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Appendix Professor Gemmell's Review and the Four Papers being reviewed

Reviewer comments on four background papers on company taxation provided by Treasury & Inland Revenue officials supporting the 2018 Tax Working Group[1]

by

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May 2018

The following four papers were reviewed:

Paper 1: Appendix – Company Tax Rate Issues (15 pp)

Paper 2: Company Tax Modelling. Further Information for the TWG (23 pp)

Paper 3: Impact of a Company Tax Cut on NZ Capital Stock (12 pp)

Paper 4: Note on Incorporating Profit Shifting (4 pp)

[1] These comments should be read in conjunction with the comments added to the margins of the annotated versions of four papers submitted to TWG-supporting officials with this document.

Paper 1: Appendix – Company Tax Rate Issues. Background TWG paper, session 6 (15 pp)

- *Numbered comments below relate to the numbers assigned in the margins to the text of each paper*

General Comments:

This is a nicely drafted paper for the TWG by offering a non-technical treatment of some 'tricky to explain' tax and economic concepts (e.g. 'economic rents'; the 'ACE' company tax system). Also, I agree that the answer to the question of whether a company tax cut is advisable, is a 'judgement call'. But I do have serious concerns that (i) this judgement appears to hinge crucially on there being substantial economic rents in NZ; yet no evidence is presented (or readily available at present); (ii) it doesn't take very seriously the option of a CIT cut along with the introduction of other options to tax this rent if it exists.

However, the paper's conclusion do acknowledge the possibility of further work for the TWG around 'supplemental' economic rent-related taxes for this purpose which sounds a sensible strategy to me.

I was also surprised to see so little discussion both of the Australian analysis that seems to be more supportive of a CIT rate cut there, and of the role of Australia's CIT rate in the best CIT rate choice for NZ. Despite the role of imputation in Australia and NZ being shown (in Paper 3) to be potentially important for investment decisions across the Tasman, it doesn't seem to be referenced here in the TWG advice on the CIT rate in NZ. Is there a reason for this?

My question for officials from all of this is: if it could be established (or considered reasonably likely) that economic rents are not an important source of company tax revenues in NZ, would your advice on a company tax rate cut change? I would expect the TWG to ask a similar question. If the answer is 'yes', then I think this paper should be more balanced in its conclusions and presentation of the options. If 'no', it would be good to know what would underlie that choice – e.g. what factors other than rents remain persuasive for the 'no cut' on-balance judgement.

For me, a crucial aspect of this judgement not mentioned is how the lost CIT revenue is made up (but see Paper 3). Distortions associated with other taxes, as well as distributional considerations, (e.g. with a PIT) could well be enough to justify keeping the current balance of revenues generated by different taxes – but it deserves careful analysis. Though the modelling behind Paper 3 goes in this direction I don't think it is as complete as it could be - with respect to estimating the effects of budget balance.

Detailed Comments (see paper margins)

1. "New Zealand's *imputation regime* means that the final tax rate on investments in companies is normally taxed at the shareholder's marginal tax rate". Do we know that this is 'normal in practice as opposed to what is in legislation? Or what fraction of businesses or owner-shareholders manage to avoid the PIT top marginal rate by use of company/trust combinations or shared ownership with lower rate PIT payers?

2. I am not sure this is ever true! International competition for tax base whatever the form that takes is surely about relative tax rates across jurisdictions rather than one country's absolute level? Likewise, while I agree that the response of international flows to tax changes is a function of many things, it does not seem unreasonable to suggest that at the margin, when another country drops its company rate by 5%, this could have an effect on NZ-based firms' decisions on investment, profit and debt location etc. It is surely about gaining reliable estimates of the *size* of these responses for NZ.
3. If, as is generally argued elsewhere in these papers, the company rate is essentially a withholding tax for residents, this 'fairness' aspect seems much less compelling. If the reference to 'fairness' here is mainly related to high PIT rate avoidance via use of companies then this might suggest tighter rules and/or enforcement rather than whether or not to change the company rate.
4. See my comments on Paper 3 regarding the likelihood of rents. I think there should be some caution expressed here about whether there are significant economic rents in NZ that could be taxed.

   A related issue that could affect taxable economic rents in NZ is the fact that our large distance from foreign suppliers (other than Australia) means that a NZ producer (for the home market) who can produce at a cost, c, per unit faces competition from foreign firms at a price of c + T where T is the 'transport 'cost to NZ (where both NZ and foreign firms are equally 'efficient' at a marginal cost of c). Hence the domestic producer can sell at a price p = c + T and make excess profit of T. However, this may simply allow domestic producers that are inefficient by world standards (unit costs > c) to produce up to the point where domestic unit costs are c + T. Hence no taxable excess profit is observed and NZ simply has less efficient production. In this case there are no measurable rents to tax.
5. I still don't see much convincing evidence to believe that these rents are other than small in NZ. So where does that leave the 'judgement of officials' on the company rate level? And isn't imputation and the importance of trans-Tasman investment and profit flows a more substantial argument for at least maintaining parity with Australia?
6. This discussion – while worth covering for completeness – seems to me to be a distraction. If there are rents worth taxing in NZ they would have to be pervasive across the economy to make it worthwhile undertaking such a radical reform of the CIT, to a cash-flow or ACE system. By contract, if rents are important they are likely to be so in only a few sectors; in which case adopting a general cash-flow or ACE tax would seem to be potentially not the first-best policy, because it is not well targeted at the distortion (though it may have other more general benefits of course – as its proponents in other countries advocate).

For additional comments, see the annotated version of the paper.

Paper 2: Company Tax Modelling. Further Information for the TWG - Paper for Session 8 (23 pp)

- *Numbered comments below relate to the numbers assigned in the margins to the text of each paper*

General Comments:

This paper needs less by way of comment given that it essentially takes the modelling results discussed in Paper 1 and summarises them for the TWG. I therefore comment more extensively on Papers 1 & 3. The comments below should be read in conjunction with the earlier comments which I avoid repeating below.

One difference in this paper is that it addresses the question of *which* NZ firms foreign investors target for acquisition. The evidence points to foreign firms 'cherry picking' the most productive firms. This is not surprising – why would they target low productivity firms (for a given increment to the acquired firm's productivity that their new owners might expect to deliver)? But an interesting implication is that the marginal firm – in terms of productivity rankings – becomes a domestic firm/investor. Hence productivity improvements might be most affected by a company tax change to the extent these affect domestic-owned, more than foreign-owned, firms.

On economic rents – I have made a number of points elsewhere in my comments. But one clear conclusion to emerge from this paper, and its reporting of past Reviews, is that it is lamentable that the work required to establish the importance of economic rents for tax choices in NZ, and called for by these Reviews, has never been prioritised by officials. Surely now is the time to do so?

Detailed Comments (see paper margins):

1. I realise this is 'just' an Exec. Summary here but this simple presentation of the results without identifying their vulnerability to alternative assumptions leaves the impression that the issue is pretty much 'put to bed' – there are essentially no gains to be achieved from a 5% point tax cut. I would hope for more caveats or 'warning signs' early on. After all, you say elsewhere that this is a 'judgement call' and only 'on balance' against a company tax cut.
2. It is important to be aware that this argument about taxing economic rents is valid so long as foreign investors are not weighing up the after-tax rents than can be made in a number of international locations. In this case, the investment may well respond to the taxation of rents in NZ by shifting to locations with lower tax of similar rents. This could be especially important for the NZ multinational case where supply of the domestic market is dominant. E.g. as McDonalds or Starbucks consider where to focus their additional local investment or where to open new enterprises, the relative *after-tax* rent in different locations can be expected to be important.
3. This raises the important point made many years ago by Max Corden – on the importance of aligning the policy intervention as closely as possible to the source of the distortion. In Corden's trade context he argues this may mean using local production subsidies rather than import tariffs. In the present company tax context, it could mean

applying anti-avoidance rules instead of maintaining a higher CIT rate in order to deal directly with the distortion associated with legal form, rather than using the 'blunt' (less well targeted) instrument of the CIT rate, when it creates various other distortions if set too high.

4. I have not looked at the Australian CGE model in detail but have some familiarity with it. While it is clearly much more detailed and comprehensive than the NZ exercise undertaken by IR/Tsy, there remains the inevitable doubt that the 'black box' character of the CGE model means that the results are shrouded in a degree of mystery. For example, when a small effect is identified overall (e.g. across 111 sectors) is the model sensitive to the possibility of a small net effect arising from large gross, but opposite-signed, effects? Small changes in large individual (gross) effects can then have very big effects on the final 'net' outcome. Where a simpler model gives a consistent answer, this is encouraging but it begs the question of whether/where the additional complexity of the GCE is worthwhile and reliable. What would be an especially useful robustness test here would be to apply the simply structure of the NZ model to the Australian context to see whether it gives a similarly consistent result to the more complex CGE.

Paper 3: Impact of a Company Tax Cut on NZ Capital Stock (12 pp)

- *Numbered comments below relate to the numbers assigned in the margins to the text of each paper*

General Comments:

This is a very helpful and well-presented analysis based on a model that, though simple, is subjected to several alternative assumptions to test its results. I have a number of comments/queries about the details of some aspects of the modelling and about some of the illustrations used, especially around the size and likelihood of economic rents in various parts of the NZ economy. The overall conclusions seem to be reasonably robust, though I find the discussion on location-specific rents something of a distraction that appears to have very limited empirical backing (an absence of evidence rather than evidence of absence).

One area to be clear on is when the model results are revenue-neutral and when they are not (see detailed comments). At times the 'small response' argument seems to be based on the revenue-neutral case. But I have concerns with using this as the 'default' example, because results depends heavily on what is assumed about responses for this *other* tax – labour tax in the model. A more 'open' approach to how the budget constraint is met would be helpful.

The key conclusion – that income or revenue responses to a cut in the company rate would be small overall – is an important one; and generally hard to argue with based on the modelling (even excluding the arguments about rents!). But I would like to see some more justification in the form of answers to the question: what makes NZ different to most other countries in the OECD that lead them to be (possibly) on a race-to-the-bottom in company tax rates. Is it all down to imputation? If so, are we right to assert that the company rate effectively *only* acts as a withholding tax for domestic investors? Do the same imputation arguments apply to Australia? And therefore, is the greater estimated response by the Australian Treasury for Australia entirely due to their differences in model assumptions? If the answer to this last question is 'yes', then it points strongly towards a need to gather as much evidence as possible on the best estimates for the assumed values in NZ. Why should we think they would legitimately be different from those in Australia, or have Australian modellers got it wrong?

Finally, the paper examines the case for a company tax cut without ever mentioning the role of the Australian company rate. This seems odd; especially as (if I recall correctly) IRD's official advice in 2010 against reducing the company tax rate was partly tempered by what might happen to the Australian rate. The case for a NZ cut seemed to be stronger if the Australian rate was below that in NZ. Since the current Australian government seems to have more concrete plans now to reduce that rate, than was the case in 2010, how should this impact on your analysis and advice? I would expect that TWG members would certainly expect some answers to that question. However, it needs a more explicit 'trans-Tasman' analysis of investment flows than the current model could give, I suspect. [And though 'Paper 1' (as I have labelled it) discusses international competition and the company tax rate in some detail, it barely mentions Australia in this context (briefly on p.10)!]

Detailed Comments (see paper margins):

1. It seems odd to present this analysis of the company tax cut in conjunction with as assumed increased tax on labour (personal income tax?) – for two reasons.
   a. It conflates the positive impact of a corporate rate cut with the negative effect of the labour tax increase; and hence depends crucially on the *labour tax* assumptions.
   b. Unless modelling of a specific company tax/labour tax substitution policy has been requested it is better, in my view, to identify the *ceteris paribus* effect of a company tax cut funded by a lump-sum tax. The alternative budget constraint options can be discussed or formally modelled separately. E.g. an income tax or GST with higher distortion costs of the former, but the potentially high non-compliance costs of a higher GST rate.

   ***BUT**: the numbers you quote straight after the 'foregone revenue …tax on labour' statement "GDP increases by 1.34% …NNI … 0.54%" are not the numbers quoted later that includes the LS effect; instead they appear in the first 'no budget balance' table. So, I'm confused!*

2. Given comment 1 above, it follows that the argument about economic rents needs to be modified. Since raising income tax (if this is the 'labour tax' option considered) will also have distortionary effects, the argument about 'rents not needing to be too high' should be with respect to the impact of the company tax not the more specific 'net' company/labour tax option. Also, depending on where/how labour rents are earned by self-employed unincorporated businesses, there may also be rents associated with this tax. While this is not 'non-residents rents' (mentioned in the paper in this context) being taxed, it is still a relevant consideration when deciding the case for a company tax rate cut.
3. "In particular, that the supply of capital to New Zealand is perfectly elastic." I agree this is a strong assumption, even for a small open economy like NZ, further supporting your argument here. The lower elasticity assumed below (= 5) may be more suitable.
4. Debt funding of investment – but the key variable of interest is the *marginal* $ funded by debt, not the average. At the margin perhaps most of NZ's investment, especially foreign investment, is debt funded? And what if it is? Is there any conceptual arguments or evidence than can shed light on whether average and marginal funding are similar or different?
5. Summary of effects of FDI impacts – this all sounds fine. But, again, it ignores the possible impacts that company taxes may have on domestic investors – even *closed* economies worry about capital taxation impacts! [Implicitly the assumption here seems to be that the CIT is simply a withholding tax for the PIT. But, that itself is a challengeable assumption].
6. Good to see this NNI aspect emphasised. But why not use GNI? – it is the more naturally comparable 'income' measure to GNP, and avoids the highly uncertain measure of depreciation? I imagine, with your model, the growth rates of the two would be the same in any case? But GNI avoids having to talk about a second adjustment (depreciation) to GDP, unnecessary for making the case here.

7. Even a value of 5 seems quite a high elasticity but if the 'best estimates' for the US are around 3 (as stated) then it would surely be expected that the NZ elasticity would be higher?
8. This looks like an error to me, based on footnote 3. If the NNI effect is correct at 0.32% (one-third of 1%) then the calculation in footnote 3 of 0.32%/8% yields **0.04%, not 4%**. i.e. a negligible amount!
9. Land in fixed supply and rents … . I think the argument here is misleading and wrong to some degree (ignoring the *amount* of rent at issue above).Two basic points to begin:
    a. Land in the most meaningful economic contaxts is NOT in fixed supply.
    b. Fixed supply is not necessary for rents to exist; indeed the most common description of economic rents – due to monopoly profits in a standard textbook 'theory of the firm' usually involves infinitely elastic supply (marginal cost) but demand which declines with price *at the firm level*. Hence the crucial source of rents is the elasticity of *demand* not supply.

    But clearly, fixed supply could give rise to rents - but it is neither necessary nor sufficient. In the case of land, if it was genuinely fixed in supply from an economic production point of view, then agriculture should be awash with rents! Rather, land must have particular unique qualities – such as mineral springs – that cannot be replicated readily elsewhere, to yield some monopoly power to the land owner. Or rent-yielding reputational effects may be created - think *Central Otago* Pinot, or *Champagne* – which then confer some monopoly power on the producer. But, even here, the degree to which such rents can be exploited will depend on the closeness of available substitutes in demand. For foreign direct investors, such as McDonalds or Starbucks, there could conceivably be some firm-specific rents than can be exploited in NZ because, as a service industry (non-tradable), NZ consumers may have few alternatives. Even here I would be sceptical without evidence that these exploitable rents are other than quite small in NZ.

    If I was looking for economic rents in NZ, I would instead be looking for industries that are subject to restrictions on entry and/or highly regulated business practices. Finance/banking then seems a natural candidate with highly restricted operating licenses. Lawyers and accountants also have quite high qualification entry requirements to operate but once qualified, regulations are arguably relatively low and there are few economies of scale. Hence 'many producers' in this case may (mostly) prevent high rents being earned.

    This suggests to me, that if rents were to be taxed by a company tax regime in NZ it would be better targeted at 'high-rent' banking sector firms, (as noted in the paper), not land-based firms. This makes a relatively simple case analogous to Australia where in their case the stand-out rent was in the mineral/mining sector (and probably banking too). Interestingly, this also answers Michael Cullen's concern when Finance Minister: why give foreign banks a free lunch by cutting the corporate rate? Answer: don't – have a (separate) 'banking rent tax' or higher company tax rate for financial institutions! After all, they also currently pay limited GST!

In short – the 'land as a source of rent' illustration in the paper is misleading and best avoided in my view. It certainly isn't the best case to use to assess the likelihood of rent at 4% (or 0.04%?) of GDP. If instead you use the banking sector as your illustration, an interesting question is: what tax level would it take to persuade the Australian banks to give up on NZ or otherwise substantially cut back their presence? I doubt there is an easy answer to that, highlighting the difficulty of measuring their rents.

10. I agree 0.4 sounds high (and is footnote 6 missing some text?). But of course, your high LS elasticity will raise the cost of funding a company tax cut by an income tax rise, as you show nicely in the next table. Why do you switch to a 5 percentage point cut in this example but an 8 percentage point cut in the previous case? A key result seems to be that applying the Australian assumptions raises the GDP effect by about 2 times (0.7% to 1.5%). Again, the use of the labour tax-funded company tax cut in this example puts a particular slant on the result – a slant *against* a company tax cut. Surely, good tax policy advice would be to replace the lost company revenue with the *least* distorting alternative tax, other things equal. And if redistribution is a policy concern – potentially supporting the use of the personal income tax – then other (e.g. tax planning/avoiding) considerations would need to be factored into the analysis.
11. This could be the world interest rate plus a *fixed* country-specific risk premium (as some would argue for in NZ) and the argument below still follows through.
12. But what if (as may be relevant in various cases) the NZ tax is able to be fully (or partially) offset against the foreign firms' tax liability in their home country? [Where the opportunity cost of the foreign firm's investment in NZ is to invest at home]. The effective tax rate impost may then be much smaller than the statutory rate, *t*.
13. I presume the impact of depreciation on revenue here is a (long-run) *approximation* for actual fiscal depreciation? But in present value terms it will be lower due to the delay in the payment schedule for fiscal depreciation?
14. "Changes to the company tax rate (…) are assumed to have no impact on domestic tax revenues". Seems a strange choice. Hence also assumed no investment response? (Or just no net revenue effect of increased investment?). Crucial to know what is being assumed about NZ domestic firms' investment response – as above, even in a closed economy, 'no response' would be an extreme assumption.
15. Profit shifting - it is not clear to me from the description whether your profit-shifting analysis allows for the possibility that firms shift gross profits into NZ with a lower company rate and/or shift debt out of NZ in response? Also, some analysis – by Slemrod and others – suggest that the incentive for profit-shifting created by international statutory rate differences may stimulate some *real* investment shifts – in order for the profit shifting to appear more credibly as resulting from a genuine economic production choice!

Paper 4: Note on Incorporating Profit Shifting (4 pp)

- *Numbered comments below relate to the numbers assigned in the margins to the text of each paper*

General Comments:

A very helpful and important exercise to undertake since profit-shifting may be a much more relevant behavioural response margin than 'real' investment flows (FDI). The results are very instructive and seem to be correctly worked out in general. However, the maths is badly expressed in several places such that it is hard to follow. My detailed comments below indicate what I think is intended and suggest some amendments.

The terms 'mechanical effect' and 'behavioural effect' of a tax rate change have become commonly used in the tax literature to depict the arithmetic outcome of raising the tax rate (with no tax base change) and the behavioural tax base response to the rate change. These terms are not used here but they could be useful as a way of clarifying the exposition and also a way of highlighting when the (negative) behavioural effect of a tax increase on revenues begins to seriously undermine the (positive) arithmetic effect. Or *vice versa* in the example of a possible NZ company tax rate *cut*. For example, the paper's conclusions might usefully draw attention to the final table in the paper which shows that profit-shifting reduces the current 28% rate to an effective rate of just 24.6% (i.e. 3.4% points less) but at a 20% company rate, profit shifting has a much smaller effect: reducing the effective rate to 18.6% (only 1.4% points lower than the statutory rate). The important role of the *assumed* value of the semi-elasticity should also be stressed.

I assume from section 9 that the intention is now to apply these alternative tax rates to the previous 'real' investment response model. This seems sensible.

Detailed Comments (see paper margins):

1. I am not familiar with de Mooij and Devereux (2001) and have not been able to track it down; perhaps the working paper by de Mooij and Ederveen (2001) was intended (subsequently published in *Int. Tax & Public Finance* (2003), or Devereux and de Mooij (2011)? An update to the 2001 de Mooij-Ederveen study, by de Mooij and Ederveen (2008), provides a comprehensive range of corporate tax semi-elasticities at various margins of adjustment. For profit-shifting their 'best estimate' from meta-analysis is an average of -1.2. [See: de Mooij, R.A. and Ederveen, S. (2008) *Corporate Tax Elasticities. A Reader's Guide to Empirical Findings*. Oxford Centre for Business Taxation Working Paper No. WP08/22. Also available as: *Oxford Review of Economic Policy*, vol. 24(4), pp. 680-697, winter]. Devereux and de Mooij (2011) report an imposed/calculated value of -0.73 for the semi-elasticity, but note that (pp18-19):

> "The elasticity of transfer pricing with respect to the corporate tax rate is determined by the parameters in the cost function and is set to obtain a tax elasticity of transfer pricing of around − 1.4 on average over all countries. To compare this to the empirical evidence on profit shifting, we translate it into a semi-elasticity of the corporate tax base, which requires multiplying it with the share of intrafirm trade (which, in CORTAX, is proportional to bilateral FDI stocks). We thus obtain a mean value of the semi-elasticity of

− 0.23, i.e. the corporate tax base shrinks by 2.3% due to profit shifting if the corporate tax rate is increased by 10%-points.
… Together with transfer pricing within the 29 countries of CORTAX, the average semi-elasticity of the tax base via profit shifting thus equals -0.73. This comes close to aggregate estimates of profit shifting reported in empirical studies. Indeed, De Mooij (2005) reviews these studies and reports an average semi-elasticity of −1.0. Note, however, that the variation in empirical estimates is large."

So, the relevant size of the semi-elasticity in the paper for NZ needs careful thought.

2. The way the maths for this section is presented is very confusing, badly written and may even be wrong – but it is hard to tell because equations are not numbered and terms are not defined clearly. In the annotated version of Paper 4 I have added equation numbers (1) though (4). Page 1 then reads:

"For a semi-elasticity of $\boldsymbol{\varepsilon}$ for the tax base as a function of the difference between $\boldsymbol{t}$ and $\bar{\boldsymbol{t}}$, the tax base shifting index, $\boldsymbol{B}$, as a function of $\boldsymbol{t}$ can be written as:

$$\boldsymbol{B}(\boldsymbol{t}-\bar{\boldsymbol{t}}) = \boldsymbol{e}^{\boldsymbol{\varepsilon}\times(\boldsymbol{t}-\bar{\boldsymbol{t}})} \qquad (1)$$

If $\boldsymbol{t} > \bar{\boldsymbol{t}}$, then $\boldsymbol{B}(\boldsymbol{t}-\bar{\boldsymbol{t}}) < \boldsymbol{1}$, and vice versa.

What is $\bar{t}$?

The function $\boldsymbol{B}$ can be considered to apply on a country by country basis so that $\boldsymbol{Y_i} \times \boldsymbol{B}(\boldsymbol{t}-\boldsymbol{t_i})$ is the amount of income which is shifted to or from country $\boldsymbol{i}$ depending upon whether $\boldsymbol{t_i}$ is lower or higher than $\boldsymbol{t}$."

It is not clear whether $\boldsymbol{B}(\boldsymbol{t}-\bar{\boldsymbol{t}})$ is simply 'a function' or if *B times* $(t-\bar{t})$ is intended. If it is a function then this way of presenting it is unnecessary since the function is clear from (1) as $\boldsymbol{B} = \boldsymbol{e}^{\boldsymbol{\varepsilon}\times(\boldsymbol{t}-\bar{\boldsymbol{t}})}$.

However, if $\boldsymbol{B}(\boldsymbol{t}-\bar{\boldsymbol{t}})$ in (1) is indeed a function then then "$\boldsymbol{Y_i} \times \boldsymbol{B}(\boldsymbol{t}-\boldsymbol{t_i})$ is the amount of income which is shifted" cannot be correct, since it implies that ALL of the tax base is shifted when $\boldsymbol{t} = \boldsymbol{t_i}$; that is, B = 1. However if the 'amount shifted is $\boldsymbol{Y_i} \times \boldsymbol{B} \times (\boldsymbol{t}-\boldsymbol{t_i})$, then this value equals zero when $\boldsymbol{t} = \boldsymbol{t_i}$ and the shifted tax base is zero as expected.

Working on the assumption that $\boldsymbol{B}(\boldsymbol{t}-\boldsymbol{t_i})$ is a function, and using 'B' as a suitable abbreviated form, then it seems that B is not an index of the 'amount shifted' but it is an index of the amount NOT shifted; i.e. remaining un-shifted.

Consider re-writing (1) in the simpler form as:

$$ln\boldsymbol{B} = \boldsymbol{\varepsilon}(\boldsymbol{t}-\bar{\boldsymbol{t}}) \qquad (1')$$

such that $\boldsymbol{B}$ is a tax base <u>index</u> capturing the fraction of the tax base that is <u>not</u> shifted, $\boldsymbol{\varepsilon}$ is the semi-elasticity and is multiplied by $(\boldsymbol{t}-\bar{\boldsymbol{t}})$. Hence from (1'), $ln\boldsymbol{B} = 0$ (B = 1) when $\boldsymbol{t} = \bar{\boldsymbol{t}}$. And the tax <u>base</u> in country *j* that is *not* shifted, is $\boldsymbol{Y_jB}$ such that $\boldsymbol{Y_jB}$ =1 when $\boldsymbol{t} = \bar{\boldsymbol{t}}$. To illustrate, for example if $\boldsymbol{\varepsilon}$ = –1 then we get:

when $t-\bar{t}=0$	lnB = 0,	B = 1
when $t-\bar{t}=0.2$	lnB = –0.2	B = 0.819
when $t-\bar{t}=0.1$	lnB = –0.1	B = 0.905

That is, when the home tax rate, t, is 20% larger than the international average rate, $\bar{t}$, then 82% of the tax base is retained at home; if the tax rate difference is less, at 0.1 (10%), then 90% of the tax base is retained at home.

⇒ Is this what is intended from this section of the paper? It appears to be consistent with the numbers appearing in the first (unnumbered) table on p.2; except that the value of 'B(t)' in the right-hand '30%' column should be 86.4% not 84.5%. [And B(t) should be $B(t - \bar{t})$ if you stick with this 'style' of presentation].

3. This is a very useful section leading to the estimates for the two tax rates in the first table in section 5, clarifying the differences in the 'effective' tax rates from the points of view of the firm and the government's revenue.

4. I don't like the use of 'et' in this context as a symbol for a tax rate because it is easily confused with 'e *times* t'. Since it is an average tax rate, it might be better to label it 'a' or similar, or t*? Or why not try t^g for the government's effective tax rate (instead of t')and t^f for the firm's effective tax rate?

5. It is worth noting here, from the table, that the 'undermining' of the statutory tax rate by profit-shifting is noticeably less with a lower statutory rate. Thus t' is 2.1 percentage points below the statutory rate of 30% (27.9) but only 1.4 percentage points below when the statutory rate is 20%. I think it would also be helpful to include a second table where $\boldsymbol{\varepsilon}$ is set greater (in absolute value) than -0.73 – perhaps -1.0 or -1.2?

6. This, and the next table in section 6, need clarifying. What are the numbers in each column – the CoC (under what other assumptions)? And which effective tax rate is applied to derive them? The sentence says 'to make FDI less responsive to changes in the statutory tax rate'. But FDI does not respond to statutory rates – it responds to effective marginal, or effective average, tax rates (at the intensive and extensive investment margins respectively). Which is the rate you use here as a proxy for 'et'?

7. Section 7 is a helpful exercise – it effectively calculates the top of the Laffer Curve for the corporate tax where profit-shifting is the only response. Not surprisingly, it suggests (with an elasticity of -0.73) that tax rates could be raised beyond 100%. However, the final sentence gives the impression that only when such profit-shifting gets very severe ('runs amok') that a cap on tax rates is needed. However, long before reaching the top of the Laffer Curve we should be concerned about the loss of revenue due to these behaviour responses (even ignoring the investment response). For example, even with just a 20% point higher tax rate than the average overseas rate, and with a semi-elasticity of -1.0, almost 20% of the tax base is lost to profit-shifting overseas (and over 25% is lost if $\boldsymbol{\varepsilon}$ = -1.5).

   This issue seems especially relevant to the 'NZ v Australia' company rate issue, both because it highlights the likely importance of company tax rate difference across the Tasman, and because profit mobility can be expected to be high in this case, especially given the sizeable contribution of Australian banks in NZ company revenues, and the ease with which bank profits generally can be shifted.

8. More to come here (section 9) I presume?

Paper 1 Appendix: Company tax rate issues

Background Paper for Session 6

of the Tax Working Group

March 2018

Prepared by the Inland Revenue Department and the New Zealand Treasury

TABLE OF CONTENTS

1. Introduction

1.1 Purpose

1. This paper sets out issues relating to the company tax rate and thin capitalisation rules in an international context.

1.2 Content and scope

2. This paper covers the question of the company tax rate, primarily from the perspective of the level of capital invested in New Zealand, taking into account the effect of the company tax rate on foreign investors, who are an important source of investment in New Zealand.

3. The paper looks at:

- New Zealand's company tax rate compared to other OECD countries
- The question of thin capitalisation rules, which provide for a maximum level of debt attributable to New Zealand investment.
- International tax competition and New Zealand's response.
- Whether it would be in New Zealand's interests to have a lower company tax rate.

2. Issues

2.1 New Zealand's company tax rate

4. At 28%, New Zealand's company tax rate is relatively high by international standards. For domestic shareholders, New Zealand's *imputation regime* means that the final tax rate on investments in companies is normally taxed at the shareholder's marginal tax rate[2]. When factoring in imputation, New Zealand's tax rate on domestic shareholders is the sixth lowest in the OECD. Foreign shareholders do not receive imputation credits and for them it is the company rate that is relevant.

Commented [A1]: 1.

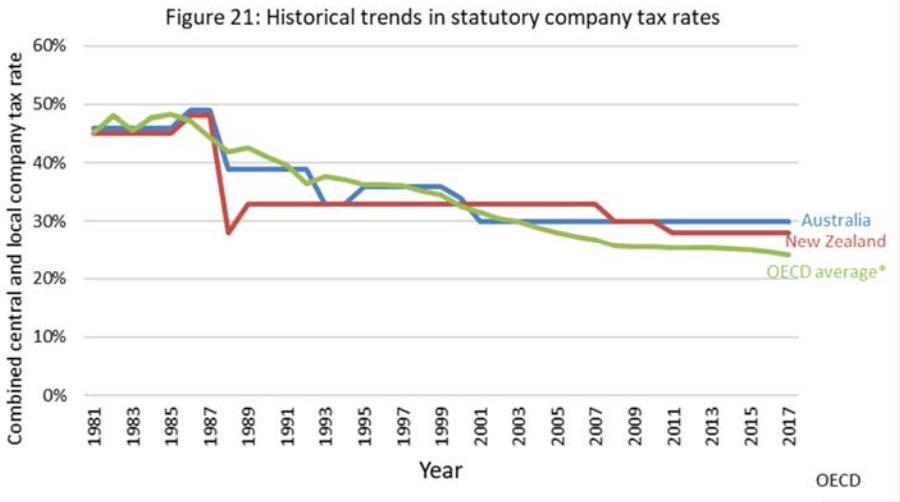
OECD member	Corporate rate (including sub-central government)
United States	38.9
France	34.4
Belgium	34.0
Germany	30.2
Australia	30.0
Mexico	30.0
Japan	30.0
Portugal	29.5
Greece	29.0
New Zealand	**28.0**
Italy	27.8
Luxembourg	27.1
Canada	26.7
Austria	25.0
Chile	25.0
Netherlands	25.0
Spain	25.0

[2] This is done by companies attaching an imputation credit for the company tax paid when it pays dividends to domestic shareholders.

Korea	24.2	
Israel	24.0	
Norway	24.0	
Denmark	22.0	
Sweden	22.0	
Switzerland	21.1	
Slovak Republic	21.0	
Estonia	20.0	
Finland	20.0	
Iceland	20.0	
Turkey	20.0	
Czech Republic	19.0	
Poland	19.0	
Slovenia	19.0	
United Kingdom	19.0	
Latvia	15.0	
Ireland	12.5	
Hungary	9.0	

5. As at 2017 New Zealand's company rate is the 10th highest in the OECD, with the unweighted OECD average being 24.9%[3].

[3] This statistic does not include the recent corporate tax rate cuts in the USA, from 35% to 21%.



6. New Zealand has reduced its rate in recent years (in 2007 it was 33%), but other OECD countries have reduced their rates more than New Zealand, resulting in New Zealand climbing up the OECD rankings of corporate tax rates. As at 2017, OECD corporate rates were[4]:

7. When examining incentives to invest in New Zealand it is the *effective* company tax rate that is more relevant than the statutory rate. The effective company rate takes into account tax base issues, including deprecation rates, methods of financing, as well as the statutory rate. If investment is financed entirely with equity, the statutory rate is relevant. For investment funded by debt, the interest paid is deductible against the income tax base in New Zealand. Accordingly, the New Zealand tax paid on the underlying income is the non-resident withholding tax at a rate of 10% or 15%, depending on whether the residence country of the parent is a treaty country or not. However, interest deductions are limited by specific rules in legislation to limit the reduction in tax that could be achieved through debt.

2.2 Thin capitalisation

8. The single most important tax base issue in determining New Zealand's share of the taxes payable on income earned on foreign direct investment (FDI) is the method of financing employed by the parent company of the New Zealand operations. In particular, is the New Zealand subsidiary financed by debt or equity from the parent?

9. The distinction between debt and equity is largely arbitrary in related-party situations. The overall risk to the parent company is not generally affected by choices between these two methods of financing the operation of subsidiaries. The arbitrary nature of the distinction means that in the absence of any restrictions a New Zealand subsidiary could be financed

[4] Again, noting that the United States has since dropped its central government corporate rate from 35% to 21%.

almost exclusively with debt which might lead to interest deductions offsetting most or all income otherwise taxable in New Zealand.

10. The amount of tax payable to New Zealand on the investment is substantially affected by the choice. Investments funded by equity are subject to full taxation at the 28% company tax rate on the income generated by their New Zealand operations. On the other hand, for investment funded by debt, the interest paid is deductible against the income tax base in New Zealand. Accordingly, the New Zealand tax paid on the underlying income is the NRWT at a rate of 10% or 15%, depending upon whether the residence country of the parent is a treaty country or not.

11. Thin capitalisation rules can play an important role in restricting interest deductions so that they do not unduly erode New Zealand's share of tax. A company is said to be "thinly capitalised" if it obtains a lot of its funds as debt. It is "thinly capitalised" because the equity portion of investment is low. The Income Tax Act has "thin capitalisation rules" to limit the amount of debt able to be attributed to New Zealand investment.

12. Unlike in many jurisdictions, New Zealand's thin capitalisation rules apply to unrelated party debt, as well as related party debt. Rather than a parent lending directly to its New Zealand subsidiary, it could arrange for the subsidiary to hold much higher third-party debt than the parent. This can be a close substitute for direct lending by a foreign parent. Accordingly, the rules respond to concerns about third-party borrowing being done through New Zealand in a manner that erodes the tax base. Australia's thin capitalisation rules also apply to both related and unrelated-party debt. Thin capitalisation rules limit base-erosion by a variety of BEPS schemes that rely on increasing interest deductions.

13. While the underlying policy framework for thin capitalisation is an apportionment of debt among countries, a safe-harbour ratio of debt to assets, below which interest is not restricted, simplifies compliance with the rules. The safe harbour was changed in 2010 from 75% to 60%. This change has been paralleled in a number of other jurisdictions, notably Australia, which has a thin capitalisation framework similar to New Zealand's.

14. Thin capitalisation rules on inbound investment could potentially increase both tax revenue and national income through the replacement of debt with equity. At the same time, they could discourage investments that would otherwise be economic by raising taxes on such investment.

15. Choosing thin capitalisation thresholds will involve trade-offs between the potential effect on the pre-tax cost of capital and level of investment on the one hand and the benefits to New Zealand arising from having taxes paid in New Zealand on the other.

Commented [A2]: I know what you mean by this (from the user cost literature) but for non-economists would 'tax-inclusive' be a better term?

16. Moreover, there are other issues as well that may be important. An important consideration when the thin capitalisation safe harbour was reduced from 75% to 60% was that 75% was an extremely high level of debt that would not be seen in arms' length situations. Thus, the former safe harbour was seen as allowing an unreasonable stacking of debt into New Zealand. New Zealand's actions here can be seen as an early response to concerns about BEPS.

17. It should be acknowledged that the thin capitalisation safe harbour is ultimately a judgement call. There is no hard evidence which would allow us to determine an "optimal" safe harbour ratio. New Zealand already collects the most company tax as a % of GDP in the OECD, and officials are not aware of any strong grounds for tightening thin capitalisation rules further. A further tightening of the safe harbour would increase effective tax rates on inbound investment for firms that are close to the safe harbour threshold. A danger of doing this is that this would deter investment and may in the longer term create downward pressures on the New Zealand company tax rate. This could in turn make company tax less effective as a backstop to maintaining a progressive personal income tax system.

Commented [A3]: Does evidence (if it exists) on how many firms are close to the threshold help here with conclusions about how much the thin cap constraint 'bites'.

2.3 International tax competition and New Zealand's response

18. Sometimes commentators suggest that New Zealand should cut its company rate to be "competitive".

19. There are three key elements to international tax competition:
    - competition between countries for tax base;
    - competition for business headquarters; and
    - competition for foreign investment.

20. In terms of competition for tax base, lower rates overseas may incentivise firms to shift profits out of New Zealand into a lower-tax country with deductible payments such as interest, or transfer pricing measures. New Zealand has specific and general anti-avoidance rules to mitigate this risk, but the greater the difference between foreign and domestic company tax rates, the greater the incentive to look for ways around our rules. Having said that, lowering tax rates might be an expensive way to reduce profit shifting, since it lowers taxes on the tax base that remains in New Zealand.

21. In terms of competition for business headquarters, there may be some New Zealand firms with substantial foreign shareholding that will choose to leave New Zealand if foreign rates are low enough or New Zealand rates are high enough. However, for New Zealand companies with a substantial New Zealand shareholder base, the New Zealand tax settings mean it is advantageous to remain New Zealand headquartered (as tax paid in foreign jurisdictions cannot be passed on as a credit to New Zealand shareholders, whereas New Zealand tax can).

Commented [A4]: But this doesn't address the question of whether NZ should follow the Irish model – of internationally especially low company rates to attract HQs. I would think is worth a paragraph or two to lay out the key elements for/against this argument.

22. New Zealand relies heavily on inbound investment to fund its capital stock, and as a result, if tax is an undue impediment, New Zealand will ultimately have lower capital stock. This can result in higher prices and lower wages for New Zealanders. This is generally because workers are more productive when using more capital.

23. However, on competition for foreign capital, the international "competition" aspect is sometimes overstated. Generally, if an investment makes sense in New Zealand with a 28% company tax rate, it does not suddenly become uneconomic because a foreign country drops its rate from (say) 30% to 25%. If the foreign country attracts such a large amount of capital due to its tax cut, it may raise the required return on global capital. In that case, projects that were viable in New Zealand may not be viable after the tax change. However, required

returns on global capital are affected by many things, only some of which are tax related. More importantly, the fact that it was caused in this instance by an overseas tax change does not imply that New Zealand must react with a tax change of its own. The converse of this is that it may be in New Zealand's interests to lower its company tax rate to attract foreign capital (discussed below), but this is independent of whatever is happening overseas (aside from the transfer pricing issue).

Commented [A5]: 2

2.4 Is it in New Zealand's interests to cut the company rate?

24. This brings us to the question of whether it would be in New Zealand's interests to lower the company rate. There are costs and benefits of such a decision. The following table sets out the relevant considerations and which direction they suggest setting the company tax rate.

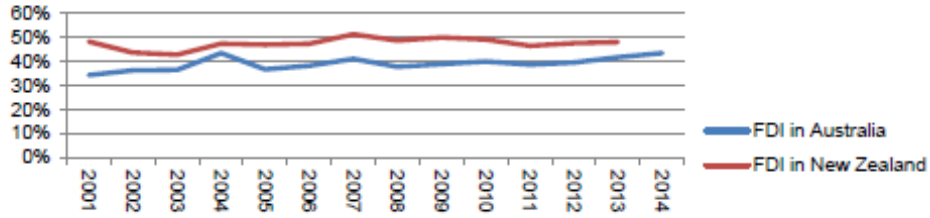
Issue	**Points towards a company tax rate which is…**
Increase foreign direct investment and labour productivity in New Zealand	Lower
Reduce profit shifting	Lower
Tax non-residents on location-specific economic rents	Current level or higher
Tax non-residents on existing investments	Current level
Maintaining tax system coherence/integrity – including fairness concerns	Current level or higher

Commented [A6]: 3

25. A company tax cut would result in some non-viable projects (due to the current tax impost) becoming viable. Under some very strong assumptions (including perfect mobility of capital and no economic rents), any corporate tax rate that applies to foreign direct investment is not in New Zealand's interests, as it simply increases the pre-tax rate of return until the post-tax rate of return equals the global rate of return, and New Zealand imports less capital and has a lower-productivity economy. There are no studies we are aware of on the sensitivity of FDI to the company tax rate in New Zealand. International studies generally report quite high sensitivities. The sensitivity of FDI to domestic company taxes is likely to differ markedly across countries. New Zealand is a very long way from the rest of the world. Much FDI to New Zealand may be associated with supplying goods and services to domestic markets. At least traditionally, it will often be hard to do this without establishing a base in New Zealand. In this case, tax is much less likely to play a critical factor in investment decisions. If companies can supply goods and services to New Zealand without a physical presence, then the company tax will not apply to them anyway (under current frameworks) and so the company tax is irrelevant.

26. As illustrated in Figure 1 below, the two recent reductions in the company tax rate in New Zealand (from 33% to 30% on 1 April 2008 and from 30% to 28% on 1 April 2011) did not cause a surge of FDI into New Zealand. Nor did it show up in NZ's level of FDI increasing relative to Australia's. Australia had no cut in its company rate over this period. This is not a sophisticated analysis - many things were happening at the same time, such as the Global Financial Crisis, and other tax changes (for example, New Zealand's second company rate cut in 2010 was accompanied by tighter thin capitalisation provisions and a tightening of depreciation rules). But it should at least cause us to question any assumptions that company tax cuts could play a major role in the level of investment in New Zealand.

Figure 1: Stock of FDI as percentage of GDP



27. A further caution against cutting the company rate is that this would mean reducing taxes on location-specific rents. Economic rents are returns over and above those required for investment in New Zealand to take place. Location-specific rents arise from factors that are linked to a location. Such factors could include resources, or access to particular markets that allow above-normal profits to be earned.

28. These returns can be taxed without discouraging investment into New Zealand. This is because a portion of the rent would still accrue to the investor, ensuring that the investment would still be viable despite taxation.

29. Economic rents are an efficient source of taxation, but are especially valuable when they are earned by non-residents. Because New Zealand gains (through greater tax revenue) but does not bear any of the costs, New Zealanders gain at the expense of non-residents. When the economic rents of New Zealanders are taxed, New Zealand gains at the expense of particular New Zealanders.

Commented [A7]: 4

30. A cut in the company tax rate will also provide windfall benefits to those who have invested in New Zealand in the past.

31. One important part of the reason for why other countries have tended to reduce their corporate rates over time is that the competition for tax base and location of companies is likely to be far more important in countries that are close substitutes. In Europe, it is likely that a business could supply the entirety of the area in any one of a number of countries. In that case, a tax rate decrease may attract businesses that were otherwise largely indifferent as to location.

Commented [A8]: And why is this irrelevant to NZ? Some comments would help. E.g. Why 'Asia is not Europe'? Why would we not expect the Googles to move to NZ (if we had a 10% CIT rate) the way it moved to Ireland?

32. A reduction in the New Zealand company rate would negatively impact on the integrity of the overall tax system as people would be likely to shelter income in companies to avoid the top personal rates. The top personal tax rate, and the rate for trusts, is 33%. The 5% rate differential between the company and personal tax rates already encourages tax-sheltering arrangements, and the rewards from these arrangements increase the greater the differential.

Commented [A9]: But other countries cope with much larger differences in CIT and top PIT rates than this. Why can't NZ, or what do we have to do to be able to? (a CGT –as mentioned in para. 37?; different corporate qualifying rules for tax purposes?)

33. All of this leads us to conclude that, on balance, in the judgement of officials it would not be in New Zealand's best interests to lower the company tax rate. The key judgement in

this assessment is the level of economic rents earned by foreign investors. If these economic rents were small, or were likely to be decreasing over time, a better case could be made that New Zealand should lower its company rate.

Commented [A10]: 5

34. At the same time, this assessment is very much a judgement call. The Australian Treasury has modelled the effects of a company tax cut in Australia. The modelling finds modest gains in national welfare from reducing the corporate rate[5] (0.1% improvement when the loss of revenue from the 5% corporate tax rate cut is made up by increasing personal income tax).

Commented [A11]: This must surely depend on HOW the PIT is used to make up the revenue – i.e. which rates or thresholds are changed? The distortionary costs are likely to vary a lot across the income distribution.

35. Of course, there are other dimensions of wellbeing aside from national income. At an aggregate level the impact on fairness derives from the assumed impact on national income. If national income declines because foreign investors' benefits from the reduced tax on economic rents is greater than the benefits to New Zealanders, this is likely to be regarded as unfair. If national income increases because the benefits to New Zealanders are greater than the loss of tax on economic rents of foreign investors, then at an aggregate level a company tax rate reduction may be regarded as fair, provided the benefits to New Zealanders are distributed in a fair manner (either as a result of the company tax cut itself, or through redistribution of the gains).

36. Even if national income increased, if, as a side product there were a material increase in tax sheltering because of the different rates for companies and individuals, the increase in national income may not justify the increase in unfairness caused by the increased tax sheltering.

37. There is also the question of whether the integrity problems from having a different top personal and company rate can be fixed. One way of mitigating the problem is broadening the taxation of capital income to include capital gains. This is because many of the tax-sheltering arrangements make use of the non-taxation of capital gains. The result is that if New Zealand taxed gains on shares, there would be greater flexibility for having different company and top personal tax rates. It is important to note that flexibility may become more important over time. While officials' judgement is that there is no need to cut the company rate, future governments may want to raise the top personal rate without raising the company rate, or cut the company rate without dropping the top personal rate. If so, measures that allow for a greater degree of difference between the top personal and company rate will be important.

2.5 Taxing rents

38. Economic rents can be an attractive target for taxation because, in principle, taxing them does not deter investment on the margin. As noted above one of the reasons that this paper concludes that reducing the company tax rate does not appear to be in New Zealand's best interests is the existence of location-specific rents.

Commented [A12]: As noted above I find this argument unconvincing empirically. And it would be strange to base a key piece of policy advice on a presumption such as this (even 'on balance').

[5] Treasury Working Paper 2016-02, "Analysis of the Long Term Effects of a Company Tax Cut".

39. We have been asked by a member of the Tax Working Group whether or not it would be sensible to attempt to tax these rents at a higher tax rate than ordinary income. Providing a full analysis of this issue would be a substantial task. It is assumed that the ordinary company tax would continue to apply. The rent tax would be a supplemental tax.

Commented [A13]: See my comments on Paper 3. If rents are concentrated in the financial sector such a specific 'supplemental' tax may not be so unthinkable.

40. There are a number of potential mechanisms. Two that have been discussed considerably in the literature (although not generally in combination with an ordinary income tax) are:

Commented [A14]: 6

- **Cashflow tax** – where capital expenditures as well as current expenditures are immediately deductible, there is no deduction for interest expenses and all receipts are taxable; and

,

- **Allowance for Corporate Equity (ACE) tax** – which would operate along similar lines to a standard company tax except that a normal return risk-free return on equity would be deducted from income

41. Of the two, the ACE is most distant from current taxing concepts as it requires the measurement of equity which is likely to be difficult with groups of companies and (if extended to unincorporated businesses) for these businesses. A cashflow tax can be calculated from amounts that are already required for income tax purposes.

42. In principle the net tax could be added to, or subtracted from, the income tax currently payable.

43. Assessing the implications of these changes is a substantial task. Officials have not had sufficient time to make a proper analysis. Therefore, officials ask the Group if they would like analysis of supplementary taxes on economic rents to be drafted for the interim report.

3. Conclusion

3.1 Summary of analysis

44. At 28%, New Zealand's company tax rate is relatively high by international standards. As at 2017 New Zealand's company rate is the 10th highest in the OECD, with the unweighted OECD average being 24.9%[6]. Despite this, in the view of officials it would not be in New Zealand's interest to cut the company tax rate.

Commented [A15]: And is our CIT base relatively wide also? Any evidence on this?

45. New Zealand relies heavily on inbound investment to fund its capital stock, and as a result, if tax is an undue impediment, New Zealand will ultimately have lower capital stock. This can result in lower wages for New Zealanders. This is generally because workers are more productive when using more capital.

46. The effects of a company tax cut would be:

- Greater capital investment in projects that are viable at the lower company rate (but would not have been viable at the higher previous rate), with corresponding benefits for labour productivity due to increased capital investment.
- Reduced pressure on base erosion and profit shifting – multinational companies that are able to shift profits out of New Zealand would have less of an incentive to do so with a lower New Zealand company tax rate.
- Windfall benefits to those who have invested in New Zealand in the past.
- Loss of taxation on location-specific rents (rents arising from factors that are linked to a location - such factors could include resources, or access to particular markets that allow above-normal profits to be earned).
- Increased integrity concerns from New Zealand investors sheltering income in companies, although this may be ameliorated through other policies, including a capital gains tax.

3.2 Concluding thoughts

47. Overall, in officials' judgement, the above effects when considered together (while pointing in different directions individually) suggest that a company tax cut is unlikely to be in New Zealand's best interests.

48. It is important to note that flexibility may become more important over time. While officials' judgement is that there is no need to cut the company rate, future governments may want to raise the top personal rate without raising the company rate, or cut the company rate without dropping the top personal rate. If so, measures that allow for a greater degree of difference between the top personal and company rate will be important.

[6] This statistic does not include the recent corporate tax rate cuts in the USA, from 35% to 21%.

49. Location-specific rents are an important part of the judgement in recommending not cutting the company rate. We intend to report in later meetings on environmental resource rental taxes and a financial activities tax, but ask the Group if they would like analysis of supplementary taxes on economic rents to be drafted for the interim report.

Commented [A16]: See comment 5 above!

3.3 Questions for the group

50. The questions we suggest the Tax Working Group focus on are:

- Would the group like material on the company tax rate to be included in the interim report?
    - What should be the broad conclusion of that material?
- Would the group like additional information on taxing rents differently to be drafted for the interim report, noting that we will report at a later date on environmental resource rental taxes, and on a financial activities tax.

Paper 2 Coversheet: **Company tax rate issues – further information**

Discussion Paper for Session 8 of the Tax Working Group

May 2018

Purpose of discussion

This paper expands on the Secretariat's paper provided to support the Group's previous discussion on the company tax rate. The paper briefly outlines the theory of company taxation in a small open economy. It sets out the Australian Treasury's modelling of company tax reductions, which was noted in the previous paper, in some detail. It also provides results of the Secretariat's preliminary modelling of company tax rate reductions for New Zealand, and reports similar results to the Australian Treasury's results. As requested by the Group, the paper recaps the company tax changes and forecasts that were made in Budget 2007 and Budget 2010, and provides some material on the nature of foreign investment in New Zealand. Finally, an appendix provides material on what previous tax reviews said about the company tax rate.

Key points for discussion

- How, if at all, does the additional analysis provided in this paper change the Group's thinking about the company tax rate?

Recommended actions

We recommend that you:

a **note** that the Secretariat's initial modelling of reductions in the company tax rates suggests only modest potential net benefits, a similar finding to the Australian Treasury's modelling analysis

b **note** that the Secretariat intends to have the modelling analysis externally reviewed.

Company tax rate issues – further information

Discussion Paper for Session 8
of the Tax Working Group

May 2018

Prepared by Inland Revenue and the Treasury

TABLE OF CONTENTS

Executive summary

This paper builds on an earlier paper: *Appendix: Company tax rate issues*. That paper formed part of the Business Tax paper, and this update provides more information as requested by the Group.

This paper describes the theory of company taxation in a small open economy. It notes that for New Zealand there may be important deviations from the most simple theories that need to be considered, such as the effects of a company tax cut when there are location-specific rents, and the fact that international capital may not be perfectly mobile.

Australian modelling that takes into account some level of economic rents shows small gains in welfare in the steady-state after a transition period from a 5 percentage point reduction in the company tax rate.

We describe the preliminary results of Inland Revenue's model of a 5 percentage point cut in New Zealand's company tax. This model assumes less than perfectly mobile capital, but does not attempt to model location-specific economic rents.

The cost of a company tax cut from 28% to 23% reduces tax revenue by $1.425 billion per annum. Economic indicators in the model change in the following way, both before and after a replacement labour tax to make the reform revenue-neutral:

Measure	Before replacement taxes (capital import elasticity of 5)	After replacement taxes (capital import elasticity of 5)	After replacement taxes (infinite capital import elasticity)
Capital stock	+1.36%	**+1.21%**	+1.47%
Capital/labour ratio	+1.04%	**+1.07%**	+1.27%
Wages	+0.78%	**+0.34%**	+0.49%
Labour supply	+0.31%	**+0.14%**	+0.2%
GDP	+0.74%	**+0.57%**	+0.72%
Net national income	+0.25%	**+0.11%**	+0.22%

When a labour tax replaces the lost revenue, net national income increases by 0.11% in the central case.

Commented [A17]: 1.

Budget 2007

We also set out company tax revenues as forecast and as actually collected after previous company tax changes. In Budget 2007 the company tax rate was cut from 33% to 30%.

Company tax ($m)	**2006/07**	**2007/08**	**2008/09**	**2009/10**
Forecast at Budget 2007	9,120	9,166	8,411	8,860
Actual	9,003	8,699	5,906	7,462
Difference (actual – forecast)	-117	-467	-2,505	-1,398

In Budget 2010 the following changes were made to company taxation:

- Rate lowered from 30% to 28%
- Building depreciation was removed
- Depreciation loading was removed
- The thin capitalisation threshold was changed from 75% to 60%

This was forecast to **increase** the tax paid by companies overall. The forecast changes resulted in the following assumptions for corporate tax, with the actual results directly below:

Company tax ($m)	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Forecast at Budget 2010	6,943	8,474	9,062	9,416
Actual	7,718	8,580	9,319	10,203
Difference (actual – forecast)	775	106	257	787

We have been unable to find any data on the split in foreign investment between greenfield investments and foreign acquisition, but we present some empirical findings on the performance of acquired firms, and make the point that foreign acquisition can fund further domestic investment by vendors.

Finally, an appendix provides material on what previous tax reviews said about the company tax rate.

1. Introduction

1.1 Purpose

51. This paper sets out issues relating to the company tax rate in an international context, building on an earlier paper: *Appendix: Company tax rate issues*. That paper formed part of the Business Tax paper, and this update provides more information as requested by the Group.

1.2 Content and scope

52. This paper covers the question of the company tax rate, primarily from the perspective of the level of capital invested in New Zealand, taking into account the effect of the company tax rate on foreign investors. Foreign investors are an important source of investment in New Zealand.

53. The paper:

- discusses the theory of company taxation in a small open economy;
- sets out the Australian company tax modelling in more detail;
- provides results of our own modelling and compares them to the Australian modelling;
- recaps the changes and forecasts that were made in Budget 2007 and Budget 2010 as requested by the Group;
- provides some material on foreign investment (particularly foreign acquisition of domestic firms) as requested by the Group; and
- provides an appendix with material on what previous tax reviews said about the company tax rate.

2. The Company Tax Rate

2.1 Company tax in a small open economy

54. Under certain strong assumptions, it will be optimal for a small open economy to levy no taxes on capital invested in the economy. The incidence of taxes on capital invested in the economy will be passed on to labour, but this will create higher deadweight losses than if labour were taxed directly. By itself, this would provide a reason for lowering the company tax rate to zero.

55. There are a number of counter arguments to this proposition. Two important ones are that capital might be less than perfectly mobile, and that there might be location-specific economic rents (i.e., above normal returns associated with firms locating in New Zealand, perhaps due to accessing resources or supplying goods and services to the domestic market). These returns can be taxed without discouraging investment into New Zealand. This is because a portion of the rent would still accrue to the investor, ensuring that the investment would still be viable despite taxation.

56. Economic rents are an efficient source of taxation, but are especially valuable when they are earned by non-residents. Because New Zealand gains (through greater tax revenue) but does not bear any of the costs, tax is collected without New Zealanders bearing the economic cost. When the economic rents of New Zealanders are taxed, tax is collected but this is at a cost to New Zealanders.

57. As outlined in the earlier paper on company tax, a reduction in the New Zealand company tax rate would negatively impact on the integrity of the overall tax system, as people would likely shelter their income in companies to avoid the top personal rates.

Savings and investment

58. When examining efficiency and equity issues for a small open economy like New Zealand, it is critical to distinguish between capital income taxes on capital invested in the economy and capital income taxes on the savings of domestic residents.

59. The distinction between taxes on savings and taxes on investment can perhaps best be illustrated with a simple example. New Zealand is a net capital importer. Firms accessing capital from foreign markets will need to offer returns that satisfy foreign investors. Assume that foreigners demand a 5% return on their capital because they are able to earn this return from investing in other countries and will not accept a lower return from investing in New Zealand.

60. Suppose first that New Zealand levies no company income tax and ignore any withholding tax. In this case, New Zealand firms would need to generate a marginal rate of return of 5% to satisfy foreign shareholders. If New Zealand levies company tax, this will tend to drive up the pre-tax rate of return that firms need to generate to provide adequate after-tax returns to their foreign investors. With a 28% company

Commented [A18]: 2.

Commented [A19]: 3

Commented [A20]: Because the first is a 'free lunch' from foreigners!?

tax and assuming all investment is financed by equity[7], the pre-tax rate of return will be 6.94%, providing 5% after tax (5% = 6.94% * (1-0.28)).

61. By dropping the company tax rate, we reduce the pre-tax rate of return required by foreign investors and receive more investment. Importantly, this is the channel by which a lower company tax rate induces more investment. Because foreign investors are assumed to be the marginal investor, and because imputation is assumed to claw back the benefits from a lower corporate rate for domestic investors, this modelling assumes that there is no greater investment from domestic firms.

62. This assumption is unrealistic on two counts. The first is that there are likely to be investment opportunities in some sectors where foreign investors do not play a significant role and where domestic investors are likely to be the marginal investors. The second is that for firms that reinvest earnings rather than pay them out as dividends, there is a deferral benefit from the lower company rate that will act to lower the cost of capital for them. On this second point, one really has to decide whether this is a cost or a benefit. It is a benefit in the sense that it leads to more investment, but it has costs because it is only available if dividends are not paid out, and this narrowing of opportunities will be distorting if there are other investments available outside of the company (e.g. in another company or area of the economy). It is also a cost in terms of social capital, as we are taxing one form of income (active business income) at a lower rate than labour or other income, which may create horizontal and vertical equity concerns.

63. Due to these issues and the difficulty of modelling something for which we have no estimated parameters, our modelling (and the Australian modelling) assumes all additional investment is from foreign investors.

Commented [A21]: But this is surely dubious, and I think it important to get a sense of the magnitude of the consequences of this assumption. As a benchmark, what is the outcome if the marginal investor is assumed to be a domestic investor facing a final tax rate of the CIT rate?

2.2 The Australian Treasury's modelling

64. The Australian Treasury[8] uses a general equilibrium modelling approach. This allows for interactions between different taxes and models second-round effects of tax changes. The model uses a single representative household, and ignores the dynamic path to the new equilibrium. That means that transitional costs are ignored. The Australian paper suggests that this is mitigated by adopting conservative assumptions which likely overstate the required return to foreign investors.

65. Other modelling exercises that include the transitional adjustment assume that it can take a significant amount of time. The Australian Treasury cites a study suggesting that roughly half of the adjustment is completed in 10 years, with the full adjustment largely completed in 20 years.

66. The rest of this section summarises the Australian model and its results.

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[7] This assumption is relaxed in the model.

[8] Treasury Working Paper 2016-02, "Analysis of the Long Term Effects of a Company Tax Cut".

2.3 Overview of the Australian model

The results

67. The overall result in the modelling is a measure of household welfare. It is the "equivalent variation", which is the cash payment that the household would be indifferent to receiving when compared against the tax change. Therefore, a welfare improvement of 0.1% in the results means that if a household's after-tax earnings were $50 000 per year, it would be indifferent between receiving after-tax income of $50 (0.1% of $50 000) or having the tax change.

68. When the 5 percentage point company tax cut is made revenue-neutral by a personal income tax increase, the results are as follows:

Commented [A22]: See my comments on Paper 3!

- Gross domestic product increases by 1%,
- Gross national income increases by 0.6%,
- Real wages after tax increase by 0.4%,
- Welfare increases by 0.1%.

69. Gross domestic product (GDP) is a measure of total production in the economy. The increase in gross national income is lower than GDP, because gross national income does not include profits or income accruing to foreigners. The additional investment is largely financed by additional foreign savings which results in additional payments to foreigners. The welfare increase is lower than gross national income. In part this is because a higher capital stock requires ongoing higher levels of replacement investment. Thus, part of the additional GDP will be this higher stream of replacement investment. Also part of the increase in gross national income is due to workers working more hours, which is a cost.

70. The Australian paper tests the sensitivity of its results by changing assumptions. It generally finds that cutting the company tax rate continues to increase welfare but by very small amounts. The Australian modelling does not take account of the potential impact on social capital of having a greater gap between its company tax rate and higher rates of personal income tax and the additional sheltering opportunities this would create.

Model details

71. The Australian model has four economic decision makers:

- A representative household,
- Firms,
- Government,
- The foreign sector.

Households

72. The representative household is calibrated to be an "average" household. As a consequence the progressive personal income tax structure is ignored, and an "average" flat rate is applied to the household.

73. The household sells its labour services to firms and owns all domestically-owned capital. The household is subject to taxation on labour and capital income, and consumption. The household is assumed to have a fixed savings rate.

Firms

74. The model has 111 different sectors, which produce different goods or services. The firms maximise profits. Firms can employ 12 different primary factors:

    - Labour,
    - Eight types of produced capital,
    - Three fixed factors: land, firm-specific factors, and location-specific factors.

75. The firm sector is modelled as a single representative firm for each of 111 different sectors.

76. Economic rents are captured by having "fixed factors" that do not vary due to the tax cut. This means that tax lost on these factors does not induce any further investment in the factors. The important point to note is that the Australian model does attempt to incorporate economic rents, and foreigners are assumed to own 16% of the fixed factors, which in turn contribute 7% of gross domestic product.

Government

77. Government collects all taxes and uses revenue for its consumption of goods and services. The government is assumed to have no debt and maintain a zero primary budget balance (i.e., it funds expenditure out of current taxation).

78. The modelling looks at three scenarios, with a company tax cut financed by:

    - A lump-sum tax,
    - An increase in the average personal income tax rate,
    - A cut in real government spending on goods and services.

79. Because government spending in the model is assumed to not affect the welfare of households, the scenario where government spending is cut is less useful because it is assumed the government spending that is cut is worthless. As such the economic gains are overstated in that scenario to the extent that government spending is of any value. A lump-sum tax is also unrealistic as it assumes that the reduction in company tax is funded by a completely non-distorting replacement tax. In practice, just about any tax is likely to be distorting to some extent. A possible exception is

where tax changes remove loopholes and in doing so make the tax system more neutral and consistent. In this note we focus on the second scenario where a cut in the corporate rate is made up with an increase in the average personal income tax rate.

Commented [A23]: My view is you should compare both to see how much of the impact of the CIT change is CIT-specific and how much due to the budget balancing effect.

Foreign sector

80. Australia is assumed to be a small open economy. This means that Australia can access funds for investment, provided that the after-tax rate of return on capital equals the global rate of return. This is the channel by which a cut in the company rate leads to more investment. Because the "hurdle rate" or required pre-tax rate of return on capital falls, there are more investment opportunities in Australia that are worth undertaking, and firms identify and invest in those areas. Part of this may be additional investment by foreign-owned firms. Another part may be additional investment by domestic owned firms which are partly owned by foreign shareholders. Either way, it is assumed that any gap between investment and domestic savings is met by drawing on the savings of foreigners and to do so firms need to offer the returns that foreign investors demand.

81. The cost of capital takes into account the tax treatment of debt and equity, and assumes debt-to-equity ratios (based on statistical averages) for each of the 111 different sectors.

2.4 Preliminary modelling for New Zealand

82. In contrast with the Australian paper, we have conducted a much simpler modelling exercise, but the results are of the same order of magnitude. The Secretariat's model does not factor in location-specific economic rents earned by foreigners.

83. Our model is the product of preliminary internal work and has not been reviewed externally due to time constraints. The Australian model applies to a different economy, but has been much more rigorously tested. Both (NZ and Australian) modelling exercises lead to positive but quite small increases in national income. The Australian modelling shows that increases in welfare are likely to be very small and much smaller than the growth in national income.

84. The Secretariat understands these results may be of significant public interest. We therefore propose that the model be externally reviewed.

Commented [A24]: 4.

85. In modelling a company tax, there are a variety of assumptions that need to be made. The major ones we make for our modelling exercise are:

- the cost of capital for international investors;
- the debt/equity ratio used by international investors, and consequently, the effective tax rate on foreign investment;
- how responsive foreign capital is to changes in the cost of capital; and

- the rate of depreciation on capital.

86. The assumptions required for a full judgment also include:

- the level of location-specific economic rents earned by foreigners; and
- the transition – how long it takes for the "static" results modelled to be in full effect.

87. We do not model those assumptions, but discuss them later. We model a drop in the company tax rate from 28% to 23%. We assume an elasticity of capital of 5 in our central case, which means that if the rate of return in New Zealand increased by 1%, (e.g. from 5% to 5.05%) then the foreign capital stock would increase by 5%. We also present findings for perfect capital elasticity as an upper bound.

Commented [A25]: mobility … or 'infinite elasticity'

88. The reduction in company tax from a 5% drop in the company tax rate is approximately $2.4 billion per annum. If we exclude the effect on Crown-owned companies (because the Crown receives higher post-tax profits as well as lower tax), and assume that profits are paid out and shareholders of New Zealand companies pay higher tax at the shareholder level, the total fiscal cost to the Crown falls to $1.425 billion per annum.

89. The results are as follows:

Measure	Before replacement taxes (capital elasticity of 5)	After replacement taxes (capital elasticity of 5)	After replacement taxes (infinite capital elasticity)
Capital stock	+1.36%	**+1.21%**	+1.47%
Capital/labour ratio	+1.04%	**+1.07%**	+1.27%
Wages	+0.78%	**+0.34%**	+0.49%
Labour supply	+0.31%	**+0.14%**	+0.2%
GDP	+0.74%	**+0.57%**	+0.72%
Net national income	+0.25%	**+0.11%**	+0.22%

90. The capital stock increases and capital/labour ratio increases as foreign investors invest more capital in the economy given the lower pre-tax rate of return requirement. Wages increase as workers become more productive by using more capital.

91. Because wages increase, workers increase their supply of labour now that the returns to labour have increased.

92. GDP increases given the greater capital and labour being used in the economy.

93. In our simple model, the ultimate measure is net national income. Net national income accounts for the fact that some of the higher GDP pays foreign investors and

depreciation on capital. It is ultimately a measure of the total income of New Zealanders. The Australian welfare measure is superior in that it isolates the pure welfare gain, whereas net national income also factors in greater income from working more, which is a cost.

94. Replacement taxes are modelled as an increase in taxes on labour. Relative to the case where there are no replacement taxes, this reduces the increase in the capital stock and the increase in the labour supply, because the new tax reduces the after-tax wage. The capital stock and labour supply still increase relative to the status quo (i.e. no cut in the company tax rate).

95. Despite the fact that our model is a lot simpler than the Australian model, the results it produces are similar in magnitude: this gives us some comfort that we are not missing a big part of the story. Two factors that are not factored into our modelling are the presence of location-specific economic rents, and the transition path. If location-specific economic rents are material, then New Zealand may be worse off with a company tax cut due to the loss in tax revenue from economic rents where the tax is currently being borne by foreign investors. During the transition path there are likely to be differing profiles through time of costs and benefits, depending on many factors, including how quickly foreign investors increase their investment. If investment is delayed, the delay in higher wages will tend to reduce benefits while the immediate loss of tax revenue will increase costs. If investors bring forward investment in anticipation of a lower company rate cut this effect will be moderated.

96. There could be other, non-modelled benefits from attracting foreign direct investment (FDI), including multi-factor productivity spillovers from greater competition. Without being able to quantify these we have not modelled them, but note that we would expect the greater investment to be the primary channel affecting New Zealanders' living standards.

Commented [A26]: and expanding use of foreign 'frontier' technology.

97. Finally, we emphasise that the replacement taxes are modelled as taxes on labour. If the Group is considering other revenue-raising policies (including the extension of the taxation of capital income), there would be a case to consider offsetting income tax reductions (including on companies) in a coherent manner.

2.5 Previous company tax changes

98. The Group asked for information on what was forecast when the rate was cut previously, and how that compared with actual company tax receipts.

Budget 2007

99. In Budget 2007 the company tax rate was cut from 33% to 30%. This was forecast to reduce company tax revenue in the following manner:

Company tax ($m)	2006/07	2007/08	2008/09	2009/10
Company tax rate cut of 30%		-60	-675	-695

100. The aggregate forecast of company tax at Budget 2007 and the actual company tax revenue were:

Company tax ($m)	2006/07	2007/08	2008/09	2009/10
Forecast at Budget 2007	9,120	9,166	8,411	8,860
Actual	9,003	8,699	5,906	7,462
Difference (actual – forecast)	-117	-467	-2,505	-1,398

101. The Cabinet paper seeking agreement to the reduction said:

> We recommend reducing the company tax rate from 33% to 30%, with effect from the 2009 income year. (For companies with a 31 March balance date, the new rate will apply from 1 April 2008.) This will allow successful businesses to keep a greater share of their profits.
>
> The New Zealand economy operates in an inter-connected world where profits, investment and businesses are increasingly mobile. When the New Zealand company tax rate was last amended, in 1989, it was low by world standards. Company tax rates worldwide have in the meantime reduced, with the risk that New Zealand will become an unattractive outlier. This is a particular concern in the context of Australia, given the increasing integration of the trans-Tasman capital market.
>
> Reducing the company tax rate would boost the competitiveness of New Zealand-based companies and encourage more inbound investment by firms that have decided to locate in New Zealand. A lower company tax rate would also reduce incentives for firms to stream profits away from New Zealand.
>
> A lower company tax rate would tend to increase New Zealand's stock of plant, equipment and buildings, which would, in turn, boost labour productivity and wage rates.
>
> In addition, since it is not possible to measure and tax economic income perfectly, income taxes will inevitably distort investment decisions and impede corporate capital from flowing to its most productive uses. Reducing the company tax rate would boost capital productivity by reducing these distortions.

102. A background note on some modelling that informed the decision forecast a one-off increase of 0.8% in GDP but also said:

> There are reasons why this point estimate could either overstate or understate the eventual effect on GDP. On the one hand, it ignores second round effects. The increase in capital per unit labour has been calculated taking account of the change in the wage rental ratio brought about by the change in the company tax rate but not from any consequential increase in the

> wage rate. If the wage rate rises by the growth in private sector labour productivity of 1.2 percent, the wage rental ratio will increase by approximately 6 percent rather than the 4.8 percent assumed with a consequentially somewhat larger increase in capital stock and output.
>
> On the other hand, there are a number of grounds for believing that this overstates the benefits of such a change. First, it is important to note that this is a 0.8 percent increase in GDP. In the absence of any increase in domestic savings to fund this increase in capital stock, the additional capital will be financed from abroad. Much of any increase in GDP is likely to accrue to foreigners as a return on their capital. Increases in GDP and in labour productivity can be misleading as an indicator of increases in New Zealand's welfare because payments to foreigners are being ignored.

103. Because of the timing of the change (just prior to the beginning of the global financial crisis), actual revenue was sharply lower than forecast revenue. Whether GDP increased by 0.8% because of the tax cut is impossible to determine after the fact, because we cannot measure the alternative: New Zealand's GDP during the global financial crisis if the company tax rate was not cut.

Budget 2010 changes

104. In Budget 2010 the following changes were made to company taxation:

- rate lowered from 30% to 28%;
- building depreciation was removed;
- depreciation loading was removed; and
- the thin capitalisation threshold was changed from 75% to 60%.

105. This was forecast to **increase** the tax paid by companies overall, with the following estimates relative to the status quo:

Company tax ($m)	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Company tax cut to 28%	-20	-340	-450	-305
Building depreciation (removal)		685	685	690
Depreciation loading (removal)	135	245	310	345
Thin capitalisation (60%)		200	200	200
Static impact (relative to status quo)	**115**	**790**	**745**	**930**

106. The forecast changes resulted in the following assumptions for corporate tax, with the actual results directly below:

Company tax ($m)	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Forecast at Budget 2010	6,943	8,474	9,062	9,416
Actual	7,718	8,580	9,319	10,203
Difference (actual – forecast)	775	106	257	787

107. The important point is that while company tax revenue increased, this was expected because the aggregate result was not a decrease in company taxation, but an increase when the base changes were factored in. No exercise was undertaken to estimate the overall increase in company taxation on economic performance. Forecasts were made about aggregate taxation changes (reduction on taxes on personal income), but no growth assumptions (positive or negative) were made for the increase in company tax.

3. Foreign Investment

3.1 What sort of investment?

108. Some members of the Group enquired about what sort of investment in New Zealand is funded by foreign investment, and whether it was "greenfields" investment or the acquisition of existing New Zealand companies.

109. It is important to note that foreign acquisition of existing New Zealand companies can, in turn, fund greenfield investments by the New Zealand vendor of the business. There are high-profile examples of this in New Zealand[9].

110. We have been unable to find any data on the split between greenfields investment and foreign acquisition. Over the last decade, around 15% of investment in fixed assets in New Zealand has been financed from foreign investment[10].

111. For firms acquired by foreign investors, Fabling and Sanderson (2011)[11] looked at firm performance prior and subsequent to foreign acquisition:

> We find that acquired New Zealand firms tend to be larger, pay higher wages, and have higher capital intensity and labour productivity than other domestic firms. Although recently acquired firms appear to increase both average wages and gross output compared with firms which remain in domestic ownership, there is no evidence to suggest that acquisition improves either labour or multi-factor productivity performance.

112. They also find that foreign investors tend to buy the highest-performing firms:

> In keeping with the international literature, foreign-owned firms in New Zealand outperform domestic firms on almost all firm outcomes. They are larger (in terms of both output and employment), more capital intensive, pay higher average wages, and have higher labour productivity. However, [figure] suggests that at least part of this difference is due to positive selection of FDI targets. Dividing the population of domestically-owned firms according to their future ownership status – whether or not they will be acquired by a foreign owner in the following year – suggests that pre-acquisition firm characteristics more closely mirror the patterns for foreign-owned firms shown in [figure] than those of other non-acquired domestic firms. That is, foreign owners seem to "cherry pick" high performing firms.

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[9] http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&objectid=10854152 [Rod Drury]

[10] Gross Fixed Capital Formation has averaged about 22% of GDP over the last decade. This must be financed from national and foreign saving. The current account deficit, which equals the amount of net capital inflows from abroad, has averaged around 3.5% of GDP over the last decade. We can therefore conclude that, on a net basis, foreign investment has financed about 15% of domestic investment (3.5/22 = 15.9%).

[11] Fabling, Richard and Sanderson, Lynda, (2011), Foreign acquisition and the performance of New Zealand firms, No DP2011/08, *Reserve Bank of New Zealand Discussion Paper Series*, Reserve Bank of New Zealand

4. Conclusion

113. Consistent with the advice previously provided to the Group, the analysis provided in this paper indicates that reductions in New Zealand's company tax rate are unlikely to lead to large welfare gains, particularly when issues such as the coherence and integrity of the tax system (which are not incorporated into the modelling analysis) are considered.

114. This is not an instance where it is clearly in our interests one way or another. It is still important that New Zealand monitor global trends. Finally, there may be other ways of reducing the effective tax rates faced by businesses that are in New Zealand's interests, including ensuring depreciation deductions are appropriately set.

Commented [A27]: … and accrued capital gains are appropriately taxed!

Appendix 1: Previous reviews

The 2001 McLeod Review looked at a lower company tax rate for non-residents of between 15% and 20%. No explicit modelling of the economic effects was undertaken in the review. It concluded:

> **Our final policy framework**
>
> 8.22 We regard increased levels of FDI as essential if a real attempt is to be made to significantly increase GDP per capita. Reducing New Zealand's tax burden on non-resident investment would result in additional investment by non-residents, though the magnitude is uncertain.
>
> 8.23 Appropriate additional FDI in New Zealand can provide jobs for New Zealanders, raise New Zealanders' work skills, transfer technology to New Zealand, provide access for New Zealand-made products to the non-resident's international marketing network and provide opportunities for New Zealand entrepreneurs. Perhaps the most important benefit to New Zealand of an increase in quality FDI is the raising of the New Zealand population's entrepreneurial, managerial and scientific skills (that is, human capital).
>
> 8.24 The key question is whether, in the aggregate, such a policy of reducing taxes on nonresidents would produce a net national benefit. This depends critically on the extent of any proposed reduction, to whom it should apply, and the mechanism by which it should be delivered.
>
> 8.25 Important factors in forming policy are the three factors raised in our Issues Paper: economic rents, foreign tax credits, and the economic consequences of a tax differential between residents and non-residents. In Annex E, we have provided a more detailed analysis of these factors, and we summarise our views here.
>
> 8.26 It is not possible to restrict tax on non-residents to precisely the level of foreign tax credits allowed, because:
>
> - a general rule to that effect would be problematic under other countries' rules and
> - would result in widely disparate rates of New Zealand tax;
> - foreign tax credit rules vary considerably across countries and according to the particular position of individual investors; and
> - any principle of taxing to the extent of foreign tax credits is muddied further by the tax laws of all key countries from which New Zealand sources foreign investment. These countries generally have rules exempting their residents' New Zealand income or deferring tax until repatriation.
>
> All that can be done is to set an overall tax rate, having some regard to likely availability of credits to some non-resident investors.
>
> 8.27 Furthermore, non-resident investors who earn economic rents and are not sensitive to New Zealand tax are not readily identifiable – all we know is that, to some extent, some non-residents are prepared to bear the burden of New Zealand tax:
>
> - as a general rule, portfolio investment is likely to be more sensitive to New Zealand tax than FDI;
> - much existing FDI is a 'sunk cost' and thus is, in general, unable to be quickly withdrawn. It is therefore less sensitive to New Zealand taxes. New Zealand raises significant amounts of revenue in respect of FDI;
> - FDI directed towards exploiting New Zealand markets or New Zealand's natural resources is expected to be less sensitive to New Zealand taxes;
> - New FDI primarily directed towards manufacturing/research and development in relation to export market exploitation is likely to be more sensitive to New Zealand tax; and empirical

evidence is that, over time, FDI has generally become more sensitive to host-country tax burden. We believe that it is likely that the tax sensitivity of FDI will increase further over time.

[…]

8.34 The question is whether we can conclude that Policy Option One [18 percent company tax rate to the extent that a New Zealand company is owned by non-residents] increases net national welfare. This is a question of judgement on which, within our time constraints, we have not reached unanimous agreement or conclusion. It depends on personal judgements on a number of factors, which cannot be quantified with mathematical precision:

- the degree of sensitivity of new non-resident investment to New Zealand income tax and, in addition, the extent to which New Zealand can be regarded as being in competition with other countries whose use of low tax rates/tax incentives and grants are 'pervasive'. For example, much of Asia offers an even lower tax environment for non-residents than our proposal. New investment resulting from the tax rate reduction could be expected, over time, to generate additional tax revenue at the new tax rates, but we cannot predict with any certainty how much;
- the extent of the risk of existing non-resident investors withdrawing over time and the extent to which this can be reduced by lowering New Zealand tax impost (recognising that in a large number of instances existing investment is a sunk cost that is not tax sensitive); and
- the extent to which the current tax paid by non-resident investors will continue to be paid by investors. The validity of current anecdotal evidence of a greater degree of debt-financing of existing FDI so as to reduce the current New Zealand tax burden should be tested; and
- the nature and quality of new non-resident investment that can be expected to be responsive to the New Zealand tax reduction.

No explicit modelling of the economic effects was undertaken in the 2010 Tax Working Group. That Group said:

In a global economy, company tax can discourage inbound investment. For a small open economy that can import as much capital as it wishes at a fixed after-tax return, the tax will not be borne by foreign residents. Instead, it will reduce capital invested in the economy and adversely impact on labour productivity and real wages.

A relatively high company tax rate can encourage firms to relocate business functions outside of New Zealand and also encourage multinational firms to stream profits away from New Zealand and into lower tax countries. This streaming can be achieved by firms:

- "Thinly capitalising" their New Zealand operations (by financing as much of their New Zealand activities as possible by using debt rather than equity); or
- Using transfer pricing arrangements where New Zealand entities pay as high as possible prices and charge as low as possible prices on transactions with associated companies overseas.

There are measures to prevent transfer pricing and thin capitalisation but these are not completely effective. Incentives to stream profits from New Zealand overseas will tend to arise when the New Zealand company tax rate is higher than in other countries, or where those other countries have an imputation system, such as Australia.

The above factors support a reduction in the company tax rate. However, there are also a number of factors that suggest for New Zealand, a deep reduction in the company tax rate may not be the most efficient approach. A higher company tax rate ensures maximum taxation of economic rents (these are profits above the normal return earned on an investment). If foreign inbound investment in New Zealand generates location specific economic rents (i.e. extra profits arising from advantages foreign companies accrue from being located in New Zealand), then the main effect of

taxing this income is to generate tax revenue allowing lower taxes to be imposed on New Zealanders. However, a possible consequence of reducing the company tax rate is that to the extent this benefits non-residents, taxes levied on New Zealand residents would need to be higher.

The availability of foreign tax credits to non-resident shareholders is also an issue to be considered in setting the company tax rate. Where non-resident shareholders are able to receive a tax credit in their home country, there is no additional cost imposed by New Zealand company tax. As such, non-resident shareholders will not demand an additional return which would otherwise increase the cost of capital to New Zealand fi rms. Where a foreign tax credit is available, reducing New Zealand company tax only leads to a transfer of revenue from New Zealand to the overseas government's revenue. However, taxes paid by foreigners provide scope to reduce the tax burden on domestic residents. Company tax also provides a backstop to the personal tax system in limiting the benefits of income being sheltered in companies to avoid personal income taxes. Income earned by a company is subject to company tax. This is, in effect, a withholding tax for domestic shareholders as the personal and company systems are integrated by the imputation system. As such, corporate income is subject to personal marginal tax rates when distributed to domestic shareholders.

In practice, determining the best rate of company tax for New Zealand means making judgements on the benefits and costs of cutting the company tax rate in the face of considerable uncertainty. What other countries do will also have an influence. For example, if other countries continue to cut their company tax rate, in particular, if Australia decides to have a significant cut in its rate, the question arises of whether or not it would be sensible for New Zealand to continue with its 30% company tax rate, which is already high by OECD standards.

The 2010 Tax Working Group concluded:

The TWG considers that New Zealand's company tax rate needs to be competitive with global corporate tax rates, particularly the Australian company tax rate. However, this needs to be balanced against the integrity benefits of a fully aligned system and the fact that reducing the company tax rate will reduce the level of tax on economic rents earned from foreign investments, to the extent these exist. We recommend that officials be requested to undertake further research on this complex interface. There was discussion by the Group about stratifying the company tax base. However, the Group consider that much more work would be required on the implications of this approach before it could be seriously considered.

Critical to the Government's choice between an aligned and non-aligned system will be recommendations of the Australian Taxation Review (especially in respect of the Australian corporate tax rate), the expected future changes in international corporate tax rates, and government preferences for the level of personal tax rates. Personal tax rates influence incentives to work and to develop skills, and the attractiveness of New Zealand to skilled New Zealanders working overseas.

The TWG would prefer to have the company rate aligned with trust and top personal rates. However, if due to international pressures this is not possible, then the aim should be to keep the company and other tax rates as closely aligned as possible. The path to reform should ensure it is feasible to achieve a non-aligned system with integrity in the event alignment proves difficult to sustain.

The TWG also supports the retention of the imputation system. However, this may need to be reviewed if Australia decides to move away from its franking credit system.

Appendix 2: Glossary

Capital/labour ratio: A measure of capital intensity. A higher capital/labour ratio means that for every worker there is more capital available for the worker to use.

Capital importer: A capital importing country is one that, at an aggregate level, funds more investment than would be able to be funded from domestic savings.

Capital stock: Total amount of physical capital in the economy.

Depreciation loading: Accelerated tax deductions for depreciable assets.

Economic rent: An excess payment made for a factor of production over the amount required by the property owner to bring that factor into production.

Equivalent variation: A measure of economic welfare changes associated with changes in prices.

General equilibrium modelling: Modelling the economy-wide consequences of policy changes or external shocks.

Gross domestic product (GDP): monetary value of all the goods and services produced in a country.

Location-specific economic rent: Returns associated with locating in a particular place, perhaps due to accessing resources or supplying goods and services to the domestic market, that are above the amount required to bring the activity to the place.

Mobility of capital: A measure of how responsive capital is to various changes. The price elasticity supply of capital is a measure of the percentage by which the supply of capital changes in response to a 1% increase in the rate of return available in the country. In this instance a 1% increase represents a change from (for example) 5% to 5.05%.

Net national income (NNI): Income of domestic households and businesses, and the government.

Paper 3 - Impact of a company tax cut

This note looks at the impact of cutting the company tax rate from 28% to 20%, using a simple CES model. Under standard assumptions (notably the absence of economic rents) and requiring the foregone revenue to be made up through a tax on labour, the cut **increases domestic production by 1.34% and New Zealand's national income by 0.54%**.

The key take-away is that these increases, for a reasonably sizeable cut to the company rate, are quite small indeed. The results imply that economic rents in New Zealand need not be too significant in order to tip the balance against a company tax rate cut. For example, if economic rents earned by non-residents comprised 4% of national income or more, the loss in tax on these factors would be larger than the modelled increase in national income, implying a negative overall welfare income for New Zealand.

The above results are based on conservative assumptions. In particular, that the supply of capital to New Zealand is perfectly elastic. While the supply of capital is likely to be highly elastic it may be less than perfectly elastic. With a less than perfectly elastic supply of capital, the gains to New Zealand would be smaller – the economic impact of a company tax cut would turn negative with even smaller rent-earning factors owned by non-residents.

The results of the model are explored more below, and the technical detail of the model are set out in the annex.

Impact of company tax rate cut – no budget balance

A reduction in the company tax rate from 28% to 20% is a 29% reduction. However, much of investment in New Zealand (about 52%) is through debt. Debt investment is, in effect, taxed through the imposition of either NRWT at 10% or AIL at 2% instead of the company tax.

Based on the assumptions set out in the annex, this would drop the user cost of capital by 1.95%. Under the typical assumption of perfectly mobile capital, the results of this would be:

Percentage change in key macroeconomic statistics	
K/L	1.70%
Wages	1.41%
Labour supply	0.57%
Capital stock	2.28%
GDP	1.34%
Net national income	0.54%

The reduction in the company tax rate increases FDI flows into New Zealand, increasing the capital stock by 2.28% and resulting in a capital deepening (i.e. an increase in the capital per labour). This increases labour productivity, and accordingly wages increase by 1.41%. Because of the higher wages, labour supply increases by 0.57%.

Commented [PW28]: This note has results for an 8 ppt company tax cut with an 11% depreciation rate. In work for the TWG we modelled a 5ppt cut with a 7.28% depreciation rate. A lower depreciation rate will increase the net national income gains from a tax cut relative to a higher one.

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The combination of these factors results in an increase in GDP of 1.34%. However, GDP is simply a measure of *production* in an economy – it is not a good measure of who is benefitting from that production. This is important as much of this increase in GDP has come about due to an increase in foreign investment, meaning payments from New Zealand offshore will also increase. Also with a higher capital stock, there will be greater depreciation on capital and some of the higher GDP will merely go towards replacing this higher level of capital stock.

Net national income, which is a measure of the overall *income* of New Zealand residents (and is therefore a better measure of the welfare of New Zealanders than GDP) therefore increases by somewhat less than did GDP – by 0.54%.

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The above results were based on the assumption of perfectly mobile capital. Although this is a typical assumption for this type of modelling exercise, there is empirical evidence that mobile is not perfectly mobile. Gravelle and Smetters[12], for example, used a capital supply elasticity of 3, which they considered somewhat high, though this was set based on studies of the U.S. The model used as part of our Savings and Investment Review (the Diamond and Zodrow model, or DZ model) used a capital supply elasticity of 5 (stating that it is "relatively high", but no references were provided for this).

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Relaxing this assumption of perfectly mobile capital reduces the impact of the company tax rate cut, as shown below. This is because, as more capital is drawn into the economy, investors demand a higher return on *all* of the capital that they have invested here. This lowers the economic benefit of additional capital investment.

Percentage change in key variables with different assumptions for capital mobility		
	$\varepsilon = 5$	$\varepsilon = \infty$
K/L	1.43%	1.70%
Wages	1.19%	1.41%
Labour supply	0.48%	0.57%
Capital stock	1.92%	2.28%
GDP	1.13%	1.34%
NNI	0.38%	0.54%

Impact of a company tax rate cut – budget balance

The lost revenue due to a company tax rate cut – estimated in the model to be $865 million - will have to be made up somehow.[13] The replacement taxes will have their own economic impacts. These also need to be taken into account.

[12] Gravelle and Smetters (2006), *Does the Open Economy Assumption Really Mean that Labour Bears the Burden of a Capital Income Tax?*

[13] Treasury's ready-reckoner puts the fiscal cost much higher, at $2,280m. In part this will be because the ready reckoner does take into account the tax that will be collected on the additional capital that the tax cut will attract (for comparison, the static costing from this model is $950m). More significantly, the Treasury's model factors in the cost of the company tax cut due to resident-owned companies (i.e. if a New Zealand-owned company earns a profit but does not distribute it all to shareholders). This is not factored into this model.

To illustrate this, we have modelled the impact of making the tax cut revenue neutral by imposing a labour income tax. Since a labour income tax reduces returns to work, it reduces labour supply and therefore GDP and net national income. This acts to offset the some of the benefit to New Zealand of the CIT cut.

Percentage change in key variables - revenue neutral change		
	ε = 5	ε = ∞
K/L	1.47%	1.70%
Wages (after tax)	0.55%	0.75%
Labour supply	0.22%	0.30%
Capital stock	1.69%	2.01%
GDP	0.89%	1.08%
NNI	0.17%	0.32%

With perfectly mobile capital supply, the modelled revenue neutral reduction in company taxes improves New Zealand's welfare although by a small amount (an increase in net national income of 0.17%).

If instead high but not infinite elasticity of capital supply were assumed, the net benefit to New Zealand become smaller still. (Under Gravelle and Smetter's preferred elasticity of 3 the gains in NNI would be only 0.10%).

Economic rents

It is important to note that this model does not take into account economic rents – one of the key reasons we have argued against company tax rate cuts in the past. The reasons for this are well summarised in our inbound investment framework document:

> *One reason pushing against cutting the company tax rate is that this would mean reducing taxes on location-specific economic rents. Economic rents are returns over and above those required for investment in New Zealand to take place. It is widely recognised that location-specific economic rents provide a justification for taxing inbound investments, even when the supply of foreign capital is perfectly elastic. Location-specific rents arise from factors that are linked to a location. Such factors could include resources, or access to particular markets that allow above normal profits to be earned. The rents can be subjected to tax since a portion of the rent would still accrue to the investor so that they could still earn more than their required rate of return even with the tax impost.*
>
> *Even if companies are owned by domestic residents, there is a reason to tax these rents because doing so provides an efficient way of raising revenue. Tax revenue can be raised without distorting investment decisions. However, where companies are owned by non-residents there is a stronger reason still. A tax on these rents would be essentially borne by non-residents. This is less costly to New Zealand than if taxes are imposed on New Zealanders. Nevertheless, otherwise standard assumptions would still suggest exempting the normal rate of return on such investments from tax.*

Incorporating economic rents into this type of model is not a straight-forward exercise. However, it is somewhat instructive to ask: how significant would

economic rents earned by non-residents have to be for the tax revenue lost on the rents to outweigh the modelled economic benefits from the company tax rate cut? The answer is about 4 percent of national income.[14]

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How likely is this? A significant source of rents is land (since land is in fixed supply). The Tax Working Group estimated that the unimproved value of land in New Zealand is between $450-480 billion. If the rate of return earned on land was 5%, then income from land would be approximately 11 percent of net national income.[15] If more than 36 percent of land was owned by non-residents, this 4 percent threshold would be crossed. (Of course, land is only one potential source of rents; companies operating in uncompetitive sectors, such as finance and insurance, could also be a source of significant economic rents).

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Comparison with other models

Company tax cuts have been modelled by the Australian Treasury (see for example Treasury Working Paper 2016-02, "Analysis of the Long Term Effects of a Company Tax Cut). The Australian Treasury estimates much larger impacts on the capital stock and GDP (as shown below). This is because:

- (most importantly), they make the assumption that marginal investment decisions are not affected by the ability of non-residents to partially capitalise investments with debt (i.e., the cost of capital for a marginal investment is calculated as if the investment is 100 percent equity financed, even though in reality some of the investment will be made through debt resulting in a lower actual cost of capital); and
- relatively low depreciation rates (an average rate of 5.1 percent, compared to the 11 percent assumed in our modelling).[16]

Going in the other direction, the Australian Treasury assume a labour supply elasticity of 0.15 compared to the 0.4 assumed in our modelling.[17]

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[14] The difference in tax collected on rents is 28% * rents – 20% * rents (= 8% * rents). The (revenue neutral, infinite elasticity) tax cut is modelled to increase national income by 0.32%. This implies that the tax lost on rents earned by non-residents would exceed the modelled gains if rents were at least 4 percent of national income (=0.32% / 8%).

[15] Income from land of $22.5 billion compared to net national income in 2016 of $206.4 billion (from Stats NZ National Accounts series for the year ending March 2016, table 1.2).

[16] Australia's model has numerous types of capital, each with their own depreciation rate. The 5.1 percent average rate was calculated using the depreciation rates used in the Australian Treasury's model and ABS Capital Stock statistics.

[17] Though interestingly, the estimated labour supply results of the two models if we used a labour supply elasticity of 0.4 instead of 0.15.

Overall, these assumptions mean that the capital stock is much more responsive to reductions in the company tax rate. To illustrate, the table below shows the results of a cut from 30 percent to 25 percent (a) under our model under our core assumptions, (b) under our model under the assumptions discussed above that are used in Australia's modelling, and (c) under the Australian Treasury model. In all cases, the company tax cut is funded through a labour income tax and the elasticity of international capital flows is assumed to be infinite.

	Our model (core assumptions)	**Our model (Aus assumptions)**	**Australian Model**
Capital stock impact	1.29%	3.63%	4.80%
Labour supply impact	0.19%	0.13%	0.69%
GDP impact	0.69%	1.48%	2.06%

ANNEX – A simple approach to estimating the impact of changes to capital taxation

We have used a simple model that relates changes in the user cost of capital to changes in the capital stock – and from there to changes in labour supply and output.

The user cost of capital

The starting point for the model is the user cost of capital. This is simply the rate of return an investor needs to earn to make an investment just worthwhile. Without taxes, it is equal to the opportunity cost of capital (generally taken to be the interest rate) plus the investment's economic depreciation rate (δ). An investment that earned less than this would lose money and would not be worthwhile; an investment that earned more would not be marginal.

Consistent with typical modelling approaches, the model assumes that New Zealand is a small open economy, able to attract an infinite amount of capital at the world interest rate of r and where the marginal investor in the economy is a non-resident. It is the desirability of New Zealand to non-residents that ultimately determine the total capital stock in the model.

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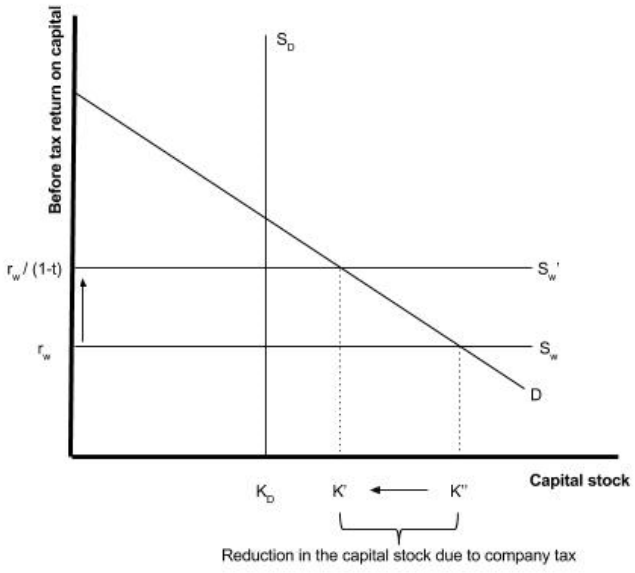

The imposition of tax increases the user cost of capital, reducing the attractiveness of New Zealand as an investment destination and reducing the capital stock. This is illustrated above – without tax an investment in New Zealand would need to return r_w, and accordingly total capital stock would be *K''*. However, the imposition of a tax pushes up the required rate of return to $r_w/(1-t)$. This reduces the number of economic investments, pushing down the total capital stock to *K'*.

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The use of debt and withholding taxes

New Zealand investment in the model is financed with a mix of equity and debt in fixed proportions. The after-tax returns on both debt and equity capital is required to equal the world rate of return r_w. Since interest payments are deductible, the required pre-tax return on debt investment is lower than that of equity investment (and similarly, the higher the proportion of debt investment, the lower the required weighted-average cost of capital).[18]

The model incorporates withholding taxes on interest payments. Non-resident withholding tax is applied to related-party interest payments (generally at 10%) and approved issuer levy is imposed on interest payments to third parties (strictly at 1.96%[19]).

The three sources of capital (equity, related-party debt, third-party debt) are calibrated based on Inland Revenue data of large foreign-owned companies.[20] This data indicates that foreign-owned firms are on average capitalised with: 30% related-party debt, 22% third-party debt[21], and 48% equity[22].

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Table 1: Sources of capital

Type of capital	Weight	Tax imposed	Required return
Equity	48%	28%	6.80%
Related-party debt	30%	10%	5.56%
Third-party debt	22%	1.96%	5.10%
Overall weighted tax/required return[23]	**100%**	**18.3%**	**6.12%**

[18] There is an underlying assumption here that the non-resident investor is not taxed on interest income they receive (for example, they are a tax exempt or are otherwise able to avoid the interest income tax). The use of debt would have a less significant impact on the weighted average cost of capital if this assumption were relaxed – if interest income were taxed at 28% there would be no advantage in using debt capital.

[19] The rate of AIL is generally quoted as 2%, but this rate is not comparable to the rate of NRWT or company tax because AIL is calculated based on the AIL-exclusive interest rate, in contrast to other taxes. The comparable tax rate is 1-(1/1.02) = 1.96%.

[20] The data is from Inland Revenue's International Questionnaire for the 2015 tax year. The dataset contains information on the largest 300 or so foreign-controlled companies operating in New Zealand (excluding banks).

[21] Note this third-party debt may be sourced from a foreign bank or a New Zealand-based bank, but we have nevertheless assumed AIL applies to all of the third-party debt. We consider this reasonable, since AIL will generally be paid by NZ's banks when the source funding offshore, which will then be passed on to borrowers.

[22] Strictly, our data show that, on average, the balance sheet of the firms in the IQ comprises: 20% related-party debt, 32% equity, 15% third-party debt and 32% non-debt liabilities (which includes trade credits, provisions, and interest-free loans). We have not factored these non-debt liabilities into our analysis on the basis that non-residents may be less likely to fund the purchase of new fixed assets with them.

[23] The weighted required pre-tax rate of return is p = 0.48*0.05/0.72 + 0.3*0.05/0.90 + 0.22*0.05/0.9804 = 6.12%. The effective tax rate is (p – r)/p = (6.12% - 5%)/6.12% = 18.3%.

The basic model

This basic framework for the model is taken from a paper written by Jane Gravelle[24]. However, we have extended the model in various ways, including allowing labour to be endogenous and to factor in profit shifting.

The model has a standard CES production function:

$$Q = A(\alpha_1 K^{1-\frac{1}{\sigma}} + \alpha_2 L^{1-\frac{1}{\sigma}})^{\frac{1}{1-\frac{1}{\sigma}}}$$

K is the capital stock, L is labour, σ is the capital labour substitution elasticity, A and α_1 are calibration parameters, and α_2 is $(1-\alpha_1)$.

Output is the numeraire and has a price of unity. Since CES production functions exhibit constant returns to scale, payments to factors (K and L) exhaust total production:

$$\pi = Q - cK - wL = 0$$

where w is the wage rate and c is the user cost of capital for the marginal investor.

Under the assumptions above, a marginal investment in New Zealand will need to generate at least $\frac{r}{(1-t_w)}$, where t_w is the weighted effective tax rate. The user cost of capital is $c = \frac{r}{(1-t_w)}. + \delta.$

Again, since the model is constant returns to scale, output can be expressed as a function of the K/L ratio (denoted *k*):

$$Q = f(k) * L$$

$$f(k) = A(\alpha_1 k^{1-\frac{1}{\sigma}} + \alpha_2)^{\frac{1}{1-\frac{1}{\sigma}}}$$

In this model *c* is exogenous. We assume that *w* responds endogenously to equate supply and demand for labour.

The optimal K/L (k*) ratio is given by one of the first-order conditions for the firm:

$$\frac{\partial \pi}{\partial K} = \frac{f'(k) * L}{L} - c = 0$$

Therefore:

$$f'(k^*) = c$$

and

[24] Economic Effects of Investment Subsidies, Jan 2008 (presented at the VUW conference *New Zealand tax reform – where to next?*

$$k^* = \left[\frac{\left(\frac{c}{A\alpha_1}\right)^{\sigma-1} - \alpha_1}{\alpha_2}\right]^{\frac{\sigma}{\sigma-1}}$$

In order for the labour market to be in equilibrium we require

$$\frac{\partial \pi}{\partial L} - w = 0$$

From this, we can solve for the equilibrium wage rate (w):

$$\frac{\partial \pi}{\partial L} = \frac{\partial}{\partial L} f(k^*) * L - w = 0$$

$$w = -kf'(k^*) + f(k^*)$$

$$w = -k^* c + A(\alpha_1 k^{1-\frac{1}{\sigma}} + \alpha_2)^{\frac{1}{1-\frac{1}{\sigma}}}$$

Tax revenue and impacts of tax changes

Company tax revenue in the model is total company profits less depreciation and interest deductions.

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$$R_c = t_c(cK - \partial K - i_R K_R - i_T K_T)$$

where R_c is total company tax revenue, i_R and i_T is the required rate of return on related-party and third-party debt respectively, and K_R and K_T is similarly the fraction of the capital stock financed by related-party and third-party debt (these required returns and financing fractions are shown in Table 1 above).

Total tax revenue (R) is then company tax revenue plus NRWT and AIL revenues:

$$R = R_C + t_N i_R K_R - t_A i_T K_T$$

Changes to the company tax rate (or to the rate of NRWT or AIL) are assumed to have no impact on domestic tax revenues. In the case of equity investment this is because of imputation (any reduction in company tax will be clawed back when profits are distributed to resident shareholders). In the case of NRWT and AIL, this is simply because these taxes do not apply to resident investors.

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Of particular relevant then is R^F, the tax revenue imposed on capital owned by non-residents (*denoted* K^F)

$$R^F = R\frac{K^F}{K}$$

Changes to tax settings will result a change in the user cost of capital. This will result in a new equilibrium wage rate (w) and K/L ratio (k*). The new optimal K/L ratio can be solved with the expression for k^* above, since that is a function only of c (and the

exogenous parameters σ, A, α_1 and α_2). The new equilibrium wage rate can then be solved, since that is a function of k^* and c.

The new labour supply is found using an elasticity of labour supply with respect to the wage rate (ε_w). The new level of capital stock is then determined with the new level of L and the new k*.

Model extensions

We consider several extensions to this basic model:

Commented [N44]: Looks sensible and helpful

- Estimating the effects of replacement taxes
- Allowing for a less than perfectly elastic supply of capital
- Allowing for profit shifting

Replacement taxes

The basic model requires no fiscal balance – reductions in the company tax rate, which result in lower total corporate revenues, are not recovered elsewhere. We therefore look at what may be the more realistic case of a revenue neutral tax switch.

To balance the budget we model a flat wage tax that is just sufficient to recover the lost company tax revenues. This is approximately equal to

$$Wage\ tax = \frac{foregone\ revenue}{new\ labour\ income}$$

This calculation is not exact. The imposition of the wage tax reduces after-tax wages and therefore labour supply. Since capital demand is governed by the capital/labour ratio, the wage tax also reduces capital demand and therefore company tax revenues. The revenue-neutral wage tax has to be solved iteratively.

The new labour supply, based on after-tax wages, is determined in the same way as previously discussed – using the elasticity of labour supply with respect to the wage rate.

Less than perfectly elastic supply of capital

The basic model assumes a perfectly elastic supply of foreign capital, so that the required return on foreign capital invested in New Zealand remains fixed. This is a standard modelling assumption for small open economies.

However, there is some evidence that international capital may not be as mobile as is commonly believed. For example, there is the Feldstein Horioka puzzle, the finding that savings and domestic investment are strongly correlated; a result one would not expect to see with perfect capital mobility. Incorporating less than perfectly elastic capital supply is a worthwhile extension.

Commented [N45]: Agreed!

We define the supply of capital as:

$$K_S = Br_d^{\varepsilon_K}$$

Where B is a calibration factor[25], ε_K is the elasticity of foreign capital, and r_d is the domestic required rate of return on capital. The post reform domestic interest rate is then found that equates the supply and demand for foreign capital[26].

Profit shifting

The recent focus on Base Erosion and Profit Shifting (or BEPS) has highlighted that some firms seek to shift profits offshore. We incorporate this into the model following the approach used by De Mooij and Devereux (2011)[27] and the Australian Treasury in their modelling.

It assumes a constant semi-elasticity of profit shifting as a function of the statutory tax rate of ε, which the Australian model assumes has a value of -0.5, but De Mooij and Devereux calculate the elasticity as -0.73. (The elasticity is calculated in Europe from a Netherlands perspective which might lead to values that are too high for New Zealand. We use -0.5 in our modelling).

Commented [N46]: Agree with the logic

Profit shifting enters the model in two ways. It affects the cost of capital as the effective statutory tax rate on income from investments is reduced due to the ability of firms to shift some of their tax base, either to their home country or to tax havens/BEPS. But it also has an effect on the revenue constraint as profit shifting modifies the revenue gained from any given statutory tax rate. In both cases this lessened sensitivity to the headline tax rate reduces the impacts of changes in that rate. In addition there are second order effects as the amount of tax shifting changes as the tax rate changes. These two rate effects are different since the home country tax rate affects the cost of capital (since profit is shifted to that country), but not the government's revenue calculation.

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This approach is explained more in David Holland's note *Profit shifting and effective tax rates*.

Model calibration

The model parameters A and α1 (and by extension α2) were calibrated so that the K/L ratio, labour productivity (Y/L) and capital productivity (K/L) closely matched that of the New Zealand economy.

We took labour productivity and capital productivity figures for 2002 from Treasury WP 05/05 Capital shallowness: A problem for New Zealand? We then updated these ratios to 2015 values using Stats NZ's productivity indexes for the measured sector. (The K/L ratio is simply Y/L divided by Y/K).

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[25] B is set so that the pre-reform domestic interest rate is equal to the world rate of return r_w.- i.e. $K^F/(r_w \wedge \varepsilon_K)$

[26] Solving the domestic required rate of return on capital is more complex in the revenue-neutral case, since the imposition of the wage tax affects the capital stock and therefore the domestic required rate of return.

[27] Mooji, Ruud and Devereux, Michael, *An applied analysis of ACE and CBIT reforms in the EU*, International Tax Public Finance (2011).

Calibration factor	Model	Target
Y/L ratio	24.0	24.0
Y/K ratio	0.37	0.37
K/L ratio	64.7	64.7

Capital in the model is set to the real net capital stock reported by Stats NZ for 2016 ($640,337m). From the K/L ratio, we get a stock of labour of 9,891m.

Total output in the model is $238b, which is slightly higher than actual real GDP for 2016 of $224b.

Model parameters

Capital labour substitution elasticity (σ) – set at 0.55, which is the elasticity used in the New Zealand Treasury Model.[28]

World rate of return (r) – assumed to be 5%. This is a fairly typical assumption – used for example in Jane Gravelle's paper.

The depreciation rate of capital (δ) – assumed to be 11%. Gravelle in her model used 7%. Note that this deprecation rate is faster than the rate used in the Australian Treasury modelling (which averaged 5.1%).

The labour supply elasticity with respect to wages (ε_w) – assumed to be 0.44. This is what was used by the New Zealand Treasury in estimating the impacts of the Budget 2010 tax package.[29] The Australian Treasury in their CGE model used a somewhat lower elasticity of 0.15.[30]

Commented [N48]: What is the unit of analysis here? – I can't make sense of this number!

Commented [N49]: But probably regarded as a bit high now!

Commented [PW50]: In work for the TWG we reduced this to 7.28%, which is a depreciation estimate excluding residential buildings. 11% excluded all buildings including industrial and commercial

Commented [N51]: I'd be interested to see their justification – it seems quite high as an average across all labour supply – but mine is a 'gut feeling' (based on a range of LS estimates in the literature); they may have some better data to back it!

[28] Based on Treasury WP 09/02 - *An Introduction to the New Zealand Treasury Model*

[29] http://www.treasury.govt.nz/budget/forecasts/befu2010/assumptions-taxpackage-may10.pdf.

[30] Australian Treasury WP 2016/02 – *Analysis of the long term effects of a company tax cut*

Profit shifting and effective tax rates

The following is intended to help incorporate profit shifting effects of tax rate changes into our model of the tax impacts of company tax rate changes. It assumes a constant semi-elasticity of profit shifting as a function of the statutory tax rate of ε, which the Australian model assumes has a value of -0.5, but De Mooij and Devereux (2001) calculate the elasticity as -0.73. (The elasticity is calculated in Europe from a Netherlands perspective which might lead to values that are too high for New Zealand.) Profit shifting enters the model in two ways. It affects the cost of capital as the effective statutory tax rate on income from investments is reduced due to the ability of firms to shift some of their tax base, either to their home country or to tax havens/BEPS. But it also has an effect on the revenue constraint as profit shifting modifies the revenue gained from any given statutory tax rate. In both cases this lessened sensitivity to the headline tax rate reduces the impacts of changes in that rate. In addition there are second order effects as the amount of tax shifting changes as the tax rate changes. These two rate effects are different since the home country tax rate affects the cost of capital (since profit is shifted to that country), but not the government's revenue calculation.

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The profit shifting function

Commented [N53]: 2.

Assume a tax rate of t and an average tax rate internationally, for profit shifting purposes, of $\bar{t}$.

For a semi-elasticity of ε for the tax base as a function of the difference between t and $\bar{t}$, the tax base shifting index, B, as a function of t can be written as:

$$B(t-\bar{t}) = e^{\varepsilon\times(t-\bar{t})} \quad (1)$$

If $t > \bar{t}$, then $B(t-\bar{t}) < 1$, and vice versa.

What is $\bar{t}$?

The function B can be considered to apply on a country by country basis so that $Y_i \times B(t-t_i)$ is the amount of income which is shifted to or from country i depending upon whether t_i is lower or higher than t. We can sum across countries so that $\bar{t}$ is the "weighted average" tax rate that sets the net tax base shifted to zero. That is, Y is the total tax base which is the sum of the tax bases related to investments to (outbound) or from (inbound) the different counties i:

$$Y \times B(t-\bar{t}) = \sum_i Y_i \times e^{\varepsilon\times(t-t_i)} \quad (2)$$

Dividing by Y to create weights $W_i = \frac{y_i}{Y}$ and removing the common factor $e^{\varepsilon\times t}$ yields:

$$e^{-\varepsilon\times\bar{t}} = \sum_i w_i \times e^{-\varepsilon\times t_i} \quad (3)$$

which can be seen as a non-linear weighted average of the tax rates in the other countries.

For example, if there are two countries, with tax rates of 10 and 30 per cent respectively, with equal shares of income and ε = -0.73, then $\bar{t}$ is equal to 20.4 per cent rather than a simple arithmetic average of 20 per cent. While the relevant tax rate in other jurisdictions would normally be their statutory tax rate, with BEPS double non-taxation or tax haven situations the "other jurisdiction" tax rate could be considered to be zero.

Tax rate affecting government revenues

Commented [N54]: 3

There are two different effective company tax rates that are important in determining the impact of profit shifting on the economy. The first determines the amount of revenue that the government receives from the economic income earned in the country by non-residents. The second is the total amount of tax that is paid by the company assuming that a portion of that income can be shifted between jurisdictions. Amounts can be shifted in or out of the country.

The tax received by New Zealand depends upon the extent and nature of the base shifting. With simple transfer pricing, the amounts shifted are entirely removed from New Zealand taxation. However with related party debt, New Zealand is able to apply withholding tax at 10 per cent. Some portion of the income shifted would be taxed at 10 per cent. Arguably this effect is already incorporated in the estimate of the cost of capital since non-arms' length debt is explicitly treated as a source of funds. Therefore it is ignored in the following. Accordingly the tax rate that can be used to calculate the amount of revenue that the government will get from a dollar of income at tax rate t is:

$$t' = t \times B(t - \bar{t}) = t \times e^{\varepsilon \times (t - \bar{t})} \quad (4)$$

Tax rate affecting cost of capital

And the effective tax rate the company faces on a dollar of economic income is:

Commented [N55]: 4.

$$et = B(t - \bar{t}) \times t + (1 - B(t - \bar{t})) \times \bar{t} \quad (5)$$

Where et differs from a normal weighted average since the weights are not constrained to be between zero and one.

If $t > \bar{t}$, then $B(t)$ is less than one and et is simply the weighted average of the tax rates in the two jurisdictions. However, if $\bar{t} > t$, then et reflects the tax savings between the domestic and foreign tax rates.

How big is the effect of profit shifting on different tax rates?

It is hard to calibrate how much BEPS double non-taxation there is. But if average statutory tax rates are in the order of 20 per cent and about half of the profit shifting involves simple shifts to taxpaying jurisdictions and the rest in hybrids and tax haven arrangements then $\bar{t}$ would be in the order of 10 per cent. The effective tax rates that correspond to an elasticity of -0.73 and a value of $\bar{t}$ of 10 per cent are:

t	0%	$\bar{t}$ =10%	20%	28%	30%

B(t)	107.6%	100%	93.0%	87.7%	84.5%
t'	0.0%	10%	18.6%	24.6%	27.9%
et	-0.8%	10%	19.3%	25.8%	29.4%

Under the assumption of an elasticity of -0.73, the tax base is eroded by profit shifting of about 12.3 per cent, when t = 28%. New Zealand's current tax rate of 28 per cent is reduced to an effective 'revenue rate' of 24.6 per cent for the government. Non-resident firms face an effective tax rate of 25.8 per cent. It is higher than the revenue rate since some of the income lost to New Zealand is subject to tax in other countries (at a rate assumed equal on average to $\bar{t}$ = 10 per cent).

Incorporating this into our simulation of the economy would involve using the appropriate tax rate formula for purposes of the revenue constraint, i.e., ***t'***, and the user cost formula for the cost of capital, i.e., ***et***.

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Impact of profit shifting on cost of capital

The model currently calculates the cost of capital as a weighted average of the cost of capital on equity, arms' length debt and non-arms' length debt. Since the latter two sources of funds do not give rise to taxable income in New Zealand, the following table applies the index of profit shifting to the equity portion of the return. First profit shifting lowers the cost of capital for a given tax rate. Not surprisingly, profit-shifting reduces the impact of the change in the statutory tax rate on the cost of capital. This would tend to make FDI less responsive to changes in the statutory tax rate.

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	28%	20%	%age fall in CoC
No profit shifting	17.122	16.789	1.94%
Profit shifting	17.022	16.762	1.53%

Impact of profit shifting on tax rate for revenue calculation

A similar effect applies to the effective tax rates relevant to calculating New Zealand tax revenues. The effective rates are lowered by profit shifting relative to the statutory tax rates as is the sensitivity to changes in that rate. In that case, there would be less revenue to make up from changes to after-tax income to labour.

	Before	After	%age reduction
No profit shifting	28	20	28.5%
Profit shifting	24.6	18.6	24.3%

Can we make money by cutting the company tax rate for non-residents?

One reason for cutting the company tax rate on non-residents is to reduce base-shifting pressures. Ignoring impacts on investment is there a tax rate that maximises the tax take on the income earned by non-residents?

Setting the value of the derivative of t' equal to zero yields the condition that revenues are maximised at $= -1/\varepsilon$. For an elasticity of -0.73, the tax rate would need to be 137 per cent which is a nonsense. But for higher elasticities, i.e., more aggressive tax planning, there could be times when a rate cut would make sense. With an elasticity of -5 the revenue maximising tax rate would be 20 per cent.

Thus if there are tipping points where profit shifting runs amok, then they might put an effective cap on tax rates.

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Impact on model of base shifting

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Impact on cost of capital simple to incorporate. Impact on government revenues breaks simple identity used by the model for taxes collected. Need to compute directly.