® CPLEX® for Microsoft® Excel is an extension to IBM ILOG CPLEX that allows you to use Microsoft Excel format to define your optimization problems and solve them. Thus a business user or educator who is already familiar with Excel can enter their optimization problems in that format and solve them, without having to learn a new interface or command language. CPLEX is a tool for solving linear optimization problems, commonly referred to as Linear Programming (LP) problems": IBM ILOG CPLEX V12.1 IBM ILOG CPLEX for Microsoft: Excel User's Manual, 12 <ftp://public.dhe.ibm.com/software/websphere/ilog/docs/optimization/cplex/cplex_excel_user.pdf>.

[66] In the Australian context, it appears that Singapore is a relatively more popular jurisdiction than other well-known low-tax jurisdictions such as Ireland in terms of the volume of intercompany payments made by Australian companies: B Butler and G Wilkins, 'Singapore, Ireland Top Havens For Multinational Tax Dodgers', *Sydney Morning Herald* (online), 1 May 2014 <http://www.smh.com.au/business/singapore-ireland-top-havens-for-multinational-tax-dodgers-20140430-37hzi.html>.

[67] See, for example, OH Jacobs and C Spengel, 'The Effective Average Tax Burden in the European Union and the USA: A Computer-based Calculation and Comparison with the Model of the European Tax Analyzer' (ZEW Discussion Paper No 99–54, Centre for European Economic Research (ZEW) and University of Mannheim, September 1999).

capital with different firm types linked to different types of capital whereby MNEs dispose of as unit of mobile capital.[68] Even when the analysis is constrained to a single MNE, models developed have focussed on, for example, the 'model-firm' approach[69] or determining the MNE's optimal after-tax income by reference to labour, capital and production[70] or have only considered debt financing without exploring its economic equivalents.[71]

Rather than projecting MNEs' decisions over time, this paper considers behavioural implications of different rules at a given point-in-time. A key disadvantage of a single-MNE one-period model approach is that the results are heavily dependent on the particular characteristics of the hypothetical MNE. To that end, a consideration of various types of MNEs is beyond the scope of this study.[72] However, this model takes into account different funding situations and planning options at different levels of MNE tax-aggressiveness. So, it has the ability to engage in detailed scenario/'what-if' analysis. This enables validation testing to be conducted to anticipate MNE behaviour and quantify the impact on the total tax payable by the MNE of different reform options. As observed by Jacobs and Spengel, the technique of sensitivity analysis is used in all important studies on international tax burden comparisons regardless of the methodical approach and the underlying model.[73]

This model also extends the analysis of behavioural implications beyond the limited perspective of a single MNE by also considering optimal government policy. This was not previously contemplated by the literature in this area. More generally, the literature on transfer pricing contains very few papers considering both optimisation problems jointly, with Raimondos-Møller and Scharf presenting a notable exception.[74]

Accordingly, this model presents a single-period model for a hypothetical MNE, applying four variations, each with 20 increments of MNE tax-aggressiveness. This framework is 'flexed' by adjusting the values of various parameters to test the relative impact of a change in specific tax laws. This facilitates a comparison between the baseline model and alternative reform options proposed both in this paper and subsequent papers by the author. Validation testing consists of representing algorithmically the alternative reform options by incorporating their different funding constraints and regulatory limitations. This aims to provide an objective assessment of each reforms' impact on an MNEs tax minimising behavioural responses.

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[68] A Haufler and M Runkel M, 'Firms' Financial Choices And Thin Capitalization Rules Under Corporate Tax Competition' (2012) 56(6) *European Economic Review* 1087, 1090.

[69] Jacobs and Spengel, above n 67, 9.

[70] See further, C Sommer, *Separate Accounting Or Unitary Apportionment? The Fairy Tale of Arm's Length Pricing and General Equilibrium Analysis of Multinational Enterprise Behavior Under the Formulary Taxation Alternative* (Lohmar: Köln, Reihe Steuer, Wirtschaft und Recht, 2011).

[71] M Mardan, 'Why Countries Differ in Thin Capitalization Rules: The Role of Financial Development' (CESifo Working Paper Series No 5295, CESifo Group Munich, 2015), 9. In Mardan's model each MNE's headquarters chooses the amount of internal loans that maximises the overall profits of the MNE such that the MNE's overall profits are:

$$\pi^j = (1-t_1)\theta^j f(K^j) - rK^j + t_1 r D_E^j + t_1\, min(rD_I^j, \phi^j(z)) - t_2 r D_I^j - C(D_I^j)$$

[72] This limitation has been echoed in the literature; see for example: Brada and Buus , above n 55, 69.

[73] Jacobs and Spengel, above n 67; and references cited therein at footnote 43.

[74] P Raimondos-Moller and K Scharf, 'Transfer Pricing Rules And Competing Governments' (2002) 54(2) *Oxford Economic Papers* 230, 234–35.

For ease of reference, the abbreviations used throughout the remainder of this section are summarised in Table 1 below:

Table 1: Abbreviations used in formulation of model

Abbreviations	
$NPBT_{i,0}$	Net profit before tax for company 'i' at the start of the period
$NPBT_{i,1}$	Net profit before tax for company 'i' at the end of the period
r_i^*	Headline corporate income tax rate in country 'i'
TTP	Total tax payable
r_{ij}^D	The rate of return on debt financing from company 'i' to company 'j'
D_{ij}	The balance of debt financing provided from company 'i' to company 'j'
I_i	The interest received by company 'i' (or, if negative, interest paid)
r_{ij}^E	The rate of return on equity financing from company 'i' to company 'j'
E_{ij}	The balance of equity financing provided from company 'i' to company 'j'
V_i	The dividends received by company 'i' (or, if negative, dividends paid)
r_{ij}^C	The rate of return on licensing from company 'i' to company 'j'
C_{ij}	The balance of licenses provided from company 'i' to company 'j'
R_i	The royalties received by company 'i' (or, if negative, royalties paid)
r_{ij}^S	The rate of return on finance leasing from company 'i' to company 'j'
S_{ij}	The balance of finance leases provided from company 'i' to company 'j'
P_i	The finance lease payments received by company 'i' (or, if negative, finance lease payments paid)

4.1 The objective function: Minimising total tax payable

Since this model is only concerned with the intercompany activities conducted to minimise tax, the only relevant constraints relate to these intercompany transactions.[75] $NPBT_{i,0}$ is the amount of Net Profit Before Tax ('$NPBT$') of company i at the beginning of the period; $NPBT_{i,1}$ is the amount of EBIT of company i at the end of the period; r_i^* is the tax rate[76] defined by the government of country i. For simplicity, the 'real' NPBT is a constant for each entity in each jurisdiction and is given ($NPBT_{i,0}$). The impact of the sum of intercompany transactions in each affiliate on NPBT is denoted as follows:

$$NPBT_{i,1} = NPBT_{i,0} + I_i + V_i + R_i + P_i \quad (1)$$

The general optimisation problem is the minimisation of the objective function by adjusting the design variables and at the same time satisfying the constraints. In the present analysis, the objective function is Total Tax Payable ('TTP') for the corporate group.

[75] Elements of Section 4 have been elaborated on in detail in a previous paper by the author: Kayis-Kumar, above n 53.

[76] While the 'effective tax rate' would arguably be preferable, for simplicity the headline corporate income tax rate is used in this variation of the model.

$$Minimise: \quad TTP = \sum_{i=1}^{n} NPBT_{i,t+1} \times r_i^* \tag{2}$$

As illustrated in an earlier paper by the author,[77] the model is set with an initial NPBT at $100 for both affiliates in the high-tax jurisdictions and with NPBT as $0 for the affiliate in the lower-tax jurisdiction.[78]

4.2 The constraints: Intercompany financing activities

Since this model is only concerned with the intercompany activities conducted to minimise tax, the only relevant constraints relate to these intercompany transactions, rather than extending to 'real' economic activities.

Accordingly, this optimisation problem is subject to four 'primary constraints'. Each constraint relates to one of the four categories of fungible intercompany funding that constitute the focus of this thesis; namely, debt financing, equity financing, licensing and finance leasing ('D_{ij}', 'E_{ij}', 'C_{ij}' and 'S_{ij}', respectively).[79] These can be characterised as the underlying capital amounts ('K_{ij}'). The 'flow' ('F_i') or remuneration derived therefrom constitutes interest, dividends, royalties and finance lease payments ('I_i', 'V_i', 'R_i' and 'P_i', respectively).

This is formulated as follows for each constraint:

$$F_i = \sum_{\substack{i=1 \\ i \neq j}}^{n} K_{ij} \times r_{ij}^K \tag{3}$$

In other words, the 'flow' or remuneration ('F_i') is received by company i, where K_{ij} is the underlying capital provided by company i to company j, at a cost of capital of r_{ij}^K.

This optimisation problem can then be remodelled by layering additional parameters that reflect the tax laws applicable to each reform variation, as further detailed below in Section 4.3. One example is thin capitalisation rules, which apply in both the subsidiaries in the US and Australia. This is factored into the model by considering that the ratio of debt to equity for each company should be kept at less than 1.5, assuming the debt-to-equity ratio is 1.5:1 for both the US parent and Australian subsidiary.[80]

This can be expressed algorithmically as follows:

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[77] Kayis-Kumar A, above n 30, 646.

[78] As such, in the absence of any tax planning the group-wide effective tax rate is 34.50 per cent. This is on the basis that the US and Australian corporate income tax rates are 39 per cent and 30 per cent, respectively.

[79] For completeness, in the context of leases, this model focusses on finance leases only and this iteration does not contemplate the impact of depreciation.

[80] It is noteworthy that Australia's thin capitalisation regime had its safe harbour rules tightened from 3:1 to 1.5:1 through the *Tax and Superannuation Laws Amendment (2014 Measures No. 4) Bill 2014* (Cth), which received Royal Assent on 16 October 2014.

$$D_{ij} - 1.5 \times E_{ij} \leq 0 \quad (4)$$

With the above algorithm, it is possible to target both or either inbound and outbound investment. For simplicity, the amount of intercompany transfers between each company ranges from a minimum of $0 to a maximum of $1000.

This paper acknowledges that there may be an element of uncertainty in classification of various financing types in practice. This is exemplified by different jurisdictions' varying tax treatment of hybrids. Accordingly, future iterations of this model will explore treating this constraint as 'soft'.[81] However, since this feature goes beyond standard linear programming, it is outside the scope of this paper.

4.3 Building the baseline model[82]

Based on the previous Sections 4.1 and 4.2, this section outlines the baseline model in three steps: first, applying the objective function; second, including the constraints; and third, overlying the parameters. Each are dealt with in turn.

First, the objective function is the minimisation of TTP. Once the current headline corporate income tax rates ('r_i^*') are included, the objective function is denoted as:

$$Minimise: \quad TTP = 0.39 \times NPBT_{A,1} + 0.17 \times NPBT_{B,1} + 0.30 \times NPBT_{C,1} + 0.165 \times NPBT_{D,1}$$

Second, the constraints are represented formulaically below, separated by category of funding; namely, debt financing, equity financing, licensing and finance leasing assuming for simplicity all rates of return (r) are 7.5 per cent for each entity within the MNE. The model is designed so that r can later be adjusted to simulate the impact of tax rules on the cost of capital, enabling a more complex analysis of MNE behaviour.

Third, the design of the optimisation model allows for the incremental inclusion of concurrent and/or alternative tax rules (or 'parameters') to simulate the impact of various rules on MNEs' tax planning behaviour. This scenario analysis makes it possible to address the question of what the most likely behavioural responses would be to alternative rates of taxes being levied on otherwise fungible intercompany activities and to what extent alternative reform proposals developed by this paper could ameliorate the distortions leading to said behavioural responses. A more complex analysis can be conducted which also highlights the breadth of the problem; specifically, that the literature has thus far been too focussed on modification of one parameter at a time. The behavioural responses incentivised by each parameter can then be examined and cross-referenced in the context of both the standalone entity and the overall group.

This paper highlights the use of withholding taxes in this context. Specifically, various withholding tax rates apply for each of the types of intercompany flows examined in this model. Table 2 below indicates the withholding tax rates for each type of intercompany funding applicable for each jurisdiction.

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[81] P Meseguer, F Rossi and T Schiex, 'Chapter 9: Soft Constraints', in F Rossi, P van Beek and P Walsh, *Handbook of Constraint Programming* (Elsevier, 2006), 281–328.

[82] For a more detailed outline of the overlaying of parameters, including foreign tax credits and the use of conduit financing, please see: Kayis-Kumar A, above n 36. Parameters such as the PE rules and the CFC regime are beyond the scope of this iteration of the model.

Table 2: Overview of withholding tax rates between USA, Singapore, Australia and Hong Kong

Withholding tax rates					
		Interest	Dividends	Royalties	Finance lease payments
USA	A, B ○	30%□	30%	30%	30%
	A, C	0/**10**%◊	**0**/5/15%●	5%[83]	0/**10**%◊
	A, D ○	30%□	30%	30%	30%
Singapore	B, A ○	15%	0%	10%	15%
	B, C	10%	0%	10%	10%
	B, D ○	15%	0%	10%	15%
Australia	C, A	0/**10**%◊	**0**/5/15%[84]●■	5%	0/**10**%◊
	C, B	10%	0/**15**%■	10%	10%[85]
	C, D ○	10%	0/**30**%■	30%	10%
Hong Kong	D, A ○	0%	0%	**4.95**/16.5% ◙	0%
	D, B ○	0%	0%	**4.95**/16.5% ◙	0%
	D, C ○	0%	0%	**4.95**/16.5% ◙	0%

Key: ○ represents absence of a comprehensive tax treaty; ◊ government authorities/ financial institutions are afforded a withholding tax exemption; □ interest on certain 'portfolio debt' obligations are exempt from withholding tax; ♦ withholding tax exemption applies to interest paid in relation to either a sale on credit of goods, merchandise or services, or a sale on credit of industrial, commercial or scientific equipment; ● higher withholding rates apply if there is a lower level of participation;[86] ■ relates to different rates arising from imputation system; the higher rate applies to unfranked dividends; ◙ the higher rate applies if the royalties are received by or accrued to a non-resident from an associate.

For completeness, in the above Table 2 where one form of intercompany funding may be subject to varying rates of withholding tax, the rate most likely to apply is

[83] For completeness, the Australia–United States DTA was amended in 2003, reducing the rate of RWT from 10 per cent to 5 per cent; see further: *Protocol amending the Convention between the Government of Australia and the Government of the United States of America for the Avoidance of Double Taxation and the Prevention of Fiscal Evasion with Respect to Taxes on Income 2003*.

[84] 'Australia does not impose withholding tax on dividends to the extent they are franked. To the extent dividends are unfranked, the rate is 0 per cent or 5 per cent, if the beneficial owner of the dividends is a company that holds at least 80 per cent or 10 per cent, respectively, of the voting power in the payer. In all other cases, the rate is generally 15 per cent': EY Worldwide Corporate Tax Guide (2015), 89–91; Australia–United States DTA, Article 10 amended in 2003; 'While the top withholding rates are similar across jurisdictions, substantial concessions are available to investors from the US and the UK, including a zero withholding tax rate on unfranked dividends which may be available where the investor beneficially holds an 80 per cent or greater stake in an Australian company': R Tang and J Wan, 'A refocused tax treaty network is key to achieving the Asian Century vision' (Corrs Chambers Westgarth, 20 November 2012); available at: http://www.corrs.com.au/thinking/elsewhere/a-refocused-tax-treaty-network-is-key-to-achieving-the-asian-century-vision/.

[85] 'Section 128AC was introduced by the *Taxation Laws Amendment Act (No 2) 1986* … The mischief to be remedied was the loss of revenue by the use of non-traditional methods of finance where a resident enters into a hire-purchase agreement or finance lease arrangement with a non-resident … The EM recognises the dual purpose served by the agreements in question, namely, purchase and financing the purchase. Consistent with this objective, the section deemed that part of the hire payments that were equivalent to interest in the financing arrangement to be interest for withholding tax purposes': Australian Taxation Office, *Income Tax: Withholding Tax Implications of Cross Border Leasing Arrangements* (2 December 1998) ATO Taxation Ruling TR98/12, 12 <https://www.ato.gov.au/law/view/document?docid=TXR/TR9821/NAT/ATO/00001&PiT=20100630000001>.

[86] However, the differences between direct and portfolio investment are beyond the scope of this iteration.

highlighted in bold. For example, assuming a high level of participation, the withholding tax rate of dividends from Co C and Co A would be zero per cent. It is important to note the difference in tax treatment between franked and unfranked dividends in the context of Australia's imputation system, which in the first instance, this model assumes are unfranked.

For the purposes of the optimisation model, the existence of withholding tax gives rise to a potentially increased TTP.

A run-time test indicates that the MNE will funnel all funds through a combination of the decision variable with the lowest withholding tax rate and the jurisdiction with the lowest corporate income tax rate. This can be further validated by a two-fold analysis; first, anecdotal evidence from leading tax practitioners suggests that this reflects MNEs' behaviour. Second, from the perspective of the MNE as a group, withholding taxes increase the cost of capital of the funding type by the amount of the tax rate withheld.[87]

5. RESULTS OF THE OPTIMISATION MODEL

This section is designed to test the existing thin capitalisation regime against the OECD/G20 BEPS Project recommendation on Action Item 4; namely, the recommendation for a fixed ratio rule (the 'OECD's BEPS Recommendation'). Accordingly, this section presents the results of incrementally adding both concurrent and alternative tax rules (or 'parameters') to simulate four variations; first, the current tax regime; second, if the OECD's BEPS Recommendation were adopted by Australia; third, if the OECD's BEPS Recommendation were adopted by both Australia and the US; and fourth, an extended thin capitalisation rule, which constitutes this paper's proposal.

In terms of expressing the results, both the numeric value (as 'TTP') and the percentage value of the TTP relative to the global NPBT (as the group-wide effective tax rate) is presented. The latter is particularly meaningful because, at a practical-level, it is difficult to measure or estimate the budgetary impact of a reform. Accordingly, it is necessary to utilise a proxy instead. Given the usefulness of the average effective tax rate (AETR) in the context of measuring revenues of government[88] and discrete location decisions,[89] it is also appropriate to utilise this measure here.

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[87] European Commission, 'The Economic Impact of the Commission Recommendation on Withholding Tax Relief Procedures and the FISCO Proposals' (European Commission Staff Working Document, 24 June 2009), 44.

[88] Fullerton observes that AETRs are 'relatively easy to calculate, and they are useful for measuring incomes of capital owners, revenues of government, and the size of the public sector'. It is however important to acknowledge that the ' measurement of average effective tax rates is not unambiguous': D Fullerton, 'Which Effective Tax Rate?' (NBER Working Paper No 1123, National Bureau of Economic Research, May 1983), 3–4.

[89] ' [d]iscrete investment choices do depend on an average tax rate'. Further, Devereux and Griffith observe that:

> Conditional on the choice of location, the size of investment depends on the EMTR. But the choice of location depends on the level of post-tax net present value ('NPV'); for a given pre-tax NPV in each location, the impact of taxation on the location choice is through its effect on the post-tax NPV. This can be measured by an effective average tax rate ('EATR')

5.1 Variation 1: Tightening Australia's thin capitalisation rules

One of the most surprising findings in relation to the existing system is that the hypothetical MNE is indifferent to the existence and/or variation in thin capitalisation rules. This is because while thin capitalisation rules change the funding mix of entities within an MNE, the TTP remains unchanged.

Specifically, where this variation is modelled with $NPBT^C$ increments between 0 and 100, the TTP remains the same for each increment of tax aggressiveness, such that the AETR is 26.50per cent to 30.75per cent regardless of whether thin capitalisation rules are tightened. In contrast, in the absence of any tax planning the AETR is 34.50 per cent for the hypothetical MNE. So, contrary to policymakers perception that thin capitalisation rules can be made more effective at restricting base erosion by simply tightened the debt-to-equity ratio, this model also finds no impact on TTP.

The model shows no change in TTP from tightening thin capitalisation rules from a debt-to-equity ratio of 3:1 to 1.5:1, as recently implemented by *Tax and Superannuation Laws Amendment (2014 Measures No 4) Act 2014* (Cth).

In addition, capital structure and both the quantum and direction of funds flow remains the same under so-called tightened thin capitalisation rules. In particular, the Australian subsidiary experiences no change in its funding mix between inbound-only, outbound-only, or both inbound/outbound rules. This result seem to be at odds with the literature that tightening thin capitalisation rules would impact MNEs' funding decisions. The reason is that the funding mix selected by the MNE is already beyond the scope of the thin capitalisation rules. For example, at a moderate level of tax-aggressiveness (where $NPBT^C$=50), the MNE utilises finance leasing payments (P^C) from Australia to Hong Kong and royalty payments (R^A) from the US to Hong Kong.

This result confirms the anecdotal evidence present in the literature in relation to both Australian and US base erosion techniques. In the Australian setting, as observed by both practitioners and academics, the scope of the current thin capitalisation regime does not include many finance leases:

> At the moment most leasing activities are not subject to the thin capitalisation rules because of the definition of financing arrangement in ITAA s.974–130. Hence many finance leases are treated in the same way as other leases, and only a small subset of leases, recharacterised as a sale and loan, are subjected to thin capitalisation rules. [90]

Similarly for the US parent, there is also no change in funding mix between inbound-only or inbound/outbound rules. These result in the same quantum and direction of intercompany payments specifically to Hong Kong. However, if inbound-only rules apply then the MNE switches the US parent's intercompany financing from royalties to finance lease payments by simply 'mixing and matching' to still obtain the same TTP as any of the above alternative reform configurations.

Devereux MP and Griffith R 'Evaluating Tax Policy for Location Decisions' (2003) 10 *International Tax and Public Finance* 107, 107–08.

[90] T Frost et al., Submission to the Treasury on Proposed Diverted Profits Tax Consultation Paper, *Implementing a Diverted Profits Tax*, 24 June 2016, 11 <http://www.greenwoods.com.au/media/1794/dpt-submission.pdf>.

While at first blush these results may appear unusual, the anecdotal research presented by Ruf and Schindler[91] anticipates this result. This finding is significant because even though there is a growing body of literature challenging the traditional belief that thin capitalisation rules protect the tax revenue base, including Ruf and Schindler[92] and Vann,[93] there is currently no empirical evidence that new FDI is simply financed at or around the debt-to-equity ratio limits set by thin capitalisation rules. Accordingly, this finding could have significant policy implications globally, especially given the worldwide popularity of implementing and tightening thin capitalisation rules.

5.2 Variation 2: Unilateral adoption of the OECD's BEPS recommendation

This section designs and tests the unilateral implementation of the OECD/G20 BEPS Project recommendation on Action Item 4;[94] namely, the recommendation for a fixed ratio rule (the 'OECD's BEPS Recommendation').[95]

Released in October 2015, the OECD's BEPS Recommendation for a fixed ratio rule would substitute existing rules limiting the deductibility of interest, such as thin capitalisation rules. For completeness, a subsequent paper by the author explores the implementation of a cross-border ACE[96]-CBIT[97] as an alternative to rules which only mitigate the 'symptom' of thin capitalisation.[98]

Under the best practice approach, interest and payments economically equivalent to interest will be deductible to the extent that the net interest expense-to-EBITDA ratio is less than the allowable threshold (or benchmark fixed ratio). A benchmark fixed ratio within the corridor of 10 per cent to 30 per cent is recommended. As observed by the OECD and extracted in

Table 3 below, the majority of countries which currently adopt fixed ratio rules to restrict interest relief utilise a 30 per cent benchmark ratio:[99]

[91] M Ruf and D Schindler, 'Debt Shifting and Thin-Capitalization Rules—German Experience and Alternative Approaches' (NHH Discussion Paper, RRR 06-2012, 13 December 2012), 9–10; see further, Kayis-Kumar, above n 30; Kayis-Kumar , above n 30.

[92] Ruf and Schindler, above n 91.

[93] RJ Vann, 'Corporate Tax Reform in Australia: Lucky Escape for Lucky Country?' [2013] 1 *British Tax Review* 59, 71.

[94] Please note, an earlier version of this section outlining the formulae developed by the author appears in Kayis-Kumar, above n 53.

[95] For completeness, the OECD's Recommendation was drafted with other key features, but this paper focussed only on the Fixed Ratio Rule. For an overview of the entirely to the OECD's Recommendation, see OECD, *BEPS Action 4: Interest Deductions And Other Financial Payments* (Final Report, 5 October 2015), 27.

[96] Allowance for Corporate Equity (ACE).

[97] Comprehensive Business Income Tax (CBIT).

[98] For an analysis of the economic theory, please see: Kayis-Kumar A, above n 30.

[99] OECD, *BEPS Action 4: Interest Deductions And Other Financial Payments* (Public Discussion Draft, 18 December 2014), 49.

Table 3: Convergence towards fixed interest-to-earnings ratios

Finland:	25 per cent of EBITD calculated based on the taxable profit and loss account. The calculation is made by entity and adjusted by taking into account group contributions received or made.
Germany:	30 per cent of taxable EBITDA.
Greece:	30 per cent of EBITDA. Phased-in system according to which the percentage will reduce from 60 per cent in 2014 to 30 per cent in 2017.
Italy:	30 per cent of EBITDA, adjusted by adding rental payments under finance lease transactions.
Norway:	30 per cent of taxable EBITDA.
Portugal:	30 per cent of EBITDA, adjusted by excluding certain items such as income resulting from shares eligible for the participation exemption or attributable to a permanent establishment outside Portugal to which the option for exemption is applied. Phased-in system according to which the percentage will reduce from 70 per cent in 2013 to 30 per cent in 2017.
Spain:	30 per cent of operating profits adjusted by adding certain items such as depreciation and amortisation and financial income from equity investments.
United States:	50 per cent of adjusted taxable income, ie. EBITDA plus specific deductions taken into account when calculating the taxable income.

Accordingly, this paper models the OECD's Recommendation using a 30 per cent benchmark ratio. This will be applied in both Sections 5.2 and 5.3.

For the US entity, the results of the modelling show that there is no change in either capital structure nor the funding mix from Australia's unilateral adoption of the OECD recommendation. Similarly, Australia also sees no substantial change, with the MNE simply switching the funding type utilised in Australia from finance lease payments to a combination of royalty and interest payments. This result is most likely attributable to the relatively close corporate income tax rates between these two jurisdictions, rendering neither a profit shifting destination for a tax-minimising MNE. On the other hand, Singapore would emerge as a substantial beneficiary because it would obtain the majority of NPBT from the most tax-aggressive MNEs through royalty payments (from $NPBT^C$=0–60) in a behavioural response similar to a corporate inversion.

Assuming that the OECD's BEPS Recommendation was adopted by Australia in place of the existing thin capitalisation rules, the AETR is between 26.89 per cent and –30.75 per cent (where $NPBT^C$=0–100). Despite the complexities arising in the calculation of the EBITDA, this model adopts the simplifying assumption that the NPBT measure used in the model developed by this paper is effectively the same. Accordingly, the modelling demonstrates that this reform would result in an increase in TTP for the most tax aggressive MNEs, albeit nominally. Specifically, there would be a maximum 1.45 per cent increase in TTP for the most tax-aggressive MNE (where $NPBT^C$=0).

Relevantly, the US Treasury's recently finalised regulations under Section 385 of the Internal Revenue Code,[100] were originally proposed giving authority to the IRS to classify certain intercompany debt instruments as quasi-equity. Academics such as

[100] These final and temporary regulations establish "… *threshold documentation requirements that ordinarily must be satisfied in order for certain related-party interests in a corporation to be treated as indebtedness for federal tax purposes, and treat as stock certain related-party interests that otherwise would be treated as indebtedness for federal tax purposes*": US Department of the Treasury, Internal Revenue Service Federal Register 81 (204) [TD 9790] (21 October 2016); available at: <https://www.gpo.gov/fdsys/pkg/FR-2016-10-21/pdf/2016-25105.pdf>.

Shaviro noted that this strict reform would bring the US rules closer to the German earnings-stripping rules.[101] However, there was much opposition to this 'bifurcation' rule. Commentators opposed to these regulations posited that they would likely exceed the interest deductibility limits contemplated as part of the OECD's BEPS Recommendation.[102] Originally intended to be finalised by early-September,[103] the finalised regulations were released in mid-October. In what was described as a "*significant change*" by practitioners,[104] the final regulations did not contain this rule. Rather, the preamble to the final regulations indicated that the US Treasury's decision on this issue is reserved "*pending additional study*".[105]

In any event, the modelling shows that a fixed ratio based on the level of interest expense and earnings appears to be a more robust base protection technique than rules which limit the deductibility of expenses by reference to leverage ratios.

5.3 Variation 3: Multilateral adoption of the OECD's BEPS recommendation

Multilateral implementation of the OECD's BEPS Recommendation by both the US and Australia would give rise to the same results as noted above in Section 5.2, irrespective of the benchmark fixed ratio selected by the US. This seemingly surprising result is attributable to the fact that the hypothetical MNE had ensured that $NPBT^{A}$ remained zero throughout when applying a unilateral fixed ratio rule. Similarly, under a multilateral fixed ratio rule the tax minimising MNE would make the same capital structure and funding mix decision. This is presented graphically below in Figure 3.

[101] D. Shaviro, '10 Observations Concerning International Tax Policy' [20 June 2016] *Tax Notes* 1, 5.

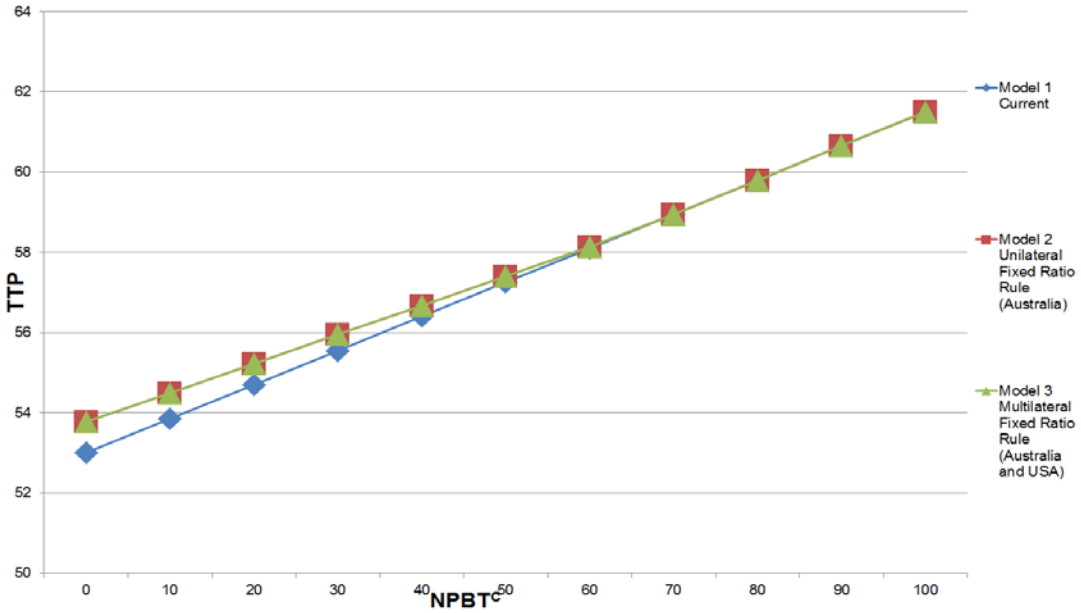
[102] S Van Weeghel, 'OECD Releases Discussion Draft On Interest Deductions In Banking, Insurance Sectors' [9 August 2016] *PwC Tax Policy Bulletin* 1, 5.

[103] However, Treasury had exceeded this expected deadline. At time of writing, October was considered a more likely time for the release of the final regulations: see, for example, B. Becker B, 'What Congress Ccan't Ddo (Hhelp Apple)', (*Politico, Morning Tax,* , 6 September 2016); available at: <http://www.politico.com/tipsheets/morning-tax/2016/09/what-congress-cant-do-help-apple-216172#ixzz4JWJjiUkS>.

[104] KPMG, TaxNewsFlash: United States, 'Section 385 final regulations: Initial reactions' (14 October 2016), 3; available at: <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2016/10/16460v5.pdf>.

[105] US Department of the Treasury, Internal Revenue Service Federal Register 81 (204) [TD 9790] (21 October 2016), 1; available at: <https://www.gpo.gov/fdsys/pkg/FR-2016-10-21/pdf/2016-25105.pdf>.

Figure 3: Results of modelling the OECD's Recommendation



Accordingly, the model developed by this paper shows that both a unilateral and multilateral implementation of the OECD Recommendation will result in a slight increase in total tax payable by the MNE compared to the current regime, most markedly for the most tax aggressive MNEs. However, for the less tax aggressive MNEs (specifically, where $NPBT^C$=70 or higher) implementing the OECD Recommendation will not result in improved tax revenue base protection compared to the current tax regime.

5.4 Variation 4: Extending the thin capitalisation regime

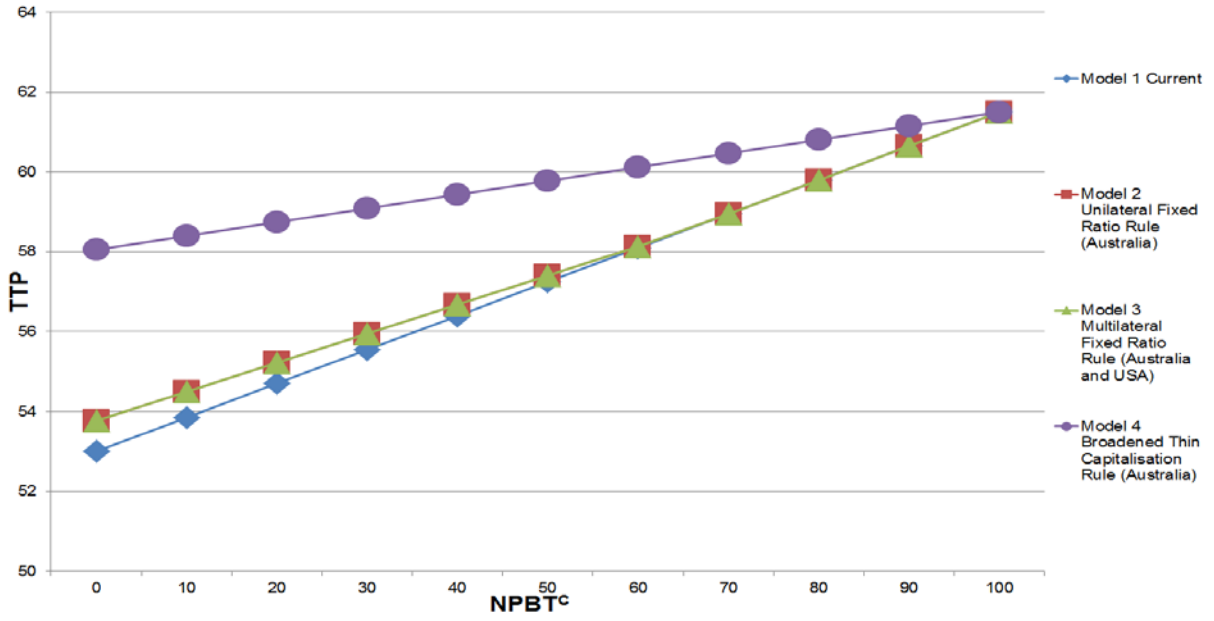
This section explores the implications of implementing an extended thin capitalisation rule; with a consistent outcome of an increased TTP as a result of broadening the scope of thin capitalisation rules such that the cross-border 'funding bias' is eliminated. Currently, the debt-to-equity rules set limits on the amount of debt, rather than the interest rate changed on debt. Since limiting the deductibility of the interest rate change on debt is considered in a subsequent paper by the author, this section focusses on the setting of limits on the amount of debt only.

The model shows improved tax base protection outcomes from broadening the scope of thin capitalisation rules to also include royalties and finance lease payments within the scope of financing because these flows are economically equivalent to, or fungible with, interest.

Specifically, where this variation is modelled with $NPBT^C$ increments between 0 to 100, the AETR is 29.03 per cent to 30.75 per cent. These findings suggest that, even though implementing an extended thin capitalisation rule cannot eliminate all tax planning (such that AETR is 34.50 per cent), this proposal is more effective at tax revenue base protection than the OECD Recommendation or any other reforms considered, particularly when dealing with the most tax-aggressive MNEs. This marked improvement in base protection afforded by an extended thin capitalisation

rule in comparison to both the existing regime and the OECD's BEPS Recommendation is presented in below in Figure 4.

Figure 4: Results of modelling the OECD's Recommendation and an Extended thin capitalisation rule



This finding has significant international tax policy implications; indicating that broadening the scope of existing thin capitalisation rules may be a highly effective reform alternative to the OECD's BEPS Recommendation. This results in two-fold tax policy advantages from a simplicity perspective. First, the relative ease of implementation since it can be built on the already-existing domestic rules and tax treaty network; and second, no transition issues as would be associated with implementing a more 'fundamental' ACE-inspired reform.

6. CONCLUSION

This paper approaches the taxation of MNEs from a novel perspective. Given the mobility and fungibility of cross-border intercompany activities, this paper establishes a framework to explore a utility-optimising MNE's behavioural responses to the international tax system. It analyses the hypothetical, 'utility-optimising' MNE's behavioural responses to laws relating to the taxation of cross-border intercompany activities; specifically, existing thin capitalisation rules against the OECD's BEPS Recommendation on Action 4, by developing an optimisation model. This model brings to the fore the range of possible 'optimal' behavioural responses by tax-minimising MNEs to various tax rules. It is instructive for policymakers to consider this because reforms may give rise to unintended or unanticipated behavioural responses in the form of profit shifting among an MNE's affiliates.

One of the most surprising findings in relation to the existing thin capitalisation regime is that the hypothetical MNE is indifferent to the existence of and/or variation in thin capitalisation rules. Further, the hypothetical MNE is also indifferent towards

the unilateral and multilateral implementation of the OECD's BEPS Recommendation, with both reforms resulting in an increase in total tax payable by the MNE, most markedly for the most tax aggressive MNEs. However, the most noteworthy finding in this paper is that an extended thin capitalisation rule is more effective at protecting a jurisdiction's tax revenue base than the OECD's BEPS Recommendation.

While the implementation of the OECD's BEPS Recommendation results in an improvement to tax revenue base protection, the improvement is only marginal and the reform ceases to deliver any improvement in tax revenue outcomes for the majority of MNEs (who are assumed to not be tax-aggressive). On the other hand, an extended thin capitalisation rule delivers a significant improvement to tax revenue base protection, particularly for the most tax-aggressive MNE but also across all levels of tax-aggressiveness, as shown in Figure 5.

Figure 5: Results of modelling the OECD's Recommendation and an Extended thin capitalisation rule

$NPBT^{C}$	Variation 1 Current	Variation 2 OECD Recommendation (Unilateral Fixed Ratio Rule ^{C})	Variation 3 OECD Recommendation (Multilateral Fixed Ratio Rule ^{C})	Variation 4 Broadened TC^{C}_{DECS}
0	53.00	53.77	53.77	58.05
10	53.85	54.50	54.50	58.40
20	**54.70**	**55.22**	**55.22**	**58.74**
30	55.55	55.95	55.95	59.09
40	56.40	56.68	56.68	59.43
50	57.25	57.40	57.40	59.78
60	58.10	58.13	58.13	60.12
70	58.95	58.95	58.95	60.47
80	59.80	59.80	59.80	60.81
90	60.65	60.65	60.65	61.16
100	61.50	61.50	61.50	61.50
200	75.00	75.00	75.00	80.67

These results are further illustrated below in Figure 6.

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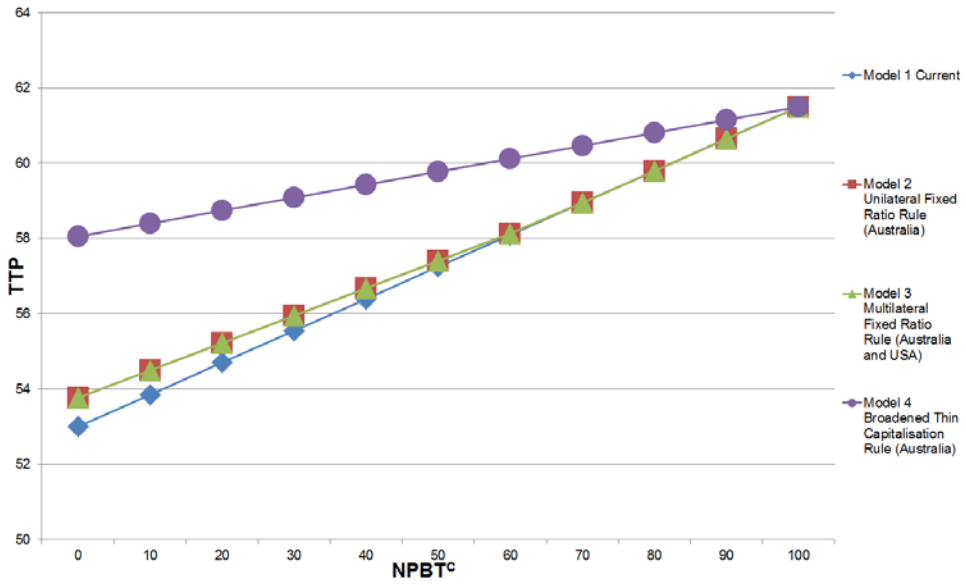
Figure 6: Results of modelling the OECD's Recommendation and an Extended thin capitalisation rule



The model developed in this paper confirms the economic literature on the merits of eliminating distortions by presenting the foundations for an extended thin capitalisation regime as an alternative to existing thin capitalisation rules. This proposal constitutes the first of three reform proposals developed by the author.

Further research and reform proposals may be derived from simulations of the allowance for corporate equity (ACE), a comprehensive business income tax (CBIT) and a combined ACE-CBIT. This work coupled with subsequent legal comparative analysis carried out by the author will form the basis for suggested improvements to existing tax regimes.