Measuring revenue responses to tax rate changes in multi-rate income tax systems

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Abstract. This paper shows how income changes in response to changes in marginal income tax rates (MTRs) translate into tax revenue changes for the familiar multi-step income tax function used in many countries. Previous literature has focused on the relatively straightforward case of a proportional income tax or the top MTR only. The paper examines revenue responses… *(max 200 words)*

Keywords: income tax revenue; elasticity of taxable income; revenue elasticity

JEL classification: H24, H31, H26

1. Introduction

The concept of the 'elasticity of taxable income', introduced by Feldstein (1995), has become a routine part of the empirical toolkit used by economists to examine behavioural responses to changes in tax rates. This elasticity is defined as the response of taxable income to a change in the marginal net-of-tax rate (one minus the marginal rate). It is a helpful summary measure because it captures the net effect on income of all incentive effects associated with the marginal rate change.[1] As Feldstein (1999) shows, under certain conditions, it also plays a convenient role in measuring the deadweight costs of marginal tax changes. However, the literature on the elasticity of taxable income has generally ignored the associated effects on income tax revenues.

In part, this reflects the tendency for the analysis to be set in the context of a single rate, proportional income tax structure where the revenue effects are analytically trivial – a given percentage change in incomes implies the same percentage change in revenues. To the extent that revenue consequences have been explored analytically, these have been restricted to changes in the top marginal rate affecting those on high incomes (Saez 2004). The aim of this paper is to show how income changes, in response to changes in marginal income tax rates, translate into tax revenue changes for the multi-step income tax function used in many

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[1] It avoids the considerable complexities of attempting to combine the varied behavioural adjustments into a structural model, as well as providing (under certain assumptions) a convenient method of measuring the marginal excess burden arising from tax changes. However, its use crucially depends on an assumed absence of income effects.

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countries. The paper examines revenue responses at both the individual and aggregate levels, and it is shown that for individual marginal rate changes within a multi-rate regime, it is possible to derive simple expressions…

2. Relationships among elasticities

This section demonstrates, at the individual level, how the revenue elasticity and the elasticity of taxable income combine to generate the elasticity of tax with respect to…

2.1. A single rate above a tax-free threshold

Let the tax paid by an individual with income of $y > a$ be denoted $T(y) = \tau(y - a)$, and $T(y) = 0$ for $y \leq a$. The individual revenue elasticity, $\eta_{T,y}$, is defined as

$$\eta_{T,y} = \frac{dT}{dy}\frac{y}{T} \tag{1}$$

and is given by the ratio of the marginal tax rate to the average tax rate faced by the individual. The following uses the general…

Figure 4 show the variations in the elasticity of revenue with respect to τ_k, $\eta_{R,\tau k}$, for each tax bracket, as the elasticity of taxable income, $\eta_{y,\ 1-\tau k}$, increases.

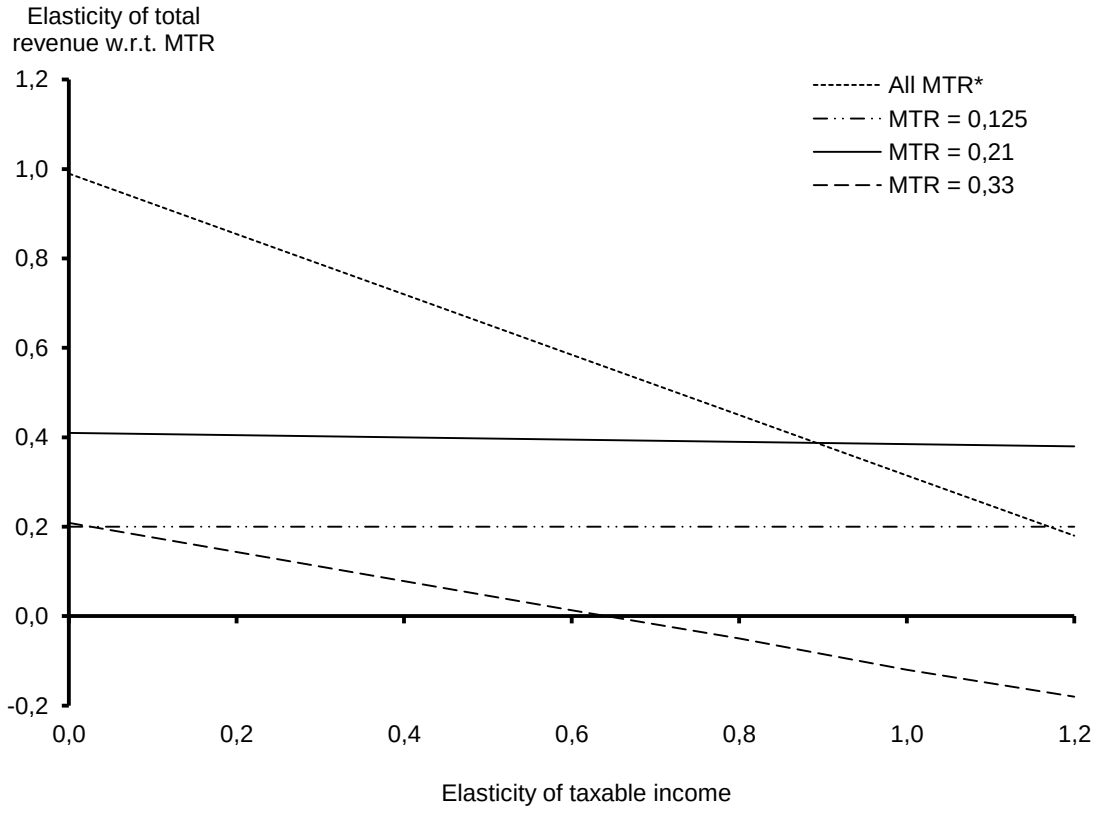

Fig. 1. Elasticity of total tax revenue wrt tax rates: 2010 budget.

Source: own calculation

* The lines marked 'all MTRs' show the elasticity of total revenue with respect to a simultaneous equal proportionate change in all marginal tax rates.

The other lines in the figures indicate, for each tax bracket, the variation in the elasticity, $\eta_{R,\tau k}$, when only the *k*th marginal tax rate is increased, with other rates held constant.

Table 1 provides summary information regarding the distribution of annual personal taxable incomes in the 2008/09 tax year, the most recent available year.[2] The overall arithmetic mean taxable income is $35 507. The thresholds shown in the table also relate to the structure in 2009/10.

Table 1. The distribution of taxable income in New Zealand: 2009/2010 tax year.

k	a_k	$\bar{y}_k$	Prop. of people*	Prop. of income
1	1	6748,82	0,241	0,046
2	14000	24080,76	0,435	0,294
3	48000	52414,34	0,224	0,330

Source: own calculation

* The thresholds shown in the table also relate to the structure in 2009/10.

The budget 2010 reductions in all tax rates, and especially the top rate, are shown in table 1. Given the relatively low value of the income threshold above which the top rate applies ($70,000), table 1 shows that this tax bracket contributes a higher proportion of total income tax revenue than the other brackets, even though it contains only 10% of taxpayers…

4. Conclusions

This paper has examined the joint role of the elasticity of taxable income (which refers to the behavioural effect on taxable income of a marginal tax rate change) and the revenue elasticity (which reflects the structural effect on revenue of a change in taxable income) in influencing the revenue effects of tax rate changes.

Illustrations were provided using the New Zealand income tax structures before and after the 2010 budget…

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[2] For the US, Saez et al. (2012) find values for $\left(\frac{\bar{y}_K - a_K}{\bar{y}_k}\right)$ around 1,5.