Estimating the Distortionary Costs of Income Taxation in New Zealand

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Background paper for Session 5
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A Summary for the Tax Working Group

Background

In two non-technical papers (and a further two more extensive, technical papers) prepared as background for the Tax Working Group,[1] Professor John Creedy summarises two areas of literature. These are (i) the distortionary costs of taxation; and (ii) recent approaches to estimating the responsiveness of taxpayers' taxable incomes to changes in marginal rates of taxation. The latter can be used directly as an input into calculations of the distortionary or 'deadweight' costs of income taxation. The discussion below extracts some material from these papers and provides a range of possible estimates of the distortionary costs of income taxes in New Zealand (Tables 1 & 2).

Introduction

Direct and indirect taxes distort individuals' behaviour. This means that there is an intangible efficiency cost, or distortionary cost, imposed on individuals in addition to the direct burden of a tax. The direct burden is measured simply by the amount of tax paid. The 'excess burden', or distortionary cost, of a tax is the extent to which the total money measure of the welfare loss to individuals and groups in society from the tax exceeds the tax paid. These distortionary costs reflect the fact that taxpayers rearrange their affairs in ways that are different and less desirable than they would in the absence of taxation. They may often (but need not) be associated with reduced output, or reduced tax revenue (compared to when there are no distortions), or increased administrative costs. To the extent that taxpayers also engage in 'rent seeking' activity as they try to influence government to set taxes in ways that minimise their personal tax liabilities, there can be additional deadweight costs. The benefits thought to arise from taxation (and the government expenditure it funds) therefore need to be compared with this `excess burden' created by the distortion.

In proposing tax cuts or increases, it would be useful to have information on the expected excess burden from the change in relation to the extra revenue to be collected. This gives rise to the concept of the marginal excess burden per dollar of extra revenue: it is referred to as the `marginal welfare cost' (MWC) of the tax change. Despite the central importance of the MWC concept there have been relatively few empirical studies, perhaps in part because these efficiency costs are not directly observable. They are also often neglected in policy debates.

Given difficulties in estimating these welfare costs of taxes a commonly discussed approximation is that the excess burden of a tax change increases approximately in proportion to the *square* of the tax rate. That is, as the tax rate doubles, the excess burden quadruples. This approximation is too crude to be useful as a measure of the consequences of specific, more detailed tax policy changes but it serves to highlight the fact that, in general, as tax rates are increased, the distortionary impacts will worsen *more than proportionately*.

[1] See Creedy (2009a, b). The two more technical papers are Creedy (2009c, d). All four papers were commissioned by the New Zealand Treasury in 2009.

This means that any erosion of the tax base, which requires a higher tax rate than otherwise if revenue is to remain unchanged, creates higher burdens. This is one important reason why the often-cited rule of thumb, that a special case needs to be made when departing from a `broad base and low rate', receives so much support. The 'square of the tax rates' approximation may also suggest a generalisation regarding comparisons between income taxation and consumption taxes. A broad based goods and services tax (like the GST in New Zealand) which has very few exemptions, and has a relatively low rate, may be expected to give rise to lower efficiency costs than income taxation, which is imposed at higher rates and is not as broad based.

The Elasticity of Taxable Income (ETI)

In recent years a method has been proposed to estimate the way in which overall taxable income responds to incentive effects created by income taxation. This involves the concept of the *elasticity of taxable income* with respect to the net-of-tax rate (ETI), defined as the proportional change in declared taxable income (for a specified population group) resulting from a proportional change in the `net of tax' rate (one minus the marginal tax rate). This elasticity aims to capture all potential responses to income taxation in a single measure, without the need to specify the nature of the various different types of response such as labour supply changes, income shifting between sources which are taxed at different rates, and tax evasion through non-declaration of income. The ETI has the added attraction that, under certain assumptions, it can be used to obtain a measure of the efficiency or 'deadweight' costs of income taxation, such as the marginal welfare cost (the marginal excess burden per extra dollar of revenue raised).

The ETI is defined by:

$$\text{ETI} = \frac{\text{percentage change in taxable income}}{\text{percentage change in 'net-of-tax' rate } (1-\tau)}$$

In a complex income tax system with many rates and thresholds, this elasticity may be very different for different individuals at various income levels. However the approach of recent literature has been to estimate the ETI for a specified group of individuals (e.g. those on, or close to, the top tax rate) and examine observed change in taxable income in association with changes in this rate. The methodologies used are subject to several criticisms and should be interpreted cautiously. This may also explain why results for apparently similar groups of (mainly US) taxpayers can be very different.

The ETI depends in part on the details of the tax legislation in place (e.g. the ease of switching legally between personal and corporate tax regimes), so that the elasticity may itself be a policy variable. One implication of this is that a suitable policy response to a high elasticity could be lower tax rates or modifications to tax legislation to reduce incentives to shift income. Further, the ETI may not remain constant over time if regulations are changed, and values estimated for one country and tax regime cannot simply be expected to hold in other countries.

Estimating the Elasticity of Taxable Income

Many empirical estimates of the ETI have been produced for a large range of countries. The values vary considerably, depending on the method of estimation used, the particular reform examined, and the country. After mentioning that a number of authors suggest a `consensus value of about 0.4', Giertz (2004, pp. 14, 37) warns that this `masks considerable variation in the estimates'. A value of 0.4 means

that if the relevant tax rate rises by 10% (e.g. from 30% to 33%) the decline in taxable income for the taxpayer group examined is 4%. With personal income taxes, where effective average tax rates tend to rise with income levels, the decline in revenues would be expected to exceed 4%.

Another feature of many estimates is that they have wide confidence intervals. After reviewing elasticities, Meghir and Phillips (2007, p. 19) comment that `the estimates of the effect of taxes on taxable income, whose purpose is to identify the impact of taxation on other dimensions of effort, should be regarded with caution'. Furthermore, Saez et al. (2009, p. 59) suggest that, `there are no convincing estimates of the long-run elasticity'. Some `short run' elasticity estimates obtained from tax reforms may perhaps capture changes in the timing of declarations.

Faced with the difficulty of obtaining data in New Zealand, it is perhaps not surprising that there is only one study containing estimates of the elasticity of taxable income for New Zealand. Using a variety of methods, covering a number of tax structure changes, Thomas (2007, p. 22) obtained estimates which `ranged from 0.35 to 1.10, with a preferred estimate of 0.52'; see also Thomas (2007, p. 18). Further work (by Treasury and Inland Revenue) to improve estimates of the ETI response to the 2000 top tax rate increase is currently underway, but will not be available until 2010 or 2011.

Deadweight Costs

Saez et al. (2009) propose method of calculating the deadweight costs of income tax changes, using the ETI estimates described above. They show that the marginal welfare cost (MWC) arising from an increase in the top income tax rate can be measured as:

$$\text{MWC} = \frac{\alpha.(\text{ETI}).(\text{tax rate})}{1 - (\text{tax rate}) - \alpha.(\text{ETI}).(\text{tax rate})}$$

where ETI is the elasticity of taxable income and α is the ratio of the average income above the tax threshold to the threshold income level. For example if average income for those with incomes above $70,000 is $120,00 then α = 120/70 = 1.71. The above expression is relevant only when the marginal tax rate is below the revenue-maximising rate. If it is, then given an estimated value of the ETI, it is a straightforward matter to obtain these MWC measures. Note that the MWC captures the costs of setting the tax rate in question different from zero; so that this effectively measures the deadweight cost of levying tax compared to no tax.[2] If it is thought that income which escapes the relevant income tax rate would be taxed at some different rate (say, the corporate or trust tax rates) then the formula above can be adapted to accommodate this.

Suppose we are interested in the marginal welfare costs of changes in the top tax rate, and that the value of α is equal to 1.6, which is approximately the case for the top rate in New Zealand. If the top tax rate is 0.4 and the ETI = 0.4 (a value that is suggested from studies of other countries, bearing in mind the caveat mentioned above), the formula above gives a marginal welfare cost of 74 cents. This represents substantial inefficiency in raising tax revenue: for an extra dollar of tax revenue, obtained by raising the top tax rate, there would be an efficiency loss of 74 cents (representing the welfare loss over and above the extra revenue).

[2] These measures are often best thought of as capturing the impact of introducing a *small* change in tax rates, so that they may not be accurate when comparing the deadweight cost of a top marginal tax rate versus a zero rate.

It is important to recognise that the results of using the expression above are highly sensitive to the terms involved. For example, if the elasticity of taxable income were 0.6 instead of 0.4, the MWC would increase to $1.78. But for ETI = 0.2, the MWC falls to 27 cents. If the top marginal tax rate is 0.5, the marginal welfare costs for elasticities of 0.2, 0.4 and 0.6 respectively are found to be 47 cents, $1.78 and $24.00. Given this kind of sensitivity, much care needs to be used in applying empirical estimates of the elasticity which are, in the best of circumstances, subject to some uncertainty.

Table 1 provides some estimates using current tax rate values in New Zealand, and allowing for the possibility that income which 'escapes' being taxed at this rate is instead taxed at 0% (completely escapes tax), 30% (e.g. taxed as corporate income), or 33% (taxed as trustee income). For each case, three values of the ETI of 0.2, 0.4, and 0.6 are again used.

Table 1 Estimating Marginal Welfare Costs (per $ of additional tax revenue) for New Zealand

Case	Elasticity of taxable income	tax rate = 38% Alternative tax rate	For 1st $ taxed at 38% (α = 1.0) MWC (per $ of rev.)	α = 1.6 **MWC**	α = 1.6 **MWC** (1/3 each)	α = 1.8 **MWC**	α = 1.8 **MWC** (1/3 each)	Comment Shift to:
1	0.2	0%	14.0c	24c	**10c**	28c	**12c**	zero rate
2		30%	2.6c	4c		5c		corporate
3		33%	1.6c	3c		3c		trust
4	0.4	0%	32.0c	65c	**26c**	79c	**31c**	zero rate
5		30%	5.4c	9c		10c		corporate
6		33%	3.3c	5c		6c		trust
7	0.6	0%	58.2c	$1.43	**55c**	$1.96	**73c**	zero rate
8		30%	8.4c	14c		16c		corporate
9		33%	5.1c	8c		10c		trust

Note: α = the ratio of average income above the 38% threshold income ($70,000) to threshold income; e.g. $112k/$70k = 1.6.

Column 4 shows the distortionary impact of the first few dollars taxed at 38% - that is, the first dollar of tax revenue raised on income above $70,000 (where $\alpha \approx 1.0$). With an ETI = 0.4 (Cases 4, 5 & 6), if the taxpayer's response to this higher tax rate were to seek to avoid tax completely on the additional income, the marginal welfare cost of the additional $1 of tax revenue would be 32 cents. But if this income were diverted into corporate or trust income the MWC is much lower at around 5c or 3c respectively. These small values are not surprising since in this example very little income is being diverted from the top rate. The columns further to the right show possible MWC values for different values of α = 1.6 and 1.8, (for New Zealand, 2007 aggregate taxpayer data suggest a value of α close to 1.6).[3] For illustration, MWC 'averages' are also shown on the assumption that the reduction in taxable income (that would otherwise have been taxed at 38%) is instead taxed at 0%, 30% and 33%, split 1/3rd at each rate. It can be seen that the MWC values are sensitive to the values of the ETI and α chosen, and range from $0.10 to $0.73, but can be as high as nearly $2 if the additional income is diverted to avoid tax completely and α is larger.

As well as estimating elasticities of taxable income for New Zealand, Thomas's (2007) study calculated deadweight costs and found that the tax rate reductions in the mid-1980s produced

[3] Note that the value of α should really be measured *in the absence of taxation*, since the existence of the top rate is likely to reduce the value of average income at which this top rate is applicable. Hence the relevant value of α is likely to exceed the value of 1.6 observed in the data.

substantial reductions in the excess burden from income taxation. He then examined the impact of the increase in the top tax rate from 33% to 39% in 2000, though he acknowledged that his results are subject to several caveats, mainly due to limited data availability. Thomas estimated that the 39% tax rate again raised excess burdens, though to levels below those of the 1980s. However, he found marginal welfare costs as high as $8 per extra dollar of revenue raised (i.e. 800%!).

A similar exercise to that shown in Table 1 can be carried out for the lower rates of income tax using a formula for the MWC that differs slightly from that used in Table 1 – see Creedy (2009d). This is relevant, for example, where fiscal drag causes taxpayers to move into higher tax brackets. It also provides a measure of the deadweight costs associated with levying the 12.5%, 21% and 33% tax rates on lower income taxpayers. Using the same methods as described above, Table 2 shows estimates of the MWC for these lower income tax rates (for an ETI = 0.4).

Table 2 MWC of Lower Tax Rates

Case	ETI	α_k [(a)]	Tax rate	**MWC**	Comment
1’	0.4	1.25	33%	**8.2c**	Shift from 33% to zero rate
2’	0.4	1.25	33%	**0.7c**	Shift from 33% to corporate rate
3’	0.4	1.71	21%	**5.9c**	Shift from 21% to zero rate
4’	0.4	7.71 [(b)]	12.5%	**15.6c**	Shift from 12.5% to zero rate

(a) The value of α_k in this case uses the average income of taxpayers in the k^{th} tax bracket and the value of the (lower) threshold for that bracket. The MWC calculation differs slightly from that used in Table 1 because higher income taxpayers (above the relevant tax bracket) also experience an income change; see Creedy (2009d).

(b) This value is obtained by assuming a lower threshold of $1000 of income; i.e. the 12.5% rate applies from the first thousand dollars of taxable income.

The marginal welfare costs can be seen to be much lower in Table 2 than those in Table 1 (even though shifts to ‘no tax’ are shown). This serves to highlight the point made earlier that the distortionary costs of raising tax rates are disproportionately greater if the tax rates in question are already high. Conversely reducing these ‘high’ tax rates has a disproportionately large beneficial effect on tax-induced distortions.

Conclusions

Until more reliable estimates of the ‘elasticity of taxable income’ (ETI) are available for New Zealand, the estimates presented above are speculative. As argued earlier, the ETI of a tax of tax system is likely to be specific to the country and time period being considered. Most of the estimates that have been obtained around ETI = 0.4 are for the US and for the top 10%, or even top 1%, of taxpayers. In New Zealand the top tax rate is relatively modest by OECD standards but it applies from relatively low incomes. In addition the ability to switch between different forms of income for tax purposes, including the minimal taxation of capital gains, in New Zealand probably tends towards a higher ETI here. On the other hand, the limited number of tax rates and qualifying deductions in the New Zealand income tax system may contribute towards lower distortionary costs.

Nevertheless, the distortionary cost estimates in Table 1 suggest that the marginal welfare costs of the 38% (formerly39%) top tax rate may be quite high such that lowering this rate, and/or raising the applicable threshold, and/or legislating to minimise the ability to re-characterise income could reduce these significantly.

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