H Impacts of reducing the LVT

The purpose of this appendix is to quantify the welfare impacts of reducing the low value threshold (LVT) on imports. The low value threshold determines the value at which imported goods are subjected to the GST and tariffs, and is currently set at $1000.

The framework is designed to model the demand and supply for imported goods and their domestic substitutes; it also includes the revenue implications for government. The framework is used to calculate the likely welfare consequences of reducing the LVT, based on a range of different assumptions. Only the part of imports destined for consumers is modelled, since the part destined for businesses is exempted from GST and tariffs.

There are 'neutrality benefits' from imposing the GST on all goods (these benefits accrue mainly to producers and government), and there are costs associated with increasing the tax (and these costs are borne by consumers). The net effect cannot be determined theoretically and depends on the value of several parameters.

The analysis does not imply that the LVT should be lowered only if it is associated with a positive welfare impact; this standard is not used when deciding to impose a tax, since the imposition of a tax is typically welfare reducing. Tax collection is justified on the basis that the value of what is done with the revenue exceeds the costs of raising it.

Nonetheless, the calculations below show the welfare impacts to illustrate the orders of magnitude involved. As with any model, this one is a simple representation of the mechanisms at work and is only used for illustrative purposes.

Some illustrative calculations

Taxing a previously untaxed good may or may not improve welfare. While broadening the tax base and removing the relative price distortion work to improve welfare, increased collection costs reduce welfare. The question of whether, on balance, the change in net welfare is positive depends on: the magnitude of the collection costs; the degree of substitutability between taxed and untaxed goods and

the supply elasticity for the taxed good (box H.1). The efficiency cost of public funds is also relevant (box H.2).

Given data limitations the calculations in this appendix can only be suggestive of possible orders of magnitude but they do highlight the importance of the parameters mentioned above. As outlined in box H.3, the calculations are based on consumers substituting between LVT goods and domestic substitutes which are subject to the GST and tariffs. It is assumed that consumers choose a consumption bundle to maximise utility subject to an overall expenditure constraint. The utility function is calibrated to fit the observed expenditure and prices, and used to calculate the consumer response to price changes.

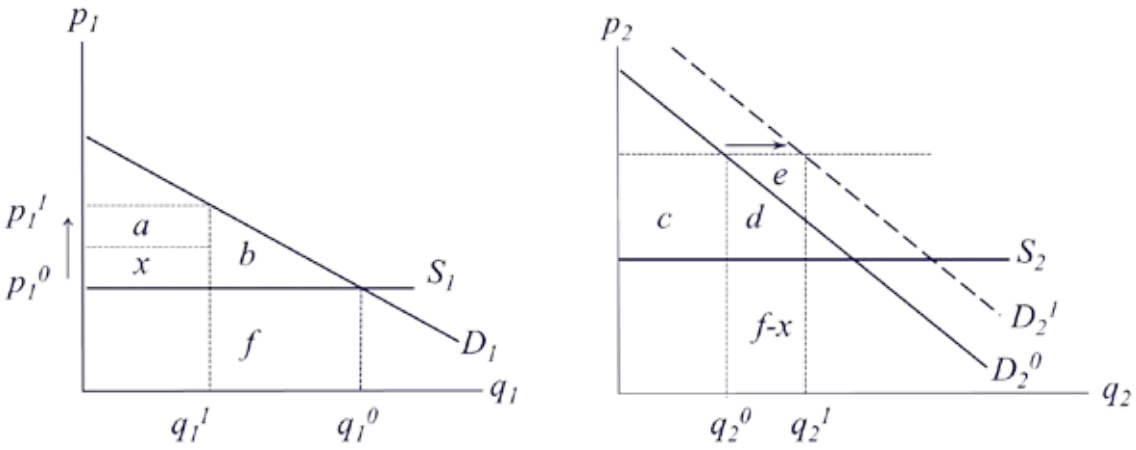
The model used measures welfare effects directly, by calculating the compensating variation associated with each simulation. The impact on consumers is measured as the income required for consumers to obtain the same level of utility as they do when the GST is not applied to LVT imports. Reflecting this, the welfare calculations reported in this appendix do not rely on the areas under the demand curves which are depicted in box H.1 to illustrate the intuition behind the results.

Box H.1 **Calculating the welfare effects of a tax increase**

As explained by Jones (2005, p. 35) the deadweight loss of imposing a tax on an untaxed good can be greater or less than zero when there are existing taxes on other goods. When the tax is imposed, it increases the demand for substitutable goods that are already taxed. This welfare gain is captured by the additional tax revenue obtained from those markets.

The net result is that welfare increases if the deadweight loss in the newly-taxed market is less than the extra tax revenue generated in previously taxed markets. An additional adjustment needs to be made when resources are used in collecting taxes (Slemrod and Yitzaki, 1996). These costs on the newly taxed good are additional to the regular deadweight losses and must be offset against any extra tax revenue.

The following diagrams illustrate a simple case with two goods, constant producer prices and a fixed consumer budget constraint.



Good 1 Good 2

Initially good 1 (left-hand diagram) is untaxed and good 2 (right-hand diagram) is taxed so that it raises *c* dollars in revenue. If good 1 is then taxed, its price rises from p_1^0 to p_1^1. This price increase includes additional taxes (*a*) and collection costs that are assumed to be borne by consumers (*x*). The result is a decrease in the quantity of good 1 consumed (from q_1^0 to q_1^1) and a shift in demand for good 2 from D_2^0 to D_2^1.

Consumers' surplus decreases by *a*+*x*+*b* dollars while tax revenue increases by *a*+*d*+*e* dollars. Area *f* represents the savings in expenditure on good 1 which, after subtracting the tax expense of *a* dollars and the resource costs of *x* dollars involved in complying with the tax on good 1, is expended on good 2.

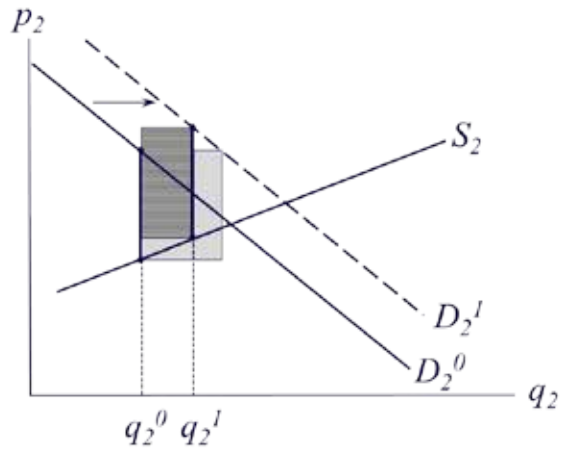
The tax on good 1 improves welfare if the total increase in tax revenue (*a*+*d*+*e*) is greater than the loss in consumers' surplus (*a*+*b*+*x*), or equivalently, if the increase in tax revenue on good 2 (*d*+*e*) is greater than the deadweight loss (*b*+*x*) which includes both the regular deadweight loss (*b*) and the loss due to compliance costs (*x*). This analysis follows the approaches in Mishan (1973), Jones (2005) and Mishan and Quah (2007).

(continued next page)

Box H.1 **continued**

Further complications arise if the supply price of good 2 is not constant but rises instead. Although the magnitude of the net benefits differs, the above basic principles still hold; imposing a tax on good 1 expands consumption and production of good 2, increasing government revenues from good 2. As before, there is a beneficial expansion in consumption and production of good 2 because the marginal valuation exceeds the marginal cost of production. And there is an increase in the tax revenue collected on good 2, and an increase in producers' surplus in market 2. However compared to the constant price case, the net benefits of imposing a tax on good 1 is moderated.

This can be seen in the following diagram of the supply and demand for good 2 where the demand curves for good 2 and tax rates are the same as previously, but supply is upward sloping. In this diagram the lightly shaded rectangle is the amount of additional tax revenue collected from good 2 when the marginal cost was fixed, equal to areas *d*+*e* in the previous diagram.



Good 2

In this case as a tax is imposed on good 1 and demand for good 2 increases, there is an increase in both the producer and consumer prices of good 2. The higher producer price encourages additional resources to be drawn into the production of good 2 and increases producers' surplus in the production of good 2. The higher consumer price discourages consumption of good 2 compared to the constant price case so that q_2^1 is less than it was in the previous diagram. With a smaller increase in consumption of good 2, the additional tax revenue collected on good 2 – shown by the dark shaded rectangle – is also smaller. In sum, the net welfare benefits of imposing a tax on good 1 are smaller when there is a lower supply elasticity for good 2, all else the same.

Box H.2 **Efficiency cost of public funds**

The marginal efficiency cost of public funds measures the cost to society of raising a dollar through particular taxes. This cost generally exceeds the nominal value of the tax collected because of the deadweight losses associated with the distortion of relative prices and the compliance and administration costs of taxes.

That said, in the case of lump-sum taxes with no collection costs, the cost of raising a dollar in tax revenue is equal to a dollar. When correcting a distortion, the cost of raising a dollar of tax revenue (with no collection costs) is less than a dollar. Tax collection is best achieved by relying less on taxes with high efficiency cost and more on taxes with a low efficiency cost.

Source: (Slemrod and Yitzhaki, 1996)

Box H.3 **Measuring the welfare effects of price changes**

The welfare calculations used in this appendix are based on a simple model of consumer demand. Consumers are assumed to maximise utility by consuming a range of goods (which consist of imported LVT goods, domestic substitutes for LVT goods, and other consumption) subject to a fixed budget constraint. The impact of the price changes on consumers is measured by compensating variation — the level of additional income that consumers would require to reach their initial level of utility.

The calculations in this appendix assume that the direct utility function for a representative consumer is a Constant Elasticity of Substitution (CES) function, nested within a Cobb-Douglas function (Keller, 1976; Rutherford, 2002). The substitution elasticity between LVT imports and domestic substitutes is constant. Consumers also choose between the (imported and domestically produced) composite LVT goods and the remainder of household consumption. The Cobb-Douglas form implies that consumers allocate fixed budget shares to each component.

This utility function is calibrated to estimated expenditure on the three types of goods: LVT imports equal $4.2b (based on CAPEC – sub 90); domestic LVT substitutes equal $115b (retail sales excluding food retailing and cafes for 2010-11 from ABS Retail Trade, Catalogue 8501.0); and a residual consumption of $758b. Prices for the three goods are respectively 1.0, 1.125 (including GST and tariffs) and 1.1 (including GST).

The total collection costs associated with lowering the LVT are assumed to be split between consumers and government in approximate 70–30 proportions.

In tables H.5 and H.6, which report the effects of reducing the LVT to $100 and $500 respectively, it is assumed that there are three goods in the lower level utility function — LVT imports, imports currently identified as LVT but subject to tax in the simulation, and domestic substitutes. In table H.5, calibrated expenditure on goods below $100 is $1.7b and expenditure on goods above that threshold is $2.5b. In table H.6, calibrated expenditure on goods below and above $500 is $3.3b and $0.9b.

The General Algebraic Modeling System (GAMS) software has been used for all calculations.

Table H.1 provides illustrative calculations of the effects of lowering the LVT to $0 with average collection costs equal to $50 per item for a range of elasticities of substitution between LVT goods and domestic substitutes. The total values of impacts on consumers, producers and government net tax revenue are shown. Also shown is the breakdown into components of the total impacts on consumers and on net government revenue. The calculations are based on a perfectly elastic supply of domestic substitute goods and thus there is no change in producer impacts.

Table H.1 **Illustrative welfare effects of reducing the LVT to $0 with $50 collection costs**

Perfectly elastic supply of domestic substitutes
($ million)

Substitution[a]	*'Low'* *s = 1*	*'Medium'* *s = 2.5*	*'High'* *s = 5*
Consumer welfare	**-2532**	**-1682**	**-968**
Collection costs	-1631	-666	-146
Other	-901	-1016	-822
Producer welfare	**0**	**0**	**0**
Net tax revenue	**-476**	**81**	**381**
Collection costs	-760	-311	-68
Tax revenue	284	391	449
Net welfare	**-3008**	**-1601**	**-587**
Changes in:			
Price of LVT goods	84%	84%	84%
Imports of LVT goods	-46%	-78%	-95%

a In the CES function, a s parameter value of 1 implies an elasticity of substitution of zero and zero cross-price substitution. Cross-price substitution increases as parameter s is increased (Rutherford 2008).

b Consumer impact is measured by compensating variation. Consumers maximise utility subject to a fixed budget constraint. From this optimisation process, the indirect utility function is calculated, and the expenditure function is solved for the initial level of utility and final prices.

Table H.1 highlights the importance of collection costs on LVT goods. At $50 per item, total collection costs are very large relative to other components of welfare. For all levels of substitution from none to 'high', collection costs are so large that the change in net welfare from reducing the LVT is negative.

It is also clear in table H.1 that substitutability is important in determining the magnitude of the changes. As substitutability increases, there is a greater consumption response to the 84% increase in the price of LVT goods with less LVT goods being consumed and a greater shift in demand towards domestic substitutes. Larger substitutability results in a smaller loss in consumer impacts, smaller total collection costs on LVT goods, greater tax revenue and, therefore, larger net benefits.

Table H.2 provides further illustrative calculations of the welfare effects of lowering the LVT to $0 for a range of collection costs (from $50 down to $0) and using the same elasticity parameter values as in table H.1. For comparison, the first block of rows in table H.2 (for collection costs equal to $50) repeats the welfare effects given in table H.1.

Table H.2 shows that, as collection costs are reduced, the welfare benefits of reducing the LVT to $0 can become positive. And with collection costs equal to $0, eliminating the LVT could be welfare improving for medium to high substitution parameters ($13 and $70 million, respectively). These amounts give a rough indication of the value of removing the distortion. The bottom row in table H.2 presents the calculation of what the collection cost per item would have to be for the policy to have zero net welfare impact; for example, with a high substitution parameter, if the collection cost per item is below $1.40, then eliminating the LVT is welfare improving, whereas per item collection costs above $1.40 are welfare decreasing.

The importance of collection costs relative to the value of the LVT goods is illustrated further in table H.3. Since the per item collection costs are assumed to be independent of the value of the parcel, the modelled effects on the average prices of LVT goods increases as the LVT is lowered.

Table H.4 illustrates the importance of the supply elasticity in calculating the welfare implications of lowering the LVT to $0, assuming collection costs are $50. Again, for comparison, the first block or rows repeats in summary form the results from table H.1 based on a perfectly elastic supply and no change in producer impacts. As would be expected, if supply is less elastic and if goods are more substitutable in demand, the change in producer impacts are greater. The total effect on net welfare is less beneficial when supply is less elastic.

Table H.2 **Illustrative welfare effects of reducing the LVT to $0 with different collection costs**

Perfectly elastic supply of domestic substitutes
($ million)

Substitution	*'Low'* *s = 1*	*'Medium'* *s = 2.5*	*'High'* *s = 5*
[1] Collection costs $50			
Consumer welfare	-2532	-1682	-968
Producer welfare	0	0	0
Net tax revenue	-476	81	381
Net welfare	**-3008**	**-1601**	**-587**
[2] Collection costs $25			
Consumer welfare	-1641	-1250	-840
Producer welfare	0	0	0
Net tax revenue	-119	137	341
Net welfare	**-1760**	**-1114**	**-499**
[3] Collection costs $12.50			
Consumer welfare	-1108	-920	-691
Producer welfare	0	0	0
Net tax revenue	133	240	348
Net welfare	**-974**	**-680**	**-343**
[4] Collection costs $0			
Consumer welfare	-492	-453	-395
Producer welfare	0	0	0
Net tax revenue	466	466	466
Net welfare	**-27**	**13**	**70**
Break-even collection costs ($)		0.18	1.40

Table H.3 **Average increases in prices from lowering the LVT[a]**

Three levels of LVT

Reducing LVT to:	*Per cent change*
$500	+24
$100	+36
$0	+84

a Assuming collection costs = $50 per item.

Table H.4 **Illustrative welfare effects of reducing the LVT to $0 with different supply elasticities**

Collection costs $50

($ million)

Substitution	*'Low'* *s = 1*	*'Medium'* *s = 2.5*	*'High'* *s = 5*
[1] Perfectly elastic supply			
Consumer welfare	-2532	-1682	-968
Producer welfare	0	0	0
Net tax revenue	-476	81	381
Net welfare	**-3008**	**-1601**	**-587**
[2] Supply elasticity = 10			
Consumer welfare	-2348	-1743	-1250
Producer welfare	-13	179	308
Net tax revenue	-529	-75	234
Net welfare	**-2890**	**-1639**	**-708**
[3] Supply elasticity = 5			
Consumer welfare	-2175	-1725	-1391
Producer welfare	-39	258	459
Net tax revenue	-565	-200	57
Net welfare	**-2780**	**-1667**	**-874**

Tables H.5 and H.6 present the calculated effects of lowering the LVT to $100 and $500, respectively, for different collection costs and demand substitution elasticities.

A comparison of tables H.2, H.5 and H.6 reveals that at various levels of unit collection costs there is less welfare loss when the LVT is reduced by less. For example, with collection costs of $50 and high substitution, reductions in the LVT to $0, $100 and $500 are calculated to result in net welfare changes of -$0.6, -$0.2 and -$0.05 billion, respectively.

The model can be used to produce 'break-even' collection costs – that is, the collection costs that would produce a net welfare effect zero. This shows that, the lower the LVT, the lower the collection costs need to be to produce a zero net welfare impact. Assuming high substitutability, the break-even costs are $5.88 to lower the LVT to $100 and $9.68 to lower the LVT to $500.

Table H.5 **Illustrative welfare effects of reducing the LVT to $100 with different collection costs**

Perfectly elastic supply of domestic substitutes
($ million)

Substitution	*'Low'* *s = 1*	*'Medium'* *s = 2.5*	*'High'* *s = 5*
[1] Collection costs $50			
Consumer welfare	-640	-533	-403
Producer welfare	0	0	0
Net tax revenue	95	151	209
Net welfare	**-545**	**-382**	**-194**
[2] Collection costs $25			
Consumer welfare	-473	-413	-334
Producer welfare	0	0	0
Net tax revenue	180	203	229
Net welfare	**-293**	**-210**	**-104**
[3] Collection costs $12.50			
Consumer welfare	-385	-345	-289
Producer welfare	0	0	0
Net tax revenue	227	237	248
Net welfare	**-158**	**-108**	**-41**
[4] Collection costs $0			
Consumer welfare	-294	-270	-236
Producer welfare	0	0	0
Net tax revenue	278	277	276
Net welfare	**-16**	**7**	**41**
Break-even collection costs ($)		0.73	5.88

Table H.6 **Illustrative welfare effects of reducing the LVT to $500 with different collection costs**

Perfectly elastic supply of domestic substitutes

($ million)

Substitution	*'Low'* *s = 1*	*'Medium'* *s = 2.5*	*'High'* *s = 5*
[1] Collection costs $50			
Consumer welfare	-184	-158	-126
Producer welfare	0	0	0
Net tax revenue	60	70	81
Net welfare	**-123**	**-88**	**-45**
[2] Collection costs $25			
Consumer welfare	-146	-130	-108
Producer welfare	0	0	0
Net tax revenue	79	83	88
Net welfare	**-66**	**-46**	**-20**
[3] Collection costs $12.50			
Consumer welfare	-126	-114	-97
Producer welfare	0	0	0
Net tax revenue	90	91	93
Net welfare	**-37**	**-23**	**-4**
[4] Collection costs $0			
Consumer welfare	-106	-97	-85
Producer welfare	0	0	0
Net tax revenue	100	100	99
Net welfare	**-6**	**2**	**14**
Break-even collection costs ($)		1.14	9.68

Conclusion

The modelling in this appendix illustrates the orders of magnitude involved in reducing the LVT under various assumptions about key parameters. In particular, the modelling highlights that total collections costs are very large, especially when compared with the potential gains from lowering the LVT. Significant reductions in per item collection costs could reduce the costs of reducing the LVT. The net welfare effects of lowering the LVT are usually negative, in large part due to the collection costs. That said, any decision to lower the LVT would also have to take into account the value of raising taxes from this source, either in terms of reductions in more costly tax collection or in terms of the benefits that can be derived from additional government expenditure.

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