The Optimal Threshold for GST on Imported Goods

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The Optimal Threshold for GST on Imported Goods[*]

John Creedy[†]

Abstract

This paper examines the determination of the optimal threshold value for Goods and Services Tax (GST) for imported units arising from internet orders. The concept of an optimal threshold is wider than simply the maximisation of revenue net of administrative costs. At the optimal threshold, the marginal cost of funds from GST is equated to the ratio of the marginal value of public funds to their marginal social value, reflecting the value judgements of a decision maker. The marginal cost of funds allows both for compliance costs and the marginal excess burden arising from a small increase in the threshold. Illustrative numerical values are reported, showing the sensitivity to administrative costs, the demand elasticity and, importantly, value judgements.

JEL Classification: H20; H21

Keywords Goods and Services Tax; Marginal cost of Funds; *de minimis*.

1　Introduction

New Zealand's Goods and Services Tax (GST) has a very broad base, with few exemptions. However, financial services are not subject to GST, along with goods produced and sold by small firms whose earnings fall below a threshold of $60k per year. Firms whose earnings are expected to fall below the threshold, but who have large expenses (for example in the early years of their operation) may wish to register so that they can claim GST paid on their inputs. There has been little detailed examination of the determinants of what may be regarded as the optimal value of this threshold. However, an important exception is Keen and Mintz (2002) who take as their starting point the first-order condition for welfare maximisation which states (loosely) that the marginal benefit from a small increase in the threshold must equal the marginal cost. They then examine those marginal cost and benefit components to establish conditions that are easy to interpret.

Another important class of exceptions includes the large number of imported goods arising from orders placed with overseas suppliers and passing through customs control, which fall below the *de minimis* threshold, which is currently set at $60.[1] This threshold refers to the duty and/or GST payable. Duty is applied to clothing, shoes and accessories. Furthermore, GST is applied to the value of the goods, plus any applicable duty, plus postal/courier and insurance charges. To simplify the analysis, the present paper considers only GST. Hence, with a GST rate of 0.15, the threshold value is $400, since the tax liable, $0.15 \times \$400$, is equal to the *de minimis* of $60. For a discussion of mainly administrative issues relating to taxation of cross-border services and goods, see Inland Revenue (2015).

The existence of the *de minimis* has been strongly criticised by New Zealand retailers, who argue that it confers an unfair competitive advantage on overseas suppliers; see for example, New Zealand Retailers Association (2011) and the review of issues and literature by Steel *et al.* (2013a). In a separate document, Steel *et al.* (2013b) propose a 'pathway' to reform of the *de minimis* system. New Zealand Customs are currently carrying out a review of the system: see Minister of Customs (2016). See also Scott and Cantin (2015) for a discussion of the issues. A survey of consumers was carried out for NZ Customs by UMR Research (2016), and a report was commissioned from the New Zealand Institute of Economic Research (2016).

In a detailed review of the Australian system of dealing with low value goods, the

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[1]The exchange rate applied is published eleven days before the effective date (the day goods arrive not when payment was made for the order).

(Australian) Productivity Commission (2011) suggested that, the 'costs to government, business and consumers entail efficiency losses and are a deadweight loss for the community. Therefore, from the viewpoint of maximising the welfare of all Australians, the question is whether there are likely to be bigger losses in welfare from trying to provide equal treatment by collecting taxes on all imports, than from the distortions created by differential rates of tax and duty for overseas and domestic retailers' (2011, p. 189). The Productivity Commission, which recommended against reducing the threshold in Australia, also quoted from Henry (2009, p. 21), who argues that, 'related to the issue of complexity are the costs of administering and complying with the tax and transfer system. These costs represent a net loss to the economy, because the resources engaged in these activities could otherwise be put to more highly valued uses. Recent research suggests there is an optimal level of system complexity and operating costs, one that balances administration and compliance costs with improved efficiency and distributional outcomes'.

The challenge is to produce an operational framework for examining an optimal *de minimis*. The limited aim of the present paper is to examine how the Keen and Minz (2002) approach – designed to deal with the optimal threshold (in terms of turnover) for domestic registration by firms – can be modified to deal with the implications for setting the *de minimis* relating to imported units. The term 'unit' is used rather than, for example, 'package'. This is because separate packages which arrive at the same time for the same purchaser are combined into a single unit for tax purposes. Furthermore, reference is made throughout to the threshold *value of units* rather than the *de minimis*. Although the NZ context is considere here, the general approach is widely applicable.

The first point to stress is that there is no objective or value-free optimal: value judgements always enter into the specification of what is meant by optimal, determining how the outcomes are evaluated by a judge or decision maker. Hence the most that can be achieved in a disinterested economic analysis of this kind is to examine the implications of adopting alternative value judgements. The approach begins from a general fundamental equimarginal first-order condition requiring the equalisation of marginal costs and benefits for each tax and expenditure component.[2] Stated in this blank way, such an obvious condition can appear to be almost content-free. How-

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[2] An alternative structural approach, as in the early treatment of optimal income and commodity taxation, is to specify an explicit form for a social welfare, or evaluation, function. This is maximised, subject to government budget and other constraints, in a structural model in which individuals' optimising behaviour is also treated explicitly. However, it is very difficult to obtain explicit solutions using this type of framework.

ever, when the costs and benefits can be expressed in tractable ways, it is sometimes possible to express results in terms of easily interpreted (though not necessarily easily-estimated) parameters, such as elasticities.[3] Nevertheless, as seen below, the cost of obtaining easily interpreted results is that there can remain a lack of clarity about the way in which value judgements are specified.

Furthermore, the equimarginal condition is, as stated, necessarily part of an extensive tax system which includes other forms of taxation and benefits. When using the approach to consider a single tax, or indeed a single component of that tax, particular care is needed: it is often implicit that the rest of the tax and government expenditure system satisfies the related first-order conditions. A total revenue requirement is not imposed explicitly; that is, it is effectively assumed that any additional revenue can be obtained optimally from an alternative source.

The analysis proceeds as follows. First, the case of revenue maximisation is examined in Section 2. This involves a very simple objective function and easily-measured outcomes. The general conditions required for the much broader concept of an optimal threshold are then discussed in Section 3. Section 4 derives expressions for the various components, including the marginal revenue and cost implications of changing the GST threshold, along with welfare changes. An expression for the optimal threshold is then obtained in Section 5. Some numerical examples are provided in Section 6 and brief conclusions are in Section 7.

2 Net Revenue Maximisation

Suppose the policy objective is to maximise tax revenue net of administration costs. Popular discussion is often in terms of this objective. The threshold which maximises the difference between total tax revenue and the total administrative cost is simply the value for which the marginal tax revenue is equal to the marginal administrative cost. Suppose there is a constant administration cost per unit of c_a.[4] The GST rate is τ and the threshold value above which units incur GST is y^*. Given that many units are likely to have the same value of y^*, a marginal increase in the threshold reduces tax revenue by τy^* – the tax on a marginal unit – multiplied by the number of units taken out of the tax net. The reduction in administrative costs is simply c_a multiplied by the

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[3]Each approach is essentially an exercise in welfare economics, asking what threshold would be imposed by a fictitious independent decision maker who has no vested interests in the outcome, but has easily-summarised value judgements. This differs from a 'political economy' approach which asks what outcome would arise from alternative voting mechanisms.

[4]Hintsa *et al.* (2014) regard the optimal *de minimus* as the value that maximises total net revenue.

same number of units that are no longer subject to taxation.[5] Equating marginal cost and marginal revenue thus gives $\tau y^* = c_a$ and the net revenue maximising threshold is given by:

$$y^* = \frac{c_a}{\tau} \qquad (1)$$

The threshold is therefore simply the ratio of the (constant) administrative cost per package to the GST rate. The total number of units and their distribution by value are irrelevant since, for any small increase in the threshold, the amount by which the tax and the administrative cost per item are multiplied to obtain the marginal changes in *total* costs and revenues are the same. Hence they cancel from both sides of the equation.

This result also suggests that the price elasticity of demand for imported units, η say, is not relevant.[6] However, this would need to be qualified if general equilibrium considerations were taken into account. Substitution away from taxed goods towards the untaxed goods, as the threshold increases, implies that the marginal revenue is larger in absolute terms. The loss of revenue includes the goods taken out of the tax net by the threshold increase, plus the loss of revenue from the reduction in the demand for other domestically supplied and taxed goods. However, this type of consideration is neglected below.

Given this simple condition, it is of interest to consider whether current New Zealand policy can be rationalised in terms of net revenue maximisation? The New Zealand Customs Service states that the duty and/or GST is not collected, 'when the total amount payable is less than \$60. This is because, below \$60, more would be spent on the administration and collection than would be collected in revenue'.[7] This might be interpreted as suggesting both that the administrative cost per unit is \$60, and that a revenue-maximising strategy is being followed. However, this seems to be an unrealistically high administration cost, especially when it is recognised that, 'Once the threshold of \$60 of duty and/or GST payable is reached an Import Entry Transaction Fee (IETF) of NZ\$49.24 (GST inclusive) is also payable. This includes the Ministry for Primary Industries biosecurity system entry levy of \$19.98 (GST inclusive)'.

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[5] These components are discussed more formally in subsection 4.1 below.

[6] Domestic suppliers are likely to argue that the elasticity matters to them since it affects the extent to which consumers switch from equivalent domestically-supplied goods to imported goods. If this loss of custom to domestic suppliers is included by decision makers in their evaluation function, the elasticity then has an additional role to play. Of course many imported goods cannot be obtained from domestic sources: this is often cited as a major reason given by consumers for making internet purchases. These considerations are not discussed further here. Producers' surplus is also explicitly excluded from the following analysis by the assumption that the supply price is constant.

[7] See the Customs Service web site: http:/www.whatsmyduty.org.nz/faq.

Further evidence suggesting that revenue maximisation is not the primary concern is provided by the fact that when the GST rate was increased from 0.125 in 2010, the *de minimis* was raised from $50 to $60. This ensured that the threshold value applied to units remained constant at $400. From (1), net revenue maximisation would have suggested a lower, rather than a higher, threshold.

3   The Optimal Threshold

This section describes the general condition required to achieve an optimal GST threshold, where 'optimal' is defined to include compliance and administrative costs, along with the welfare costs of taxation. In addition, the marginal benefit from a change in the tax structure is considered to be measured in terms not simply of the net revenue obtained, but of the perceived benefits from spending that revenue.

As explained in Section 1, the approach does not begin by specifying a social welfare function and structural model of the economy. It instead takes the 'higher level' approach of stating the first-order conditions for an optimal in terms of concepts familiar from the public finance literature. Examples of the use of this approach are Saez (2001), Saez and Stantcheva (2012), Brewer *et al.* (2010) and Mirrlees (2011) in the context of income taxation and, as mentioned earlier, by Keen and Mintz (2004) when considering the threshold value of earnings above which firms must be registered for GST. However, these authors – though they ultimately use the same fundamental condition – move quickly to their final result, rather that setting out the basic principles involved. It is therefore useful to explain the approach in some detail here.[8]

The equimarginal condition states that, from the point of view of the decision maker and for all tax structure components, the marginal benefit from taxation must equal the marginal cost. It is easiest to think in terms of an increase in tax revenue, which in the present context arises from a small *reduction* in the threshold, y^*. The revenue increase is the marginal revenue, MR, and the additional administrative cost is denoted MAC. Thus there is a net increase in revenue of $MR - MAC$. In converting this into a marginal benefit, define the 'marginal value of public funds', $MVPF$, as the value attached to an extra unit of government expenditure.[9] The marginal benefit is thus equal to $MVPF$ multiplied by $MR - MAC$.

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[8]For comparisons and further examination of the approach in the context of income taxation, see Creedy (2015).

[9]No explicit reference is made to the form of expenditure, since in the optimal structure, all adjustments are made to both the tax and expenditure side to achieve the equimarginal condition for all cases.

Consumers pay more GST, reflected in MR. The effective increase in the price gives rise to a welfare reduction, expressed in money terms as $MWC = MR + MEB$, where MEB is the marginal excess burden. A reduction in the threshold provides a loss to marginal consumers in excess of the increase in the tax paid. However, an alternative perspective would argue that the *de minimis* involves a distortion from a uniform tax structure and an associated loss of efficiency. This aspect is discussed further below, where both cases are considered.

For overseas suppliers there is an increase in their total compliance cost, denoted by MCC. It is not clear how these would be viewed by domestic policy makers, depending on perceptions about the extent to which such costs may be passed to consumers.

The decision maker also has a view about the weight attached to these costs. The relevant value judgements are expressed in terms of the 'marginal social value', MSV. This is likely to be influenced by the perceived distributional consequences of the tax change. For example, if the tax affects high-income groups and the decision maker is highly averse to inequality, a lower weight is attached to the welfare change.[10] The marginal cost is thus MSV multiplied by $MWC + MCC$.

The first-order condition for maximising the implicit social welfare function is that the marginal cost of the extra public expenditure is equal to the marginal benefit, so that:

$$(MSV)(MWC + MCC) = (MVPF)(MR - MAC) \qquad (2)$$

This condition for an optimal tax and expenditure system applies to all tax components and all expenditure types. Rewrite (2) as:

$$\frac{MVPF}{MSV} = \frac{MWC + MCC}{MR - MAC} \qquad (3)$$

The right hand side of (3) is the sum of the marginal welfare change and the marginal compliance cost per unit of net revenue: it is the marginal cost of funds, MCF.[11] Defining $\delta = MVPF/MSV$, the first-order condition can be rewritten succinctly as:

$$\delta = MCF \qquad (4)$$

Given a value of δ, the threshold is adjusted until the equality in (4) is achieved. It is likely that the decision maker attaches a value to $MVPF$ greater than unity; that

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[10]Without a structural model, the distributional consequences are not evident. In the context of income taxation, consideration can be given to those falling into different marginal income tax brackets. For example, Saez (2001), Brewer *et al.* (2010) and Mirrlees (2011) impose $MSV = 0$ for top income tax bracket taxpayers. See Creedy (2015) for further discussion.

[11]On this concept see, for example, Creedy (1998) and Dahlby (2008).

is, a dollar in the hands of the government is valued as being worth more than the dollar in the hands of taxpayers. For example, extra government expenditure may be thought to give rise to externalities or subsidise merit goods. Hence, even if a dollar of welfare and compliance loss is valued fully as a dollar (the decision maker attaches the same value as the taxpayers affected), $\delta > 1$ is the most appropriate range to consider. Indeed, a value of $\delta = 1$ would imply that no revenue, and hence taxation, is desired since the public use of the revenue cannot 'beat' the private use.

4 Marginal Changes

This section provides the structure needed to give more content to the general optimality condition discussed in the previous section. The various cost and revenue components are derived in subsection 4.1, which follows Keen and Mintz (2004) closely, despite the different context. Welfare changes, not included by Keen and Mintz (2004), are examined in subsection 4.2.

4.1 Revenue, Administrative and Compliance Costs

Suppose the value of an imported unit is y, with arithmetic mean, $\bar{y}$, distribution function $F(y)$, and associated density function, $f(y)$. The total number of units imported is n. If the GST rate is τ, total revenue, R, is expressed as:

$$R = \tau n \int_{y^*}^{\infty} y dF(y) \tag{5}$$

Hence, marginal revenue, MR, from an *increase* in y^* is:

$$MR = \frac{dR}{dy^*} = -\tau y^* n f(y^*) \tag{6}$$

This is negative in view of the increase in y^*, and in absolute terms is simply the product of the tax paid on marginal units, τy^*, and the number of those units, $nf(y^*)$. Any increase in demand for those items formerly at the threshold has no effect on revenue, unless some of the extra demand involves a reduction in the expenditure on domestically supplied and taxed goods: this kind of effect is ignored here.[12]

Denote the administrative cost per unit subject to GST by c_a: this average cost is assumed to be fixed, independent of the number of units subject to taxation. Hintsa *et al.* (2014) provide a detailed analysis of a number of components of the administrative

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[12]It would have the effect of reducing the optimal threshold somewhat.

cost and produce standard U-shaped marginal and average cost schedules: however, there is a wide 'flat' range where it is reasonable to assume constant costs. The implications of nonlinear costs are considered briefly in the Appendix. Total administrative costs, A, are expressed as:

$$A = c_a n \{1 - F(y^*)\} \tag{7}$$

and the marginal cost, MAC, is:

$$MAC = \frac{dA}{dy^*} = -c_a n f(y^*) \tag{8}$$

and in absolute terms is simply the cost per unit multiplied by the number of units, $n f(y^*)$, which no longer need to be processed.

The increase in the threshold is also associated with lower costs imposed on suppliers. Suppose the compliance cost per unit subject to GST is c_c, and is assumed to be fixed. The total compliance cost, C, is:

$$C = c_c n \{1 - F(y^*)\} \tag{9}$$

so that the marginal cost, MCC, is:

$$MCC = \frac{dC}{dy^*} = -c_c n f(y^*) \tag{10}$$

4.2   Marginal Welfare Changes

This subsection considers the welfare change arising from a marginal increase in the GST threshold. On the assumption that such units form a small part of each individual's budget, 'income effects' can be ignored and welfare changes can be measured in terms of consumers' surplus. Suppose that each consumer can purchase any number of units without any change in price. Figure 1 magnifies the effect of a small change, whereby the individual's demand curve around an existing threshold is approximated by a straight line. The price in the absence of compliance costs and tax is p_0. If the compliance cost is passed to consumers, the price becomes p_1 and the addition of an indirect tax imposed at the rate, t, per unit leads to a consumer price of p_2.

The excess burden, meb, is the area, ABC, and is equal to:

$$meb = \frac{1}{2} \Delta q \Delta p \tag{11}$$

The proportional change in price is $\Delta p / p_0 = (t + c_c) / p_0 = \tau + c_c / p_0$, where, as above, τ is the ad $valorem$ GST rate. Defining the absolute demand elasticity, $|\eta| = \left| \frac{\Delta q}{q_0} \frac{p_0}{\Delta p} \right|$, the change in quantity is:

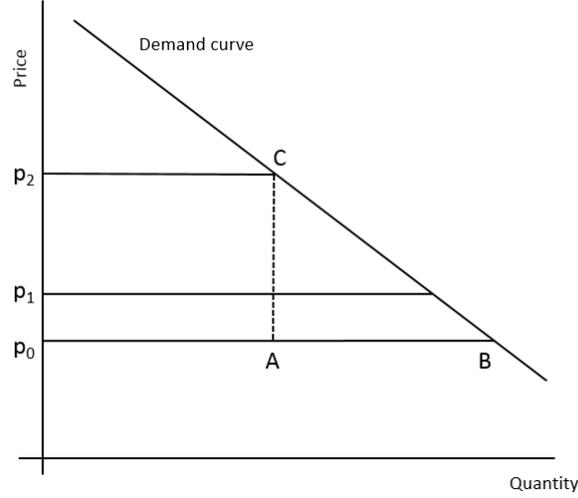$$\Delta q = |\eta| q_0 \left(\tau + \frac{c_c}{p_0} \right) \tag{12}$$

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Figure 1: Welfare Changes

Substituting for Δq in (11), again using $\tau = t/p_0$ and setting $p_0 q_0 = y^*$, gives:

$$meb = \frac{|\eta|}{2} y^* \left(\tau + \frac{c_c}{p_0} \right)^2 \tag{13}$$

Hence for the $nf(y^*)$ units at the margin, the total change, MEB, is $(meb)\,nf(y^*)$. A reduction in the threshold leads to a positive excess burden as a result of the higher consumer price for goods brought into the tax net. However, if all domestically supplied goods are taxed, the resulting movement toward uniformity may be thought to involve a reduction in tax distortions, as discussed above. When providing numerical illustrations below, both views are examined.

5 The GST Threshold

Recognising that $MWC = MR + MEB$, equation (4) becomes, after appropriate subsitution:

$$\delta = \frac{(\tau y^* + c_c) + \frac{|\eta|}{2} y^* \left(\tau + \frac{c_c}{p_0} \right)^2}{(\tau y^* - c_a)} \tag{14}$$

This can be simplified by assuming that c_c/p_0 in the numerator can be neglected, as compliance costs are likely to be small in relation to the threshold. This amounts to assuming that shifting compliance costs to consumers in the form of higher prices has a negligible effect on welfare changes, relative to that of GST. Hence:

$$y^* = \frac{\delta c_a + c_c}{\tau(\delta - 1) - |\eta|\,\tau^2/2} \tag{15}$$

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Calculations show that the approximation is very close to the exact value obtained by numerically solving the equation: values for the optimal threshold differ by only around \$1.

The optimal threshold does not depend on the form of the distribution of unit values or their total number, because the terms in $nf(y^*)$ cancel. This is a convenient result in view of the difficulty of obtaining information about the complete distribution of values. Furthermore, it means that inevitable changes in the distribution over time would not lead to changes in the optimal threshold. The implications non-constant average administrative costs per unit are discussed briefly in the Appendix.

The optimal threshold is zero only if compliance costs are ignored and administrative costs are zero.[13] An increase in the absolute elasticity, $|\eta|$, results in a higher threshold, y^*, as a result of the higher excess burden associated with the tax. The threshold, y^*, exceeds the revenue-maximising value of c_a/τ, discussed in Section 2. However, if it is argued that there is a welfare gain from reducing tax distortions where all domestically supplied goods are subject to tax, an approximation may be obtained (in the absence of a full structural model) by changing the sign on $|\eta|$ in (15). In this case it is possible for y^* to be less than the revenue-maximising value if $|\eta|$ is sufficiently large – that is, if the efficiency gains from more uniform prices outweigh the administrative and compliance costs.

Another way to write the condition in (15) is as follows:

$$\delta - \left(1 + \frac{|\eta|}{2}\tau\right) = \frac{\delta c_a + c_c}{\tau y^*} \tag{16}$$

The right-hand side of (16) is equal to the sum of marginal compliance and administration costs per unit, divided by the tax paid on the marginal unit imported; the marginal administrative cost is adjusted upwards (since $\delta > 1$) to allow for the extra value attached to public expenditure. The left-hand side indicates that the value of δ must be sufficiently larger than one, by an amount that depends on the demand elasticity. The optimal threshold becomes highly sensitive to δ as it moves close to $1 + |\eta|\tau/2$, that is, as it approaches an asymptote where no tax is collected from this source (y^* is infinitely large). However, taking the case mentioned above where the sign on $|\eta|$ is reversed, it is possible to impose an optimal tax on imported units even

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[13]The New Zealand Retailers Association (2011, p. 12) argued that the *de minimus* should 'be set at zero and that the focus goes onto finding an administrative solution'. But of course administrative costs could never be reduced to zero. It also suggests (2011, p. 12) that, 'the underlying purpose of de minimis is to exempt some from the burden of tax – we disagree with this underlying purpose'. This also implies that they believe there should be no threshold relating to GST registration for NZ firms.

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if δ is less than one, provided the welfare gains from moving towards a more uniform tax structure are sufficiently large.

6 Some Illustrative Examples

This section uses the result established in the previous section to examine the implications of adopting alternative values of δ, the elasticity of demand, $|\eta|$, and the cost components. Information about compliance costs is extremely difficult to obtain, and values reported by Hintsa *et al.* (2014) vary widely.[14] All calculations are obtained for the current GST rate of $\tau = 0.15$.

In considering appropriate values of δ, this depends on the value judgements and so only the implications of adopting alternative values can be considered. In considering sensible orders of magnitude, it may be suggested that a rough guide is provided by estimates of the marginal cost of funds obtained from other sources, given that the condition in (4) must hold for all tax sources and expenditure types at the optimum, though of course any actual structure could not claim to be 'optimal' (except in some Panglossian world). Reference is sometimes made to a marginal cost of income taxation of around 1.2, with lower values for indirect taxes, but precise estimates are not available for New Zealand. International evidence, summarised for example by Dahlby (2008), gives a wide range of values for different tax sources. In addition, marginal excess burdens, and hence the marginal cost of funds, vary substantially among different demographic groups.[15]

The variation in the optimal threshold for variations in δ and for two levels of c_a is shown in Figure 2, based on values of $c_c = 5$ and $c_c = 0$. The administrative cost takes two values, of 5 and 4 per unit. Data for current administrative costs are not available: these illustrative values are much lower than the current *de minimis* on the grounds, discussed above, that the current system is not based on revenue maximisation (so that the *de minimis* is not a guide). The demand elasticity is set at $|\eta| = 0.1$ in each case. The assumption made here is representative of values reported by Steel *et al.* (2013), and the sensitivity of results is also examined below.

In each case the asymptotic behaviour of y^* as δ approaches a lower limit, discussed above, is apparent. However, there is much less sensitivity for the relatively higher values of δ above about 1.15. For $c_a = 5$ per unit, the current threshold of 400 is

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[14]For a broad review of literature and details relating to New Zealand firms, see Gupta and Sawyer (2015). However, they do not provide details which could be used for the present analysis.

[15]Estimates of welfare costs of excise taxes in New Zealand for different groups are reported in Creedy and Sleeman (2005). On welfare costs of direct taxes in Australia, see Creedy *et al.* (2011).
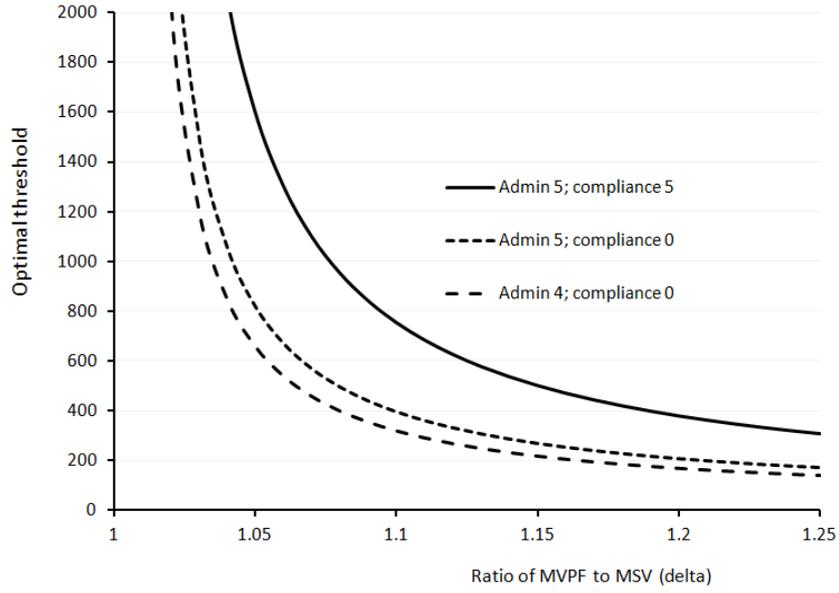
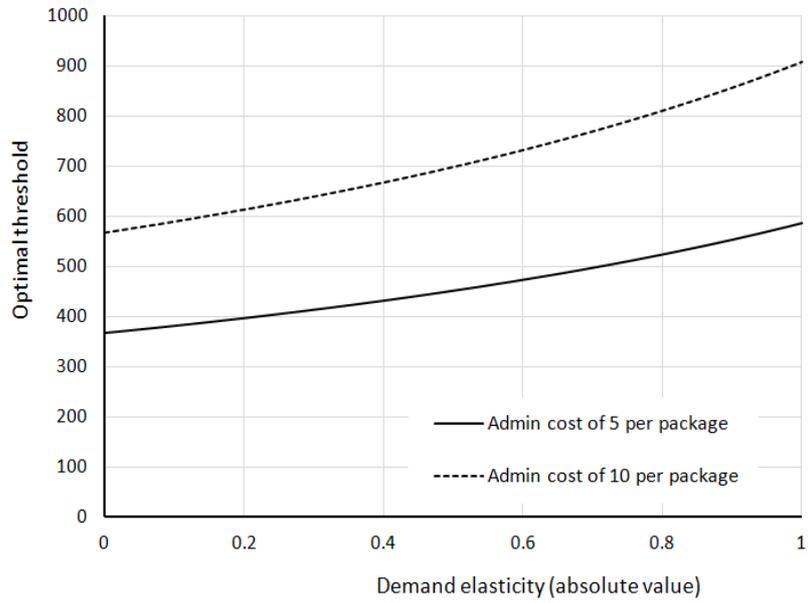Figure 2: Relationship Between Optimal Threshold and $\delta = MVPF/MSV$

Figure 3: Relationship Between Optimal Threshold and Demand Elasticity

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consistent with a value of δ of 1.19. If the compliance cost is neglected, by setting $c_c = 0$, the same administrative cost gives the current threshold as optimal with the lower value of $\delta = 1.1$. If the administrative cost is 10 per unit, the values of δ needed for the optimal threshold to be equal to the current threshold are respectively 1.29 and 1.19 for c_c of 5 and 0. By comparison, the higher cost of $c_a = 10$ implies that the values of δ of 1.19 and 1.1 give optimal thresholds of 617 and 793 respectively (for compliance costs of 5 and 0). With a higher absolute elasticity, the profiles shift upwards. The sensitivity of the optimal GST threshold to the demand elasticity is shown in Figure 3, for two levels of c_a, and for $\delta = 1.1$, with $c_c = 5$.

Consider the values of δ required for the optimal threshold to be \$200, which is half of the current threshold. With $|\eta| = 0.1$, and $c_a = c_c = 0.5$ this would require $\delta = 1.41$, although if compliance costs are neglected, this drops to 1.21. However, if $c_a = 10$, the required δ values are respectively 1.76 and 1.51. These values are of course higher if the elasticity is higher. The assumption of a constant average administrative cost is reasonable for small changes over a range of threshold values. But in practice the consideration of such a large reduction in the threshold, involving a substantial increase in the number of items to be processed, may require additional storage and other facilities, and even the introduction of new processes (for example, registration of certain suppliers). Any proposal for a large reduction in the threshold would therefore need to be clear about the implications for costs.

It is also useful to consider the case where a reduction in the threshold is considered to produce welfare gains by moving towards a more uniform tax structure. In this case a higher elasticity, in absolute terms, would imply a lower value of δ needed for any given y^* to be optimal. The current threshold of \$400 is optimal, when $|\eta| = 0.1$, and $c_a = c_c = 0.5$, for $\delta = 1.17$ compared with 1.19 in the partial equilibrium case above. The sensitivity is shown in Table 1, which shows values needed to achieve an optimal threshold of \$200.

Table 1: Values of Delta Needed for Optimal Threshold of 200: Reduction in Threshold Assumed to Lead to Efficiency Gains (Negative Excess Burden)

| | $|\eta| = 0.1$ | | $|\eta| = 0.5$ | | $|\eta| = 1.0$ | |
	$c_c = 0$	$c_c = 5$	$c_c = 0$	$c_c = 5$	$c_c = 0$	$c_c = 5$
$c_a = 5$	1.19	1.39	1.155	1.355	1.11	1.31
$c_a = 10$	1.49	1.74	1.440	1.690	1.39	1.66

The case for halving the current threshold thus requires some combination of the following characteristics: a relatively low administrative cost per unit; a relatively high

demand elasticity; low compliance costs and; value judgements such that δ is relatively high (or establishing that the marginal cost of funds from other tax sources is relatively high). The required values are sensitive to administration and compliance costs and depend on the way excess burdens are treated, though they are less sensitive to the latter.

7   Conclusions

This paper has examined the optimal threshold value for Goods and Services Tax (GST) for low-value imported units. At the optimal threshold, the marginal cost of funds from GST is equated to the ratio of the marginal value of public funds to their marginal social value. The latter ratio reflects value judgements. The marginal cost of funds allows both for compliance costs and the marginal excess burden of taxation.

This condition is derived from the general first-order condition for an optimal *tax system*, namely that the perceived marginal cost of taxation is equal to the marginal benefit from public expenditure, for all taxes and related parameters and all types of expenditure. This condition clearly does not hold in practice. In considering just one component of the GST structure, there is nevertheless an implicit assumption that the remainder of the tax structure is in fact optimal. For example, the marginal cost of funds from income taxation is equated to the required ratio, so that in an optimal system, the GST threshold should be adjusted so that its marginal cost of funds is equal to that from the alternative. If it is lower, the threshold should lowered and more tax obtained from imported units, and if it is higher, the threshold should be raised and any additional required revenue obtained from the alternative source.

It was found that if the average and marginal administrative and compliance costs are constant, the optimal GST threshold does not depend on either the number of units imported or its distribution by value. This is useful because it means that changes in the distribution over time would not give rise to a need to adjust the threshold. Costs are unlikely in practice to be constant over the whole range of possible thresholds, but may be considered to be constant over the relevant range.

Precise details about the cost components and the demand elasticity, along with the marginal cost of funds from alternative tax sources, are extremely difficult to obtain for New Zealand. In the absence of reliable estimates, illustrative numerical values were reported, showing the sensitivity to administrative costs, the demand elasticity and, importantly, value judgements.

That fact that the information needed to determine an optimal threshold is not

available is quite usual in public finance analyses. An analysis of this kind can provide an indication of the relevant relationships and the orders of magnitude involved. There is no value-free or simple way to determine an optimal value, but the analysis suggests that the case for substantially reducing the existing threshold depends on the argument that administrative costs can also be reduced and that the marginal cost of funds from alternative sources is relatively high.

Appendix: Non-constant Administrative Costs

The implications of allowing average administrative costs per package to vary with y^* can be seen as follows. Write $c_a(y^*)$ to indicate that c_a is a function of the threshold. it can be shown that the denominator of (14) becomes:

$$\{\tau y^* - c_a(y^*)\} - \eta_{c_a,y^*}\left[c_a(y^*)\left\{\frac{1-F(y^*)}{y^*f(y^*)}\right\}\right] \tag{A.1}$$

Here, η_{c_a,y^*} denotes the elasticity of the average administrative cost with respect to the threshold. The term in curly brackets is the ratio of the number of packages liable to GST divided by the value of packages at the margin. The term in square brackets is the ratio of the total administrative cost to the value of packages at the margin. In this case changes over time in the form of the size distribution of packages by value lead to changes in the optimal *de minimus*.

Even in the much simpler case where the objective is net revenue maximisation, the threshold can be shown to be the solution to the nonlinear equation:

$$1 - \frac{\tau y^*}{c_a(y^*)} = \eta_{c_a,y^*}\left[\frac{1-F(y^*)}{y^*f(y^*)}\right] \tag{A.2}$$

When $\eta_{c_a,y^*} = 0$, the simple result mentioned in the introduction applies, where $y^* = c_a/\tau$. An allowance for varying average costs clearly introduces considerable complexity, even in the otherwise simple case of maximising net revenue.

If c_a is not constant, the term, $\delta\eta_{c_a,y^*}\left[c_a(y^*)\left\{1-F(y^*)\right\}/y^*f(y^*)\right]$ must be added to the numerator on the right hand side of equation (15). The solution to the resulting nonlinear equation again clearly depends on the form of the distribution of package values.

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