PAYROLL TAX: IS IT AS GOOD AS A VAT OR AS BAD AS SALES TAX?

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Introduction

The Commonwealth Government has flagged that, in its tax reform package, part of the proceeds of a VAT will to be used to fund the abolition of sales tax. This will lead to a significant gain in national economic welfare, as demonstrated later in this report.

The Australian Chamber of Commerce and Industry and the Business Coalition for Tax Reform agree that sales tax should be abolished but want payroll tax abolished as well. They see payroll tax as a tax on jobs and exports.

Matthew Ryan[1], writing in a Treasury Research Paper, took a different view:

> "It is simplifying, and incorrect, to single out payroll tax as a 'tax on jobs' or a 'tax on exports'. In a static framework, it can be shown that payroll tax has very similar long run economic effects to broadly-based consumption taxes."

So is payroll tax as good as a VAT, as argued by Ryan and other tax economists, or as bad as sales tax, as claimed by the business sector? In other words, should payroll tax be retained or abolished as part of the tax reform package?

The proposition about the equivalence of a VAT and payroll tax applies only if both taxes are taken in their "pure" form, a situation that does not occur in reality, especially in relation to payroll tax. By a "pure" tax we mean a tax which is applied uniformly and comprehensively.

However, even if the "pure" forms did apply in reality, the equivalence proposition would not hold in the short run because replacement of a "pure" payroll tax with a "pure" VAT would lead to a one-off reduction in real wealth, stimulating higher private saving for a time. Ryan acknowledges the existence of this wealth effect, which he refers to as a "lump sum" effect. However, he does not give any estimate of how large the resulting stimulus to trade and employment might be, or how long it might last. Appendix A presents estimates of these favourable transitional effects of replacing payroll tax with a VAT.

In reality, a typical VAT is not "pure". It does not apply uniformly and comprehensively to all consumption expenditure. For example, some items such as health, education and housing are often treated concessionally. Further, for administrative reasons, financial services are generally input taxed, not output taxed like other goods and services.

However, this pales into insignificance compared with the shortcomings in coverage of Australia's payroll tax. Largely because of the small business exemption (SBE), payroll tax applies to only about one-half of labour income. The SBE induces a typical business to be smaller than it would otherwise be, reducing economic efficiency. Ryan acknowledges this inefficiency from payroll tax, but does not give any estimate of its cost.

This report estimates the loss in national economic welfare that results from the SBE for payroll tax. It compares this with the loss from a VAT and the loss from a sales tax to answer the question: is payroll tax as good as a VAT, or as bad as sales tax?

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[1] Matthew Ryan (1995), "What future for payroll taxes in Australia?", *Treasury Research Paper*, No. 10, The Commonwealth Treasury, Canberra.

These losses are estimated under the simplifying assumption that the supply of labour is fixed. This is reasonable because the model simulations do not alter the total "tax wedge" between real wages as seen on both sides of the labour market. Rather, these only change the composition of this "tax wedge" as between payroll tax, sales tax and VAT.

In this report, payroll tax is analysed using two alternative economic models.

The single-industry Payroll Tax Model is a model of the economy purpose-built by Econtech to show how a representative business chooses its size, and how that choice is distorted by the SBE. This basic model illustrates the main issues in a simple way and gives a ballpark estimate of the loss in national economic welfare resulting from the SBE. However, it is subject to the limitation that it does not distinguish between different industries.

The second model is a multi-industry model known as Murphy Model 303 Plus (MM303+). It is based on 107 industries, and is therefore more realistic but more complicated than the single-industry model. For this report, the multi-industry model was further developed so that a representative business in each industry chooses its size in the same way as in the single-industry model. At the same time, this model allows for the variation in average business size from one industry to the next.

The first section of this report sets out the policy implications drawn from the modelling described in the subsequent sections and appendices. In particular, it considers whether payroll tax should be retained in its present form or reformed to remove the SBE or (like sales tax) abolished and replaced with a VAT. The remainder of the report is structured as follows. Section 2 examines how the SBE affects efficiency. The report then estimates the loss in national economic welfare from payroll tax using in section 3 the single-industry model and then in section 4 the multiple-industry model. This includes a thorough sensitivity analysis of this estimated loss to alternative assumptions for the values of key model parameters. This loss from the inefficiencies in payroll tax is then compared with the loss from the inefficiencies in sales tax.

1. Policy implications

The modelling in this report finds that abolishing payroll tax and making up the revenue shortfall with a VAT would result in gains in employment and the trade balance in the short to medium term. The gain in employment peaks at close to ½ per cent. The gain in the trade balance peaks at the equivalent of about ½ per cent of GDP.

In the long-term, payroll tax acts as a drain on national living standards because its small business exemption (SBE) provides as an inducement for businesses to be inefficiently small. The SBE is not a policy for small business, rather it is a policy for making businesses smaller!

Removing this inefficiency by replacing payroll tax with a VAT would permanently add about $580 million to annual national economic welfare. Added to this would be a substantial further gain from eliminating the compliance costs associated with payroll tax.

While the inefficiency of payroll tax could alternatively be removed by reforming it to abolish the small business exemption, political history suggests that this is unlikely to happen. Over the years, state governments have continually increased the payroll tax threshold, thus widening the access to the SBE, while raising the top payroll tax rate. Thus instead of reforming payroll tax, they have moved in the opposite direction. Reform of payroll tax seems a dim prospect.

More promising is the proposal by the Commonwealth Government that a VAT be introduced to fund both the abolition of sales tax and other yet-to-be-specified tax reductions. This report provides a strong case for these other tax reductions to include the abolition of payroll tax.

Replacing sales tax with a VAT would result in a gain in annual national economic welfare of about $810 million, seemingly greater than the gain from abolishing payroll tax of about $580 million. However, this does not allow for the fact that sales tax raises more revenue than payroll tax. Compared with revenue raised, abolishing sales tax would provide a welfare gain equivalent to 6 cents in each dollar of sales tax revenue, while the corresponding figure for abolishing payroll tax is 7½ cents in every dollar of payroll tax revenue. Thus the case for using VAT revenue to fund the abolition of payroll tax is just as strong as for using it to fund the abolition of sales tax.

It is now possible to answer the question posed by the title of this report. Because state governments have so badly eroded the tax base through the small business exemption, payroll tax is now as bad as sales tax, not as good as a VAT.

2. Efficiency and the Small Business Exemption

The single-industry Payroll Tax Model is a model of the economy purpose-built by Econtech to show how a representative business chooses its size, and how that choice is distorted by the small business exemption (SBE) from payroll tax. This model is outlined in general terms in section 3, while a full technical description can be found at Appendix B.

To model how the small business exemption may affect economic efficiency by distorting decisions about business size, the first step is to consider how the efficiency of a business depends on its size.

It is assumed that a business's need for primary factors (i.e. capital and labour), F, depends on its level of output, Q, according to the following equation.

$$F = Q + a.(QC–Q) + a.Q.\ln(Q/QC)$$

The details of this equation are not important but the general ideas are. In particular, the most efficient size or level of output for the business equals QC. If output, Q, is above or below its efficient level, QC, there is a loss of efficiency in the use of primary factors. The sensitivity of efficiency to variations in Q away from QC is given by the parameter a.

The curve shown in Chart 1 represents the equation graphically for particular values of QC and a. The horizontal axis measures the output of the business, Q. The vertical axis measures inefficiency as the ratio of inputs of primary factors, F, to output, Q. Thus the curve can be used to read off the level of inefficiency for any given level of output.

The curve reaches a minimum for annual output of about $2.2 million. This corresponds to the efficient level of output, QC. At higher or lower levels of output, the business would operate less efficiently, resulting in a waste of labour and capital.

In the long run, a representative business must choose its size (i.e. its value for Q) so as to minimise its average cost. This average cost includes its payroll tax per unit of output.

In most states, payroll tax, PT, is calculated by applying the payroll tax rate, t, to the business wage bill net of a tax-free threshold, TH. This tax-free threshold is referred to in this report as the small business exemption (SBE). The wage bill itself can be expressed as the average wage rate of the business, W, times its employment, N.

$$PT = t.[W.N – TH]$$

The contribution of payroll tax to average cost, APT, is calculated by dividing this payroll tax liability by the level of output of the business.

$$APT = t.W.N/Q – t.TH/Q$$

The first term represents the contribution of payroll tax to average cost if there were no threshold. The second term is the tax saving to the business from the threshold, expressed per unit of output.

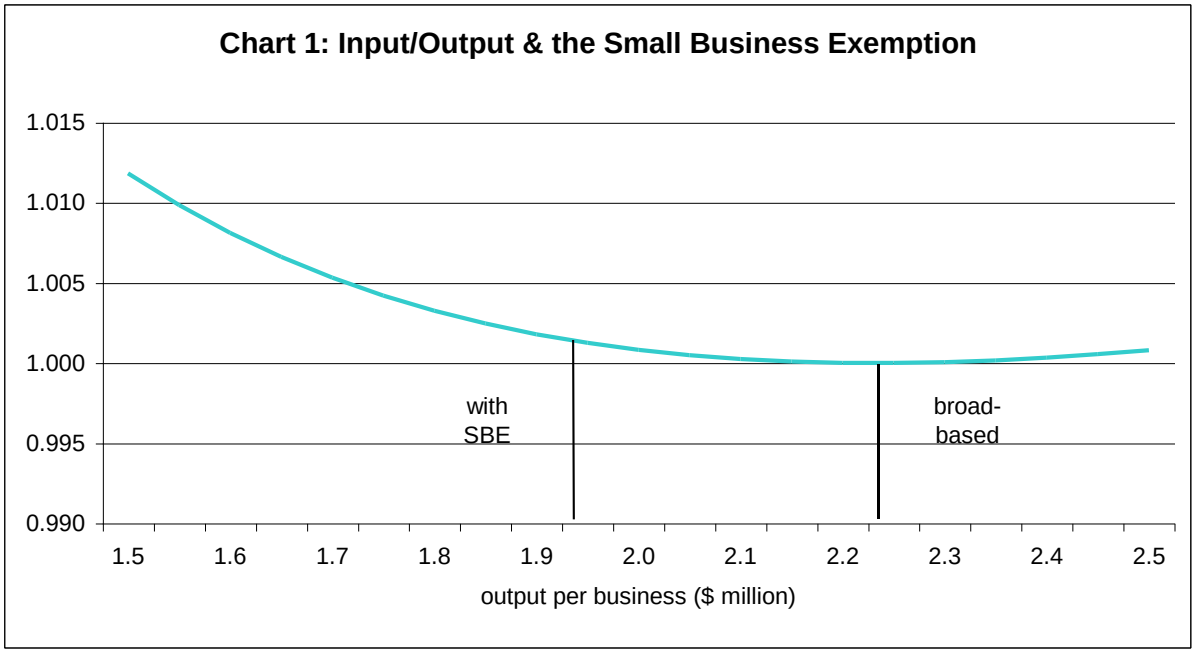


Chart 1: Input/Output & the Small Business Exemption
1.015
1.010
1.005
1.000
0.995
0.990
with SBE
broad-based
1.5
1.6
1.7
1.8
1.9
2.0
2.1
2.2
2.3
2.4
2.5
output per business ($ million)

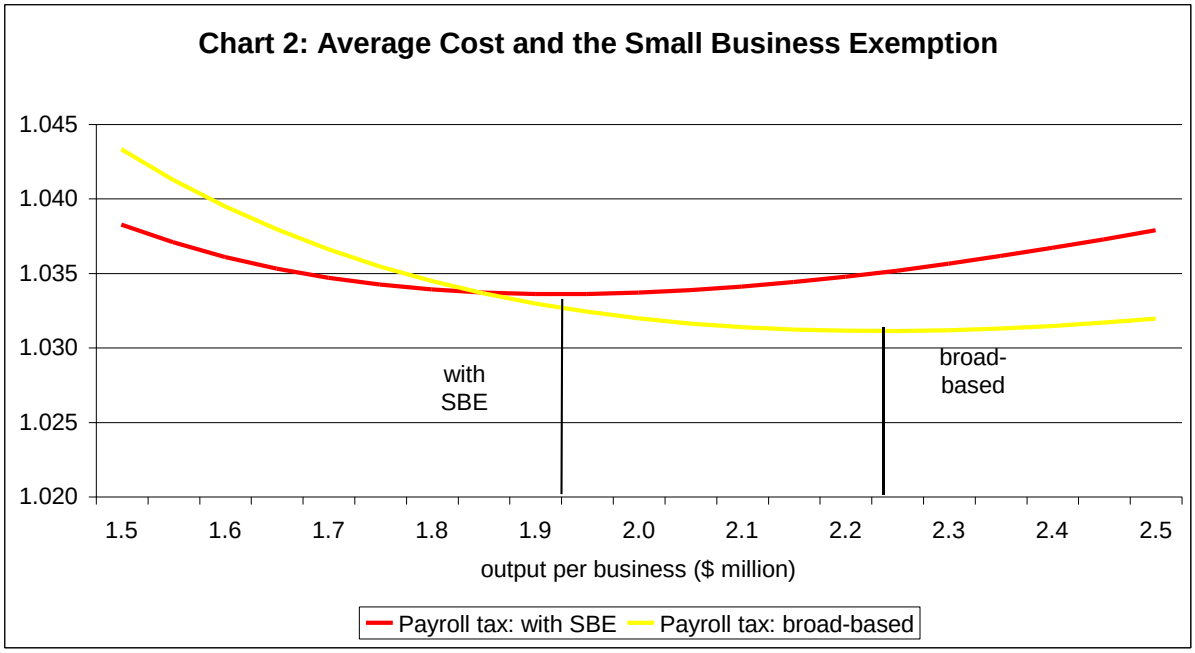


Chart 2: Average Cost and the Small Business Exemption
1.045
1.040
1.035
1.030
1.025
1.020
with SBE
broad-based
1.5
1.6
1.7
1.8
1.9
2.0
2.1
2.2
2.3
2.4
2.5
output per business ($ million)
Payroll tax: with SBE
Payroll tax: broad-based

This tax saving is the same in dollar terms for all business operating above the threshold. For example, under a payroll tax rate of 6.5 per cent, a threshold of $650,000 provides an annual tax saving of no more than $42,250 (= 6.5% X $650,000), no matter how far above the threshold a business might be.

This tax saving of $42,250 reduces the average cost of all businesses operating above the threshold. However, for a business with a very high level of output, the reduction in average cost would be slight. More generally, businesses with higher levels of output receive a smaller reduction in average cost from the tax saving due to the threshold, because that saving is spread more thinly over a higher level of output.

Put another way, under the SBE, the contribution of payroll tax to average cost is greater for large businesses than for small businesses.

Because the SBE offers a larger reduction in average cost for smaller businesses than for larger businesses, it reduces the level of output at which average cost is minimised to below the efficient level of output. Appendix B shows that a representative business will operate at the level of output given by the following equation, where λ corresponds to the overall marginal price of primary factors, including both capital and labour.

$$Q = QC - t.TH/(\lambda.a)$$

This equation shows that, because of the threshold, TH, the output, Q, of a representative business will be below the efficient level of output, QC.

The situation is depicted in Chart 2.

Consider first a hypothetical broad-based payroll tax, without a SBE but collecting the same revenue, in which case the payroll tax rate would be just over 3 per cent rather than 6½ per cent. In that case payroll tax adds the same to average cost at all levels of output, and follows the light average cost curve. Average cost is minimised at the efficient level of output of QC or just over $2.2 million. Under such a broad-based payroll tax, a representative business would operate at this efficient level of output.

Now consider the payroll tax that we have in reality, with its SBE. As explained above, the SBE means that contribution of payroll tax to average cost is greater for large businesses than for small businesses. Thus, relative to a broad-based payroll tax, Chart 2 shows that the SBE results in lower average costs for small businesses but higher average costs for large businesses. This can be seen by compared the dark average cost curve with the light average cost curve.

As a result, average cost is now minimised at a lower level of output, of just over $1.9 million, well below the efficient level of output of just over $2.2 million. The SBE provides an inducement for a business to be smaller than its efficient size. This results in a waste of scarce resources of labour and capital.

3. A Single-Industry Payroll Tax Model

The single-industry Payroll Tax Model includes the relationships outlined in section 2 that drive the result that the SBE induces businesses to operate at below their efficient size. In addition, it includes all the other relationships needed to make up a general equilibrium model of the Australian economy. Full details of the single-industry are given at Appendix B. However, it is important to draw attention to two of the key assumptions in the single-industry model. These same two assumptions are also made in the multi-industry model used in seciton 4.

The Payroll Tax Model is a long run model and accordingly holds fixed the level of national employment. This is really two assumptions in one: (i) the labour supply is fixed; and (ii) the proportion of the labour supply that is employed/unemployed is fixed. Assumption (ii) is realistic because in the long run the sustainable unemployment rate will be determined more by the efficiency of the labour market rather than by the type of tax changes considered in this report. Assumption (i) is less realistic but, as explained in the introduction, it is a fairly harmless assumption in the context of this report. In particular, the policy changes being modelled do not alter the total "tax wedge" between real wages as seen on both sides of the labour market. Rather, these only change the composition of this "tax wedge" as between payroll tax and other taxes in the wedge.

Of course, while changes to payroll tax are unlikely to affect employment in the long term, they may have an effect in the short to medium term. Indeed, it is shown at Appendix A that replacement of payroll tax with a VAT would be likely to stimulate employment for a considerable period.

The Payroll Tax Model also holds fixed the quantity of capital owned locally. This is because long-run equilibrium models cannot be validly used to show the net economic benefit of a change in domestic saving. For example, an increase in domestic saving involves incurring the cost of lower living standards in the present to receive the benefit of higher living standards in the future. Long-run equilibrium models only show the long-run benefit, not the short-term cost, and thus vastly overstate the net benefit from financing increases in investment through domestic saving. For this reason, it is essential that such a model assumes that changes in investment are financed by foreign saving, not domestic saving, so that the net economic benefit can be measured validly. This is also a reasonably realistic assumption for the purposes of this report. This is because while reform of direct taxes may change the incentives to save by altering post-tax rates of return on different forms of savings, this is unlikely to be the case for reform of indirect taxes such as payroll tax.

Again, while changes to payroll tax are unlikely to affect local saving in the long term, they may have an effect in the short to medium term. For example, it is shown at Appendix A that replacement of payroll tax with a VAT would be likely to stimulate saving and therefore improve the trade balance for about four years.

The single-industry Payroll Tax Model was calibrated using data for 1996/97. Full details can be found at Appendix B.

3.1 Results from the Central Simulation

The inefficiency from the SBE for payroll tax could be eliminated in one of two ways. First, it could be eliminated by reforming payroll tax to make it into a broadly-based tax on labour income. This would involve dropping the SBE and reducing the payroll tax rate so as to leave unchanged total payroll tax collections. Second, it could be eliminated by abolishing payroll tax and making up the revenue shortfall with a broadly-based tax such as a VAT. These two alternatives lead to the same outcomes in the single-industry model. The following results are based on reforming payroll tax. The issue of whether payroll tax should be reformed or replaced with a VAT was considered in section 1.

Thus in the central simulation with the single-industry model the payroll tax threshold was abolished, bringing all of labour income within the payroll tax base. This doubling of the payroll tax base, allows a halving in the payroll tax rate. Specifically, in the results from the single-industry model, the payroll tax rate drops from 6.5 to 3.1 per cent.

Charts 1 and 2, which have already been discussed in section 3, show how this shift from a payroll tax with a small business exemption to a broad-based payroll tax affects certain outcomes in the single-industry model.

The faint line in Chart 2 shows that average cost under the broad-based payroll tax reaches a minimum when output, Q, is $2.233 million. Competitive pressures will force the representative business to choose this unit cost minimising level of output. The solid line compared with the faint line in Chart 2 shows how the SBE introduces a bias in the average cost curve favouring the selection of a smaller business size. As a result, average cost reaches a minimum at a lower level of output of $1.925 million, rather than $2.233 million, as shown by the vertical lines extending down from the cost curves.

Chart 1 shows what this small business bias means for inefficiency in the use of primary factors (capital and labour). The SBE induces businesses to operate at a lower output level raising the ratio of inputs to outputs from 1.0000 to 1.0015 i.e. the SBE results in wastage in primary factors used per unit of output of 0.15 per cent. This wastage translates into a loss in annual national economic welfare of $676 million. This is the loss in the long run in annual private consumption valued at 1996/97 prices.

The SBE also has another negative effect on economic welfare. Its raises the marginal price of labour above its average price, because a business pays full payroll tax on its marginal employee, but only part payroll tax on its average employee. The marginal price of labour governs substitution between labour and capital. By elevating the marginal price of labour, the SBE leads to substitution of capital for labour so the economy becomes excessively capital intensive. While this extra capital adds to output, more output needs to be diverted to net exports to cover service payments to the foreign owners of the extra capital, with the net result that the supply of output to consumers actually declines. As a consequence, the capital intensity bias leads to a further loss in annual national economic welfare of $35 million.

Thus the SBE leads to a total deadweight loss in annual national economic welfare of $711 million, with $676 million due to the small business bias, and $35 million due to the capital intensity bias. Compared with net payroll tax collections in 1996/97 of $7.6 billion, this represents an excess burden from the current SBE-style payroll tax of about 9 per cent, compared with an excess burden of zero from a broad-based payroll tax.

3.2 Sensitivity Analysis

This deadweight loss estimate was subjected to sensitivity analysis by varying the values of key model parameters.

The capital intensity bias results from substitution of capital for labour. Thus in one set of simulations, the elasticity of substitution between capital and labour was varied from 0.75. The value of this elasticity affects the capital intensity bias but not the more important small business bias, and so it does not have much affect on the results. In reality, the elasticity of factor substitution is likely to lie between 0.5 and 1.0[2], pointing to a deadweight loss from the SBE of somewhere between $701 million and $720 million.

Table 1
Elasticity of Factor Substitution & the Deadweight Loss from the SBE

Elasticity of Factor Substitution	Deadweight Loss ($ million)
0.05	681
0.50	701
0.75	711
0.99	720

Source: Single-Industry Payroll Tax Model

The small business bias depends on the sensitivity of factor efficiency to business size. This sensitivity has been investigated by Fuss and Gupta[3], who analysed 91 Canadian manufacturing industries. Fuss and Gupta estimated industry cost functions, and then calculated for each industry the unit cost disadvantage for a hypothetical business operating at one-half of optimal output. The results for all industries are summarised in Table 2.

Table 2
Extent of Cost Disadvantage at One-Half Minimum Efficient Scale

Cost Disadvantage	Number of Industries
0% to 1%	18
1% to 2%	26
2% to 5%	38
5% to 10%	6
> 10%	3
	91

Source: Fuss and Gupta

The average inefficiency over all industries from operating at only one-half of optimal output (Q=(1/2).QC) was between 3 and 4 per cent. Fuss and Gupta also found that their

[2] Many studies use the Cobb-Douglas production function and therefore implicitly assume that the elasticity of factor substitution equals 1.0, but studies which have estimated this elasticity more often than not find that it is less than 1.0. Murphy Model 2 and the Payroll Tax Model use 0.75.

[3] Fuss and Gupta (1981), "A Cost Function Approach to the Estimation of Minimum Efficient Scale, Returns to Scale, and Suboptimal Capacity: With an Application to Canadian Manufacturing", *European Economic Review*, 15(2), pp. 123-35.

results were broadly supported by engineering studies of the relationship between business size and business efficiency.

Consistent with the results of Fuss and Gupta, in the single-industry model it is assumed that if the representative business were to operate at only one-half of its optimal level of output, this would result in factor inefficiency of 4 per cent. This assumption is used in setting the value of the parameter a appearing in the factor usage function. The other parameter in the factor usage function, QC, is then set so that the model correctly predicts payroll tax collections under the 6.5 per cent payroll tax.

Because there is some uncertainty about the precise sensitivity of factor inefficiency to business size, alternative inefficiency values of 3 and 5 per cent were also used in alternative calculations of the factor usage function parameters.

Table 3
Sensitivity of Efficiency to Business Size & the Loss from the SBE

Sensitivity of Efficiency to Size	Size Shrinkage	Deadweight Loss ($ million)
3 per cent	17.6%	907
4 per cent	13.8%	711
5 per cent	11.3%	585

Source: Single-Industry Payroll Tax Model

If efficiency is less sensitive to business size (3 per cent case), the natural cost disadvantage from a business being inefficiently small is less. The SBE then has a greater bearing on business size, causing shrinkage of as much as 17.6 per cent, and boosting the estimate of the deadweight loss to $907 million. At the other extreme, if efficiency is more sensitive to business size (5 per cent case) then the natural cost disadvantage from a business being small is greater. The SBE then has a lesser effect on business size, causing shrinkage of as little as 11.3 per cent, bringing the estimate of the deadweight loss down to $585 million.

The sensitivity analysis also included experimentation with an alternative factor usage function. The Econtech factor usage function is repeated below and compared with the factor usage function used by Fuss and Gupta[4].

Econtech:
$F = Q + a.(QC–Q) + a.Q.\ln(Q/QC)$, for $Q > 0$

Fuss and Gupta:
$F = Q.\exp\{a.(QC/Q + Q/QC – 2)\}$, for $Q > 0$

While these two functions take different forms, they are both based around an optimal level of output, QC, and a parameter describing the sensitivity of factor inefficiency to size, a.

An alternative version of the single-industry model was constructed based on the Fuss and Gupta factor usage function in place of the Econtech factor usage function. Table 4 shows

[4] Fuss and Gupta used a different parameterisation, but their implied factor usage function is exactly equivalent to that presented here.

that the estimates of the deadweight loss from the SBE are fairly insensitive to this variation in choice of factor usage function.

Table 4
Functional Form & the Deadweight Loss from the SBE

Sensitivity of Efficiency to Size	Deadweight Loss ($ million) under functional form of:	
	Econtech	Fuss & Gupta
3 per cent	907	850
4 per cent	711	651
5 per cent	585	531

Source: Single-Industry and Alternative Single-Industry Payroll Tax Models

Using the Fuss and Gupta factor usage function in place of the Econtech factor usage function reduced the estimates of deadweight loss by less than $60 million.

Table 5 shows how according to the single-industry model the deadweight loss from the SBE would be affected if the payroll tax rate were changed (with offsetting changes in the rate of consumption tax to maintain budget balance). The results are consistent with the standard proposition that the deadweight loss from a tax is approximately[5] proportional to the tax rate squared. For example, notice that each doubling of the payroll tax rate results in an approximate quadrupling in the deadweight loss. Thus, doubling the payroll tax from the existing rate of 6.5 per cent to 13 per cent, roughly quadruples its deadweight loss from $711 million to $3,173 million. This raises the deadweight loss from about 9 per cent of revenue collected to about 26 per cent of revenue collected; the higher the tax rate, the less efficient the tax.

Table 5
Payroll Tax Rate & the Deadweight Loss from the SBE

Tax Rate	Deadweight Loss ($ million)	Deadweight Loss/Revenue
–3.25 per cent	154	–3.3%
0 per cent	0	
3.25 per cent	169	4.1%
6.50 per cent	711	9.4%
13.00 per cent	3173	25.8%

Source: Single-Industry Payroll Tax Model

[5] It is only exactly proportional to the tax rate squared for a linear model, whereas the Single-Industry Payroll Tax Model is mildly non-linear.

4. A Multi-Industry Payroll Tax Model

The single-industry Payroll Tax Model is subject to the limitation that it does not distinguish between different industries. For that reason, a multi-industry model known as Murphy Model 303 Plus (MM303+) was used to obtain more definitive results.

This multi-industry model is based on 107 industries, and is therefore more realistic but more complicated than the single-industry model. It is a long-run equilibrium Computable General Equilibrium (CGE) model of Australia in which 107 industries produce over 303 commodities. It distinguishes 23 types of indirect taxes and has been used extensively in reports on indirect tax reform for business and government.

This model is calibrated to the ABS 1993/94 input-output table, which is the latest available. In a baseline simulation, the model was solved after updating key model inputs to 1996/97 values. This approximately replicated 1996/97 outcomes.

The multi-industry model shows how many choices in the economy are sensitive to relative prices. This is important in estimating the gains from tax reform and other micro-reforms. The main price sensitive choices modelled involve:

- ◊ business choice between labour and capital;
- ◊ business choice between different types of capital;
- ◊ business choice between different types of energy;
- ◊ choice between import and local sources of supply;
- ◊ business choice between export and local destinations for sales;
- ◊ consumer choice between broad commodity groups;
- ◊ consumer choice within broad commodity groups; and
- ◊ foreigners demand for Australian exports.

The multi-industry model pays particular attention to the correct measurement of gains in national economic welfare.

In the original multi-industry model, as in other similar models, the average business size in each industry was implicitly fixed, so that it was not possible to take into account the small business bias due to the SBE for payroll tax.

However, the multi-industry model has now been re-developed so that, in each of its 107 industries, business size is chosen in exactly the same way as in the single-industry model used in sections 3 of this report. Thus the multi-industry model now allows for the influence of the SBE on business size in each industry, as well as for the variation in typical business size between industries.

4.1 Results

Four different simulations were conducted with the multi-industry model. The main results are summarised in Table 6 and Chart 3, while detailed results are at Appendix C.

Table 6
Welfare Gains
(changes)

	1. Abolish Payroll Tax	2. Reform Payroll Tax	3. Abolish industry-type Payroll Tax	4. Abolish Sales Tax
Compensating Variation ($m)	583	475	192	809
Equivalent Variation ($m)	590	476	194	826
Compensating Variation (%)	0.19	0.16	0.06	0.27
Equivalent Variation (%)	0.19	0.16	0.06	0.27
Compensating Variation (cents per dollar of revenue)	7½	6	2½	6
Equivalent Variation (cents per dollar of revenue)	7½	6½	2½	6

Source: MM303+

Simulation 2 is based on the same assumptions as the central simulation reported in section 5. In this Reform Payroll Tax simulation, the payroll tax threshold or SBE is abolished, allowing the payroll tax rate to drop to 3.5 per cent, while maintaining revenue collections.

Removing the inducement provided by the SBE for businesses to be inefficiently small results in a welfare gain of about $475 million. This is the case irrespective of whether the gain is measured using the compensating variation or equivalent variation from welfare economics. This represents a gain in consumer living standards of 0.16 per cent.

This gain of $475 million from the multi-industry model is somewhat lower than the estimate in section 5 of $711 million from the single-industry model. The reason for the lower estimate from the multi-industry model is that it takes into account that the SBE has only a marginal impact on the efficiency of very large businesses. These very large businesses are represented in the multi-industry model by those industries dominated by such businesses, whereas the single-industry model is based on a single representative business of intermediate size.

Instead of reforming payroll tax, Simulation 1 abolishes it and makes up the revenue shortfall with a VAT. This VAT is broadly similar in design to that found in the first version of Fightback! The VAT rate needed to abolish payroll tax alone turns out to be 3.5 per cent.

Table 6 and Chart 3 shows that this option of payroll tax abolition produces a welfare gain of about $580 million, which is similar to but slightly higher than the welfare gain from payroll tax reform of $475 million. Thus the deadweight loss from the SBE can be eliminated by either reforming payroll tax, or replacing it with an efficient tax such as a VAT.

Simulation 3 illustrates how other researchers using CGE models have simulated the abolition of payroll tax in the past. Business size in each industry is held fixed. The SBE is not accounted for directly, but only indirectly through its side effect of producing different effective average rates of payroll tax between industries. For example, average payroll tax rates are lower in agriculture than in the banking sector, because agriculture is dominated by small businesses that are exempt from payroll tax. Under this inappropriate approach, payroll tax rates are assumed to vary according to industry rather than business size. The

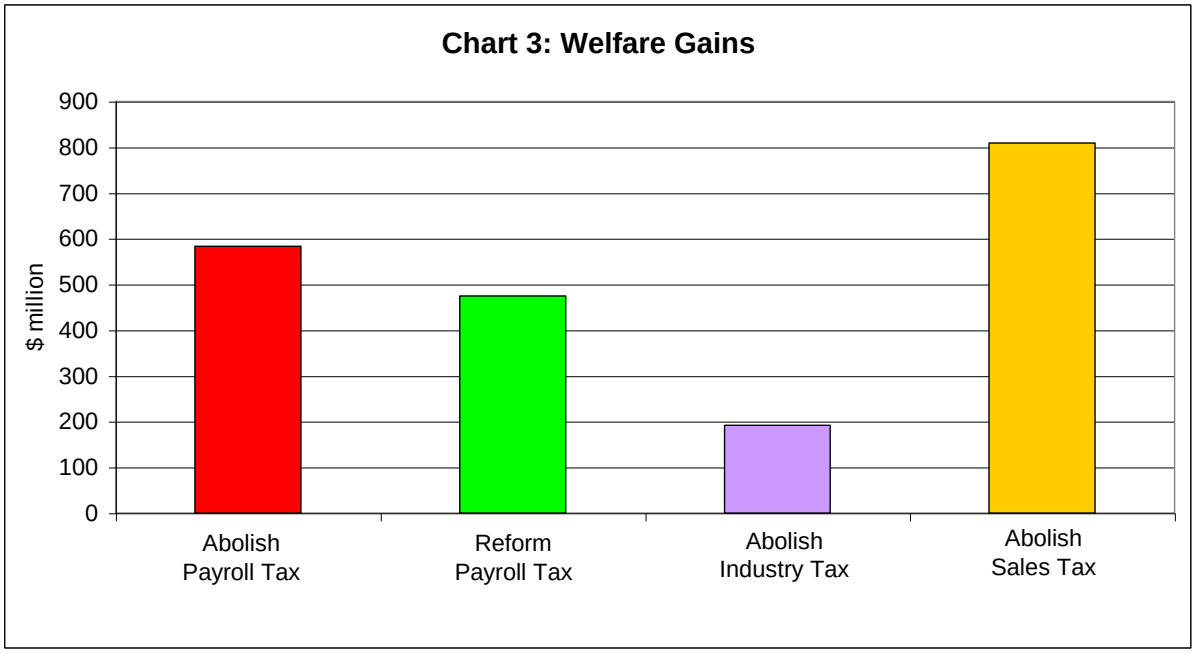


Chart 3: Welfare Gains
$ million
900
800
700
600
500
400
300
200
100
0
Abolish Payroll Tax
Reform Payroll Tax
Abolish Industry Tax
Abolish Sales Tax

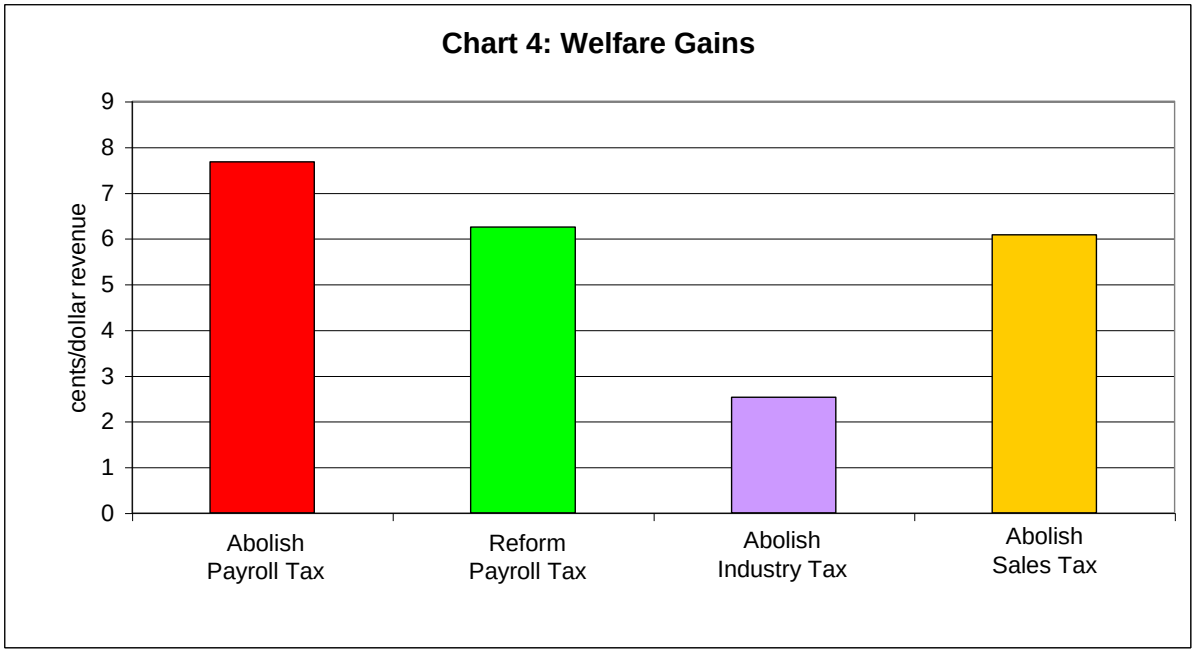


Chart 4: Welfare Gains
cents/dollar revenue
9
8
7
6
5
4
3
2
1
0
Abolish Payroll Tax
Reform Payroll Tax
Abolish Industry Tax
Abolish Sales Tax

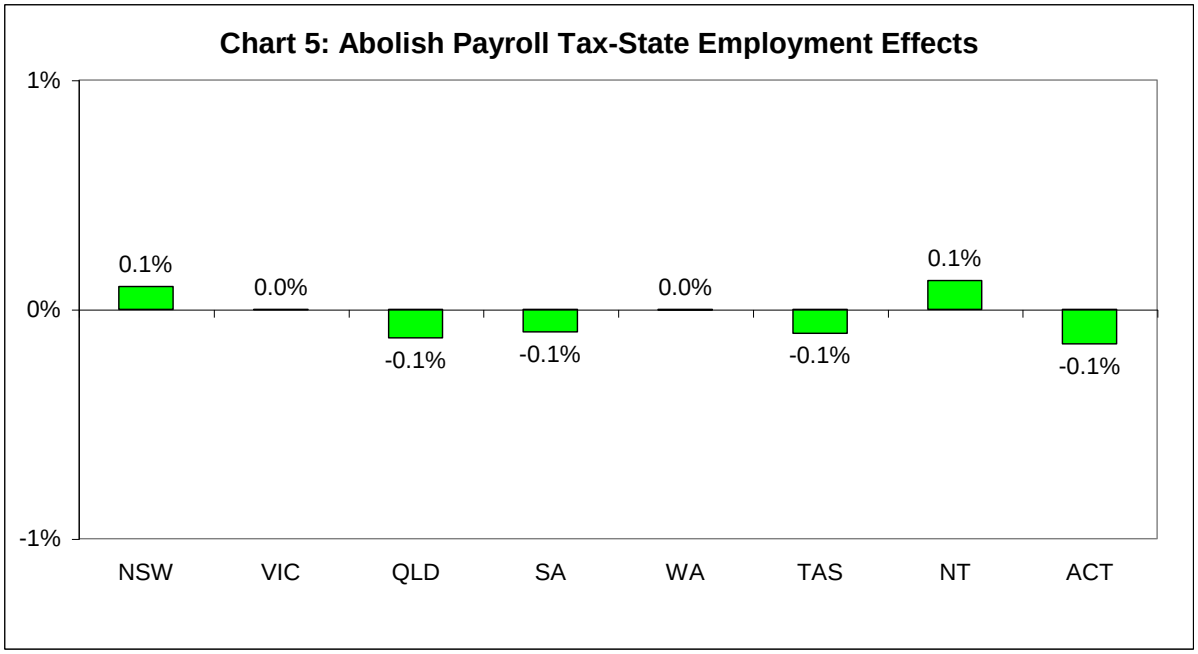
welfare gain from replacing this industry-style payroll tax with a VAT is estimated to be only about $190 million, well down on the appropriate estimate for the SBE-style payroll tax of about $580 million.

One interpretation of this is that the welfare gain of about $580 million from abolishing payroll tax and the associated SBE can be decomposed into two parts. The first part is a gain of about $190 million from removing the bias between industries favouring industries dominated by small businesses, and $390 million from removing the bias within industries making businesses smaller.

For comparison purposes, Simulation 4 is based on the Government proposal to abolish sales tax and make up the revenue shortfall with a VAT. The necessary VAT rate turns out to be 6.0 per cent. This produces an estimated annual welfare gain of about $810 million or 0.27 per cent. This estimate cross-checks with a simple back-of-the-envelope calculation of the likely gain from broadening the consumption tax base in this way.

Comparing the results of Simulation 1 and 4 shows that, relative to revenue, the gains from abolishing payroll tax and sales tax are similar. Chart 4 shows that the gain from payroll tax abolition of $580 million represents 7½ cents in every dollar of payroll tax, while the gain from sales tax abolition of $810 million represents 6 cents in every dollar of sales tax. Thus the case for either reforming or abolishing payroll tax has at least equal weight to the case for abolishing sales tax.

Finally, Chart 5 shows that abolition of payroll tax does not favour one state over another. In particular, it has almost no impact on the distribution of employment between states.



APPENDIX A:
TRANSITIONAL EFFECTS

A.1 The Equivalence Proposition

Before considering the transitional effects of replacing payroll tax with a VAT, we outline the basis for the equivalence proposition that payroll tax is equivalent to a VAT in a certain setting. Note that this proposition only applies if we take payroll tax and VAT in their "pure" forms which, as explained in the main report, is far from reality, especially in the case of payroll tax with its small business exemption.

A "pure" payroll tax and a "pure" VAT are part of the same tax wedge in the labour market. Various taxes drive a wedge between real labour costs as paid by employers and real consumption wages as received by employees, lifting the former above the latter.

Payroll tax adds to this tax wedge by adding to the level of real labour costs paid by employers. A VAT adds to the tax wedge by raising consumer prices, thereby reducing real consumption wages as received by employees.

After the laws of supply and demand have played out in the labour market, whether a tax in the wedge is formally levied on employers, as with payroll tax, or employees, as with a VAT or PAYE tax, should make no difference to its final incidence. Only the total size of the tax wedge should matter.

Suppose payroll tax were replaced with a VAT.

Under one scenario, competitive pressures would force employers to pass on to consumers the cost savings from abolition of payroll tax, leaving employers in the same position as before. This pass on of cost savings would offset the effect on consumer prices of the VAT, also leaving employees in the same position as before. While abolition of payroll tax may appear to make trade-exposed industries better off, this benefit would disappear when the exchange rate is bid up.

Under an alternative scenario, if employers do not pass on the cost saving, the VAT would have the effect of raising consumer prices. This would raise wage demands until the consumption real wage was restored. The benefit to employers from abolition of payroll tax would then be offset by higher wage rates. Under this alternative scenario, the exchange rate would remain unchanged.

The first scenario is used here. It is more likely to transpire than the alternative scenario, because the Reserve Bank would probably use monetary policy to combat any increase in consumer prices. In any case, under both scenarios, replacement of payroll tax with a VAT would have no lasting effects on the positions of employers or employees.

However, as analysed in the main report, this proposition about the equivalence of a VAT and payroll tax breaks down once account is taken of the small business exemption (SBE) for payroll tax.

This section is concerned with the other qualification to the equivalence proposition: it holds in the long run but not in the short run. This means that replacement of payroll tax with a VAT will have short run or transitional effects, even if both taxes were applied in their (unattainable) pure forms.

A.2 Estimates of Transitional Effects

The transitional effects of abolishing a "pure" payroll tax and replacing it with a "pure" VAT were simulated using Murphy Model 2 (MM2)[6]. The VAT rate was set so that the tax replacement was budget neutral in the long run. Using the standard MM2 approach to monetary policy, the Reserve Bank was assumed to gradually adjusted short-term interest rates so as to eventually neutralise any impact on consumer prices. This corresponds to the first scenario described above, rather than the alternative scenario.

The MM2 results seen in Charts 6 to 9 show virtually no long-run real effects from replacing payroll tax with a VAT. However, this is only because MM2 does not allow for the economic inefficiencies resulting from the SBE for payroll tax. As mentioned above, the consequences of these inefficiencies are considered using other models in the main report. At the same time, the MM2 results do give reasonable estimates of the short run or transitional effects of replacing payroll tax with a VAT.

Chart 6 shows that abolition of payroll tax would reduce labour costs, as measured by the "wage after payroll tax" by about 2½ per cent. This is substantially less than the top rate of payroll tax of about 6½ per cent[7] because the coverage of labour input by payroll tax is narrow, as it exempts labour input both in small businesses and by employers and self-employed.

In MM2, this reduction in labour costs is passed on to consumers on a gradual basis as it works its way through the distribution chain. In contrast, the VAT used to finance abolition of payroll tax is passed on immediately, because VAT is applied directly to final prices paid by consumers. Thus the VAT initially results in an increase in consumer prices, but this increase is eroded away as lower labour costs are passed on.

This temporary increase in consumer prices reduces the purchasing power of consumers, producing the initial dip in the volume of private consumption shown in Chart 7.

After about one year (four quarters in the charts), lower labour costs have been completely passed on, fully offsetting the effect on consumer prices of the VAT. Despite this, Chart 7 shows that at this stage the recovery in private consumption is partial rather than complete. This is due to the "wealth effect" from this tax change referred to by Ryan.

Abolition of payroll tax reduces the labour cost of producing new capital goods, resulting in a fall in the market value of existing capital goods. This reduces the wealth of owners of capital, slightly retarding private consumption in Chart 7 for a further three years (or 12 quarters). This reduction in consumption allows wealth holders to increase the volume of their holdings of capital, to restore the value of those holdings in the face of the price fall.

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[6] For a description of Murphy Model 2, see Chapter 28 in: Powell, Alan. A. and Murphy, C.W. (1997), *Inside a Modern Macroeconometric Model: A Guide to the Murphy Model*, 2nd ed., Springer, Berlin.

[7] The top payroll tax rate varies from state to state between 5 and 7 per cent. 6½ per cent is an approximate weighted average of these top rates.

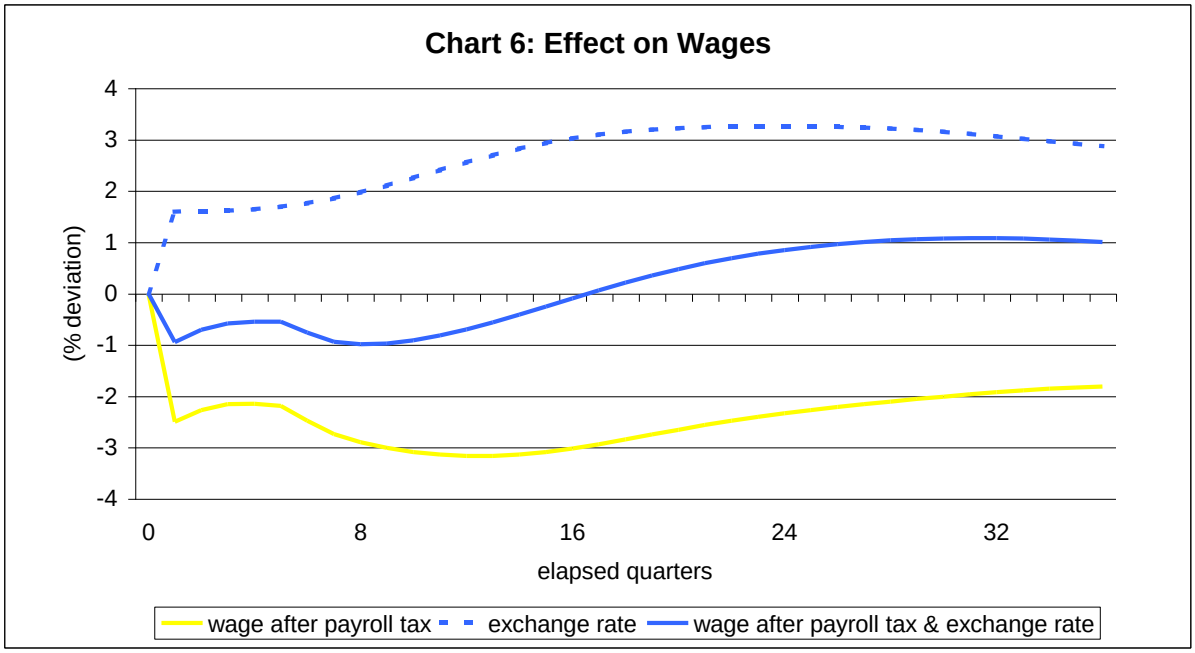
Chart 6: Effect on Wages
4
3
2
1
0
-1
-2
-3
-4
(% deviation)
0
8
16
24
32
elapsed quarters
wage after payroll tax
exchange rate
wage after payroll tax & exchange rate

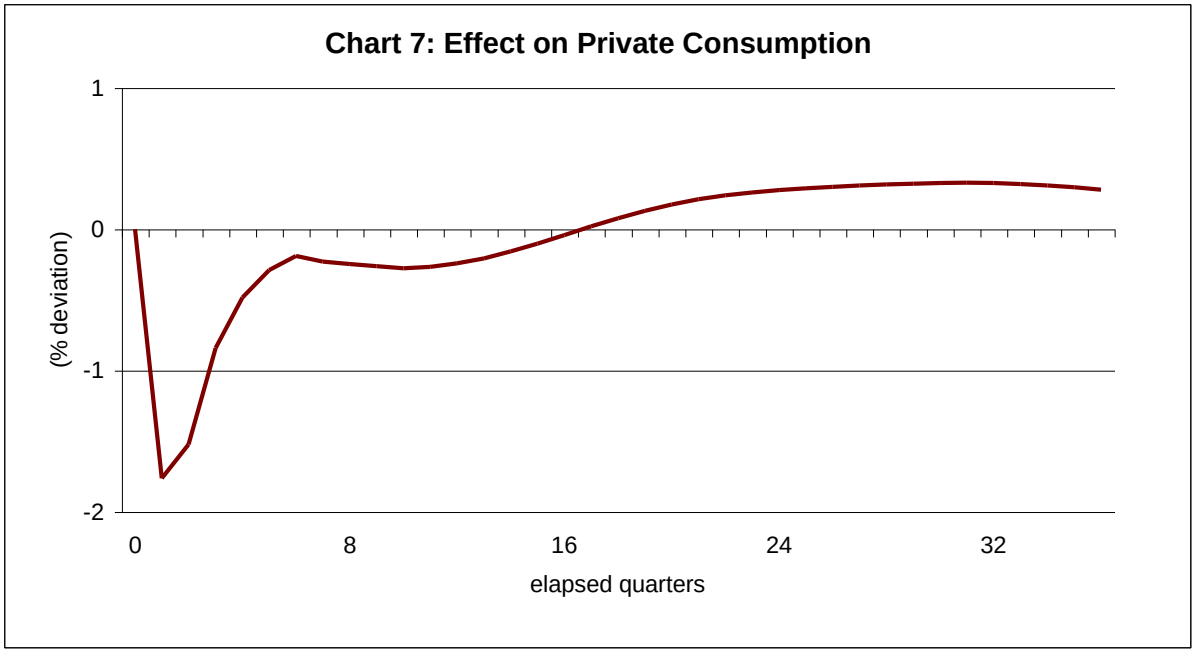
Chart 7: Effect on Private Consumption
1
0
-1
-2
(% deviation)
0
8
16
24
32
elapsed quarters

This stimulus to local saving reduces the need to call on foreign saving to finance local investment, allowing a lower current account deficit. This is associated with an increase in Australia's international competitiveness and a boost to trade-exposed sectors, both exporting and import-competing.

This improvement in international competitiveness can be seen in Chart 6. It shows that, for the first four years or 16 quarters, the appreciation of the exchange rate is less pronounced than the fall in labour costs, leading to a fall in the "wage after payroll tax and exchange rate" of up to 1 per cent. That is, with payroll tax abolished, the Australian average wage rate inclusive of payroll tax and converted to foreign currency has fallen, implying an increase in Australia's international competitiveness.

Chart 8 shows the associated improvement in the trade account. This improvement lasts for four years, and reaches a peak of the equivalent of about ½ per cent of GDP after about two years. The gain in the trade account is mainly based on a reduction in the volume of imports, although there is also a significant increase in the volume of exports.

There is also a temporary gain in employment. The lift in local saving resulting from the wealth effect lowers local interest rates for a time, stimulating investment. Chart 9 shows that after about four years this results in a gain in employment of almost ½ per cent.

It is clear from Charts 8 and 9 that Ryan and other tax economists are correct in arguing that replacement of a "pure" payroll tax with a "pure" VAT does not offer a lasting boost to employment or the trade account. However, it is equally clear that, because of the temporary stimulus it gives to local saving via the wealth effect, it does lift employment and the trade account in the short to medium term.

These short-term gains in jobs and the trade account provide some support for replacing payroll tax with a VAT. However, any decision to change the structure of taxation should be based mainly on considerations of the long-term consequences, which are analysed in the main report.

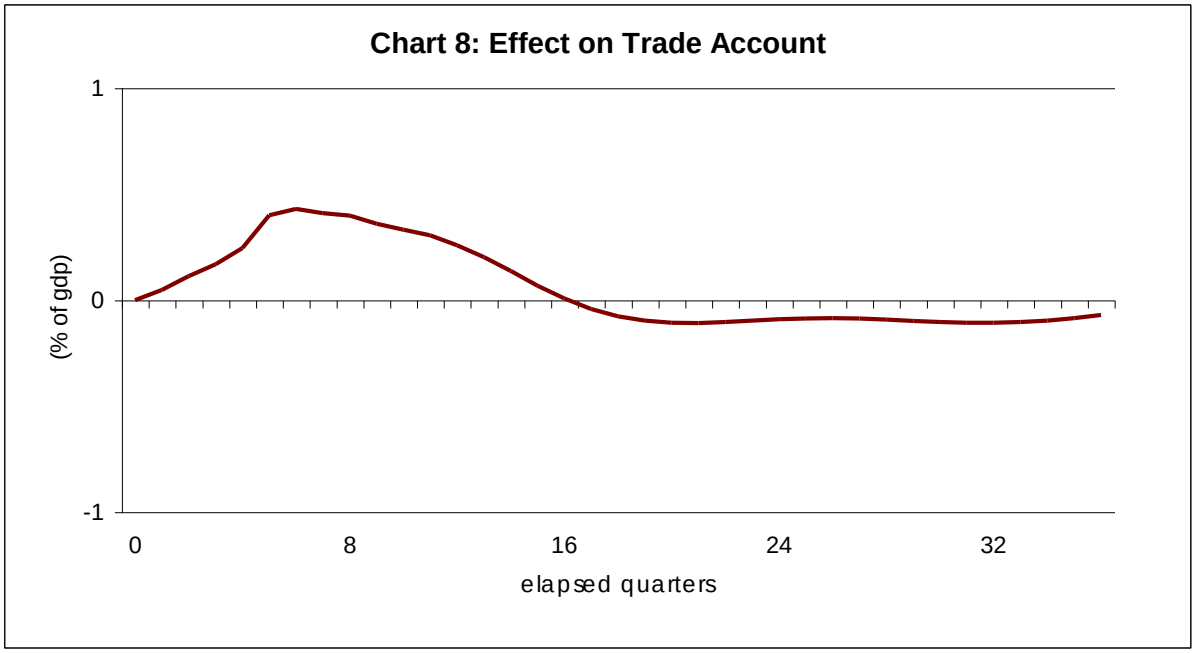
Chart 8: Effect on Trade Account
1
0
-1
(% of gdp)
0
8
16
24
32
elapsed quarters

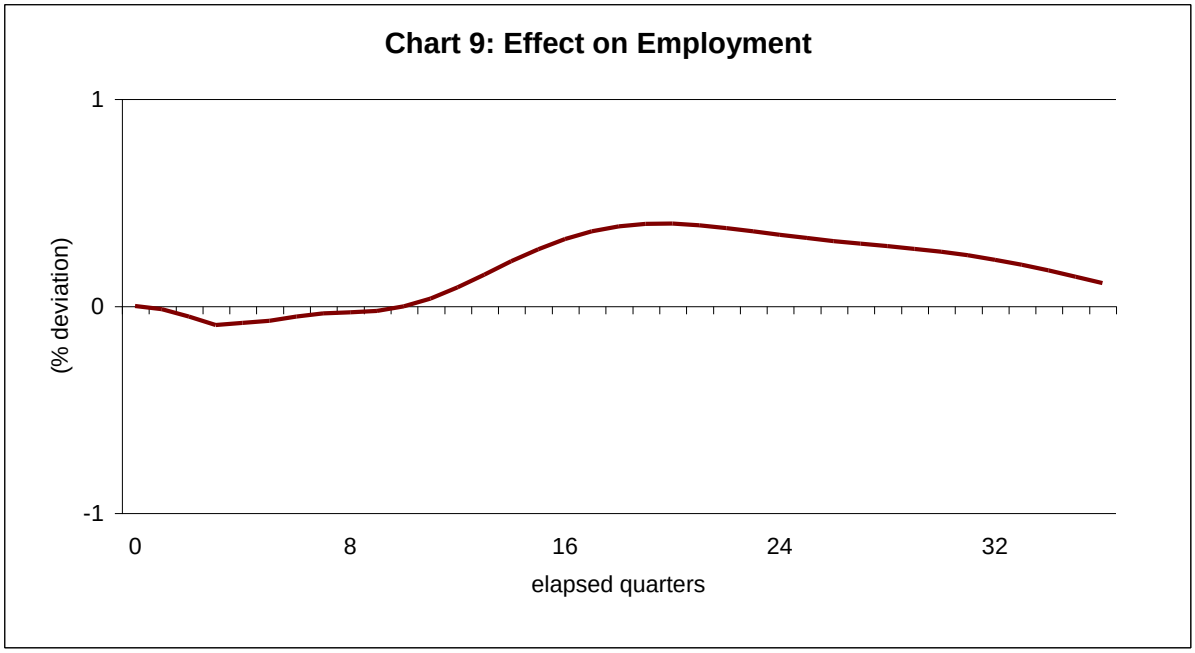
Chart 9: Effect on Employment
1
0
-1
(% deviation)
0
8
16
24
32
elapsed quarters

APPENDIX B:
SINGLE-INDUSTRY PAYROLL TAX MODEL

B.1 Factor Usage Function and Business Size

To model how the small business exemption may affect economic efficiency by distorting decisions about business size, the first step is to develop a function describing how the efficiency of a business depends on its size.

For consistency with theory and tractability, the following functional form is assumed for the dependence of primary factor (i.e. capital and labour) usage, F, on the business level of output, Q, where QC and a are parameters.

$F = Q + a.(QC–Q) + a.Q.\ln(Q/QC)$, for $Q > 0$

The particular case of constant returns to scale is obtained by setting $a=0$ in the above, giving the following simple factor usage function.

$F = Q$

In this case of constant returns to scale, factor usage, F, is strictly proportional to business size or output, Q, so efficiency is independent of business size. This would make the optimal size of a business indeterminate, so constant returns to scale is an unsatisfactory assumption. Furthermore, if a payroll tax with a small business exemption were introduced under constant returns to scale, then for viability all businesses would have to be small enough to qualify for this exemption. Larger businesses paying payroll tax would not be able to compete with smaller businesses that were exempt from payroll tax. No payroll tax would be collected.

In reality, businesses do exist that are large enough to pay payroll tax, even though there is a small business exemption. For these larger businesses, it is apparent that the cost disadvantage from paying payroll tax is being offset by other cost advantages from being large. This means there are increasing returns to scale, at least up to a certain point. This is recognised in the factor usage function by setting a to a positive value. With $a>0$, factor efficiency is maximised (or factor inefficiency is minimised) by a business selecting its size so that Q=QC, as now shown.

Factor inefficiency $f \equiv F/Q = 1 – a + a.QC/Q + a.\ln(Q/QC)$

$\delta f/\delta Q = –a.QC/Q^2 + a/Q = a/Q^2.(Q – QC)$

$\delta f/\delta Q = 0 \Rightarrow Q = QC$

$\delta f/\delta Q < 0$ for $0 < Q < QC$; $\delta f/\delta Q > 0$ for $Q > QC$

$\delta^2 f/\delta Q^2 = \delta/\delta Q(\delta f/\delta Q) = \delta/\delta Q(–a.QC/Q^2 + a/Q) = 2a.QC/Q^3 – a/Q^2 = (a/Q^2).(2.QC/Q–1)$

$\delta^2 f/\delta Q^2[Q=QC] = (a/QC^2).(2.QC/QC – 1) = a/QC^2 > 0$

so factor inefficiency reaches a minimum (i.e. factor efficiency reaches a maximum) at Q=QC.

B.2 A Representative Business Minimising Average Cost

In the long run, a representative business must choose its size (i.e. its value for Q in the factor usage function) so as to minimise its average cost, AC. It must do this to compete successfully with other businesses. This section shows how a representative business minimises its average cost in the Payroll Tax Model.

For a representative business, total cost, TC, is its cost of labour, W.N, plus its cost of capital, $(\delta+r).PI.K$, plus its payroll tax, $t.[W.N - TH]$. Payroll tax is calculated by applying the payroll tax rate, t, to the business wage bill, W.N, net of the tax-free threshold, TH.

$$TC = W.N + (\delta+r).PI.K + t.[W.N - TH]$$

$$AC = TC/Q = [(1+t).W.N + (\delta+r).PI.K - t.TH]/Q \quad (a)$$

Assuming that primary factors are combined using CES technology, then average cost given by equation (a) is minimised subject to the production technology described by equation (b)[8].

$$f = F/Q = 1 - a + a.QC/Q + a.\ln(Q/QC) = F(K,N)/Q = \{[(a_N.N)^{\rho} + (a_K.K)^{\rho}]^{1/\rho}\}/Q \quad (b)$$

This problem is solved using a Lagrangian.

$$\underset{N,K,Q,\lambda}{L} = [(1+t).W.N + (\delta+r).PI.K - t.TH]/Q + \lambda.[1 - a + a.QC/Q + a.\ln(Q/QC) - F(K,N)/Q]$$

$$L_N = (1+t).W/Q - \lambda.F_N/Q = 0 \Rightarrow (1+t).(W/a_N) = \lambda.[1 + ((a_K.K)/(a_N.N))^{\rho}]^{(1-\rho)/\rho} \quad (c)$$

$$L_K = (\delta+r).PI/Q - \lambda.F_K/Q = 0 \Rightarrow (\delta+r).(PI/a_K) = \lambda.[1 + ((a_K.K)/(a_N.N))^{-\rho}]^{(1-\rho)/\rho} \quad (d)$$

$$L_Q = -AC/Q + \lambda.[-a.QC/Q^2 + a/Q + F(K,N)/Q^2] = 0 \Rightarrow Q.AC = \lambda.[a.(Q-QC) + F(K,N)] \quad (e)$$

$$L_\lambda = 1 + a.QC/Q - a + a.\ln(Q) - a.\ln(QC) - F(K,N)/Q = 0 \Rightarrow$$
$$F(K,N)/Q = 1 + a.QC/Q - a + a.\ln(Q) - a.\ln(QC) \quad (f)$$

In the following, the numbering of equations is not sequential but rather follows the numbering used in the computer implementation of the Payroll Tax Model.

Using (c) and (d) to eliminate K/N, gives the following solution for λ, which is interpreted as the marginal price of primary factors. This price depends on both the rental price of capital, and the marginal price of labour.

$$\lambda = \{[(\delta+r).PI/a_K]^{\rho/(\rho-1)} + [(1+t).W/a_N]^{\rho/(\rho-1)}\}^{(\rho-1)/\rho} \quad (3)$$

Using (c), (d) and (a), and simplifying, we obtain:

$$AC.Q + t.TH = \lambda.F(K,N)$$

Substituting this result in (e) and simplifying gives:

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[8] ρ is a production function parameter that determines the elasticity of substitution between labour and capital, σ, according to the formula: $\sigma = 1/(1-\rho)$.

$$Q = QC - t.TH/(\lambda.a) \quad (1)$$

Equation (1) shows that the output of the representative business, Q, will fall below the efficient level, QC, if there is a small business exemption from payroll tax i.e. a tax-free threshold, TH > 0.

Equation (1) also shows that the extent to which Q falls below QC is proportional to the size of the real tax rebate implied by the small business exemption. This is calculated as the payroll tax rate, t, applied to the tax-free component of the business wage bill, TH, relative to the marginal price of primary factors, λ. Further, it is also proportional to the reciprocal of a, implying that if the cost advantage from size is small (a is small), then the small business exemption will lead to a large shortfall in Q from QC. The simple form of equation (1) is a consequence of the particular functional form selected for the primary factor usage function. The tractability of this functional form was given as a reason for its selection at the outset.

Combining (e) and (f) gives an equation relating average cost, AC, to λ. However, this is also an equation for price, P, because in the long run under perfect competition price equals average cost.

$$P = \lambda.[1 + a.\ln(Q/QC)] \quad (4)$$

The price of investment goods, PI, is given by this price of output, P, adjusted for any tax on investment goods at a rate t_I.

$$PI = P.(1 + t_I) \quad (2)$$

The marginal product of capital condition given by equation (d) can be solved for the capital stock, K.

$$K = N.\{[\{(\delta+r).PI/[\lambda.a_K]\}^{\rho/1-\rho} - 1]^{-1/\rho}\}.(a_N/a_K) \quad (5)$$

B.3 Production at the Economy-Wide Level

Equations (1)-(5) have been derived for a representative business. However, they can also be applied without modification to at the economy-wide level, subject to one point of interpretation. Equation (5), determines the optimal business capital-labour ratio. In the preceding section, this referred to capital and labour at the level of a representative business. From hereon, it refers to capital and labour at the level of the total business economy. The business economy is assumed to consist of a number, NUM, of representative business. Each of these businesses is the same in all respects, including having the same capital-labour ratio.

Total factor usage, F, is given by equation (6).

$$F = F(K,N) = [(a_N.N)^{\rho} + (a_K.K)^{\rho}]^{1/\rho} \quad (6)$$

While this equation was used earlier for the representative business as part of equation (b), it applies equally at the business economy level because all businesses are assumed to be alike (in particular are the same size) and the function F(.) exhibits constant returns to scale.

Total business output, Y, is given by the number of businesses NUM, times output per business, Q.

$$Y = NUM.Q$$

Similarly, total factor usage, F, equals the number of businesses, NUM, times factor usage per business, given earlier by the factor usage function.

$$F = NUM.[Q + a.(QC–Q) + a.Q.\ln(Q/QC)]$$

Eliminating NUM from these two equations gives an equation for total business output.

$$Y = F/[1 + a.(QC/Q–1) + a.\ln(Q/QC)] \quad (7)$$

The result for Y can then be used to solve for NUM.

$$NUM = Y/Q \quad (14)$$

In a steady state, gross investment will cover depreciation on capital, at a rate δ, plus normal growth in the capital stock, at a rate gr.

$$I = (\delta+gr).K \quad (8)$$

B.4 Other Economy-Wide Relationships

K^I is the part of the capital stock, K, which is owned by Australians. The remainder of the capital stock, K^o, is foreign-owned.

$$K^o = K – K^I \quad (9)$$

For long-run external balance, net exports, EX, need to cover service payments on this foreign-owned capital, net of an allowance for foreign-owned capital to grow at the rate gr, in line with the rest of the economy.

$$EX = (r-gr).(PI/P).K^o \quad (10)$$

Business output, Y, is used for private consumption, C, fixed investment, I, and net exports, EX.

$$Y = C + I + EX$$

All of these variables apart from C are determined by other equations. Thus the above equation can be thought of as determining C. The portion of output, Y, not absorbed by I and EX is available for private consumption, C.

$$C = Y – I – EX \quad (11)$$

The value of private consumption, C$, is equal to the volume of private consumption, C, multiplied by the price of consumption. The price of consumption in turn equals the price of output, P, adjusted for any broad-based consumption tax at a rate, t_C.

$$C\$ = (1+t_C).P.C \qquad (12)$$

In the long run the government will need to balance its budget.

$$TR + W.NG = t_C.P.C + t_N.W.NT + t_I.P.I + t.(W.N - NUM.TH)$$

On the left-hand side of this equation, government outlays are calculated as the sum of transfer payments to the private sector, TR, and the government wage bill, W.NG.

On the right-had side, in addition to the consumption, investment and payroll taxes mentioned previously, this equation provides for a tax on labour income at a rate t_N.

In calculating payroll tax collections, tax-free business labour income is calculated by multiplying the number of businesses, NUM, by the tax-free threshold available to each business, TH. Taxable labour income is then calculated by subtracting this tax-free business labour income of NUM.TH, from total business labour income of W.N.

In using the budget balance equation, it is necessary to specify the swing fiscal policy instrument to be used to achieve budget balance. In applications of the Payroll Tax Model to date, this has been the rate of payroll tax.

$$t = (TR + W.NG - t_C.P.C - t_N.W.NT - t_I.P.I)/(W.N - NUM.TH) \qquad (13)$$

Finally, total employment, NT, is calculated as business employment, N, plus government employment, NG.

$$NT = N + NG$$

In practice, as explained in the next section, NT and NG are treated as exogenous, so this equation determines business employment, N.

$$N = NT - NG \qquad (15)$$

B.5 The Single-Industry Payroll Tax Model

The core of the single-industry Payroll Tax Model consists of equations (1)-(15). The 15 equations of the core are used to solve simultaneously for the following 15 variables.

$$Q, PI, \lambda, P, K, F, Y, I, K^o, EX, C, C\$, t, NUM, N$$

In solving for these endogenous variables, 17 variables are taken to be exogenous. These can be grouped under three headings as follows.

technology parameters:

$$QC, a, \delta, \rho, a_N, a_K, gr$$

policy parameters:

TH, t_l, t_C, t_N, NG, TR

other parameters:

r, NT, K^l, W

The technology and policy parameters are plainly exogenous variables. The only flexibility here is that any one of the policy parameters could be made endogenous as the swing fiscal policy instrument, in place of the rate of payroll tax, t, which would then be exogenous.

It remains to explain the exogenous status of the variables in the "other parameters" group.

The required real net rate of return on capital, r, is assumed to be set on world capital markets and to be independent of developments in the Australian economy. Australian capital markets are now largely integrated into world capital markets.

In the long run, the level of employment, NT, is assumed to be fixed. This is really two assumptions in one: (i) the labour supply is fixed; and (ii) the proportion of the labour supply that is employed/unemployed is fixed. Assumption (ii) is realistic because in the long run the sustainable unemployment rate will be determined more by the efficiency of the labour market rather than by the type of tax changes considered in this report. Assumption (i) is less realistic but, as explained in more detail in the introduction, it is a fairly harmless assumption in the context of this report, because the particular policy changes being modelled would be expected to have little or no effect on the labour supply.

The amount of fixed capital owned locally, K^l, is assumed to be fixed. This is because long-run equilibrium models cannot be validly used to show the net economic benefit of a change in domestic saving. For example, an increase in domestic saving involves incurring the cost of lower living standards in the present to receive the benefit of higher living standards in the future. Long-run equilibrium models only show the long-run benefit, not the short-term cost, and thus vastly overstate the net benefit from financing increases in investment through domestic saving. For this reason, it is essential that such a model assumes that changes in investment are financed by foreign saving, not domestic saving, so that the net economic benefit can be measured validly. This is also a reasonably realistic assumption for the purposes of this report. This is because while reform of direct taxes may change the incentives to save by altering post-tax rates of return on different forms of savings, this is unlikely to be the case for reform of indirect taxes such as payroll tax.

The nominal wage rate, W, is exogenous because it has been selected as the numeraire. A numeraire is needed because the model does not incorporate monetary policy and so cannot explain the overall price level. However, this is of no real consequence for present purposes, because the model does explain all relative prices, including the real wage. The choice of numeraire has no bearing on model outcomes for these relative prices, or for quantities.

B.6 Supplementary Equations

In the single-industry model, in addition to the core equations (1)-(15), there are also some supplementary equations used to obtain results for some additional variables. Only one of these supplementary equations is mentioned here. This is an alternate equation for nominal consumption expenditure, that has been included as a cross-check on the solution from the core equations.

$$C\$ = TR + (1–t_N).W.NT + r.PI.K^I – gr.PI.K^I \quad (27)$$

This equation sets nominal private consumption equal to private income less private saving. Private income is calculated as transfer payments to the private sector, TR, plus private after-tax labour income, $(1–t_N).W.NT$, plus private capital income, $r.PI.K^I$. Net private saving of $gr.PI.K^I$, reflects steady state growth at the rate gr in the stock of locally-owned capital. In all simulations of the model, identical solutions for C$ have been obtained both from the solution of the core equations of (1)-(15), as well as from equation (27), confirming that the single-industry model passes this cross-check.

B.7 Model Inputs

The model was calibrated using data for 1996/97. Exogenous parameters were set as follows.

QC=2.233 ($ million) (calibrated so that correct payroll tax revenue for 1996/97 is achieved at correct payroll tax rate of 6.5 per cent)

a=0.130 (implies that at Q=(1/2).QC, F/Y is 4% above its minimum at Q=QC)

δ=10% (per year) (rough average depreciation rate across equipment and buildings)

ρ=–1/3 (implies elasticity of substitution between K and N = 3/4)

a_N=201.7 (calibrated using labour share of 65 per cent)

a_K=13.33 (calibrated using capital share of 35 per cent)

TH=0.65 ($ million) (payroll tax threshold of $610,000 or $0.61 million adjusted up to allow for the exemption for non-wage and salary labour income)

t_I=0% (set to zero as not important for analysis and main tax on investment is sales tax which is slated for abolition)

t_C=15% (arbitrary)

t_N=21.435% (calibrated so that the remaining revenue needed to balance budget with payroll tax equals actual 1996/97 payroll tax revenue)

NG=1700 (thousand persons) (approx. general government employment in 1996/97)

TR=57000 ($ million) (approx. government transfers to private sector in 1996/97)

r=10% (per year) (implies fixed investment equals approximate actual level in 1996/97)

NT=8500 (thousand persons) (approximate employment in 1996/97)

K^{l}=659077 ($ million) (set to K so that K^{o} is zero in baseline; not realistic but makes welfare analysis more valid)

W=36 ($ thousand per year) (average earnings on national accounts basis in 1996/97)

APPENDIX C:
MULTI-INDUSTRY MODEL RESULTS

Table C.1
EMPLOYMENT EFFECTS

(% change)

Code	Description	1. Abolish Payroll Tax	2. Reform Payroll Tax	3. Abolish industry-type Payroll Tax	4. Abolish Sales Tax
By Industry: 3-digit ANZSIC					
011	Horticulture and Fruit Growing	-1.2%	-1.0%	-2.1%	-4.1%
012	Grain, Sheep and Beef Cattle Farming	-0.7%	-0.8%	-2.2%	-3.4%
013	Dairy Cattle Farming	-0.4%	-0.3%	-1.9%	-1.4%
014	Poultry Farming	-1.0%	-0.8%	-1.3%	-3.2%
015	Other Livestock Farming	-1.4%	-1.2%	-2.4%	-4.7%
016	Other Crop Growing	-1.1%	-1.1%	-1.8%	-1.8%
021	Services to Agriculture	-0.8%	-0.8%	-1.7%	-2.4%
022	Hunting and Trapping	-0.4%	-0.3%	-1.4%	-3.9%
030	Forestry and Logging	-0.9%	-0.9%	-0.3%	1.5%
041	Marine Fishing	-0.2%	0.0%	-1.4%	-2.5%
042	Aquaculture	0.1%	0.2%	-1.1%	-2.9%
110	Coal Mining	-0.5%	-0.9%	-0.9%	5.2%
120	Oil and Gas Extraction	0.2%	0.0%	-0.8%	0.4%
131	Metal Ore Mining	0.6%	0.2%	1.5%	3.9%
14	Other mining	0.8%	0.6%	1.1%	1.2%
151	Exploration	-0.9%	-1.1%	0.4%	7.1%
152	Other Mining Services	-0.8%	-1.1%	0.5%	8.0%
211	Meat and Meat Product Manufacturing	-0.8%	-0.7%	-0.7%	-2.9%
212	Dairy Product Manufacturing	-0.1%	0.0%	-0.4%	-1.7%
213	Fruit and Vegetable Processing	0.3%	0.5%	0.2%	-1.7%
214	Oil and Fat Manufacturing	-0.1%	0.0%	0.0%	-1.8%
215	Flour Mill and Cereal Food Manufacturing	0.3%	0.4%	0.0%	-2.9%
216	Bakery Product Manufacturing	0.2%	0.4%	0.1%	-1.1%
217	Other Food Manufacturing	0.1%	0.2%	-0.1%	-1.3%
218	Beverage and Malt Manufacturing	0.6%	0.6%	0.3%	0.3%
219	Tobacco Product Manufacturing	0.7%	0.7%	0.3%	-2.9%
221	Textile Fibre, Yarn and Woven Fabric Manufacturing	0.0%	-0.2%	0.3%	-2.5%
222	Textile Product Manufacturing	0.3%	0.5%	0.4%	-3.4%
223	Knitting Mills	0.9%	0.9%	1.4%	-3.6%
224	Clothing Manufacturing	0.6%	0.8%	0.9%	-4.8%
225	Footwear Manufacturing	0.5%	0.6%	1.8%	0.0%
226	Leather and Leather Product Manufacturing	-0.9%	-1.2%	0.4%	0.4%
231	Log Sawmilling and Timber Dressing	0.2%	-0.1%	0.2%	-2.7%
232	Other Wood Product Manufacturing	0.1%	0.0%	0.1%	-1.1%
233	Paper and Paper Product Manufacturing	0.4%	0.5%	0.3%	1.3%
241	Printing and Services to Printing	0.2%	0.3%	0.2%	2.4%
242	Publishing	0.3%	0.5%	0.1%	-3.2%
243	Recorded Media Manufacturing and Publishing	0.1%	0.7%	0.1%	14.8%
251	Petroleum Refining	1.2%	1.0%	0.7%	-3.9%
252	Petroleum and Coal Product Manufacturing n.e.c.	0.9%	0.6%	0.8%	-1.5%
253	Basic Chemical Manufacturing	0.1%	0.0%	0.5%	2.2%
254	Other Chemical Product Manufacturing	1.1%	0.5%	1.1%	1.5%
255	Rubber Product Manufacturing	-0.2%	-0.2%	0.4%	6.6%
256	Plastic Product Manufacturing	0.3%	0.3%	0.4%	1.3%
261	Glass and Glass Product Manufacturing	0.4%	0.3%	0.4%	0.9%
262	Ceramic Product Manufacturing	0.6%	0.2%	0.4%	-1.7%
263	Cement, Lime, Plaster and Concrete Product Manufacturing	0.5%	0.2%	0.3%	-2.3%

Table C.1 (cont.)
EMPLOYMENT EFFECTS

(% change)

Code	Description	1. Abolish Payroll Tax	2. Reform Payroll Tax	3. Abolish industry-type Payroll Tax	4. Abolish Sales Tax
264	Non-Metallic Mineral Product Manufacturing n.e.c.	0.1%	0.0%	0.2%	-0.4%
271	Iron and Steel Manufacturing	0.0%	-0.1%	0.7%	4.5%
272	Basic Non-Ferrous Metal Manufacturing	0.2%	-0.1%	1.3%	5.8%
273	Non-Ferrous Basic Metal Product Manufacturing	0.3%	0.1%	1.0%	3.8%
274	Structural Metal Product Manufacturing	0.1%	-0.1%	0.3%	-0.4%
275	Sheet Metal Product Manufacturing	0.0%	0.0%	0.3%	2.6%
276	Fabricated Metal Product Manufacturing	-0.1%	-0.2%	0.5%	2.9%
281	Motor Vehicle and Part Manufacturing	0.0%	0.0%	1.0%	21.2%
282	Other Transport Equipment Manufacturing	-0.4%	-0.4%	0.6%	2.1%
283	Photographic and Scientific Equipment Manufacturing	0.3%	0.3%	0.4%	2.9%
284	Electronic Equipment Manufacturing	0.4%	0.3%	1.3%	21.8%
285	Electrical Equipment and Appliance Manufacturing	0.1%	0.2%	0.4%	2.1%
286	Industrial Machinery and Equipment Manufacturing	-0.5%	-0.5%	0.6%	3.5%
291	Prefabricated Building Manufacturing	-0.3%	-0.3%	0.5%	0.8%
292	Furniture Manufacturing	-0.3%	-0.1%	0.2%	-1.1%
294	Other Manufacturing	0.2%	0.3%	0.7%	13.2%
361	Electricity Supply	0.9%	1.0%	-1.0%	-3.4%
362	Gas Supply	0.9%	1.1%	-0.3%	-3.6%
370	Water Supply, Sewerage and Drainage Services	1.0%	1.0%	1.8%	-4.1%
41-42	Construction	-0.4%	-0.8%	-0.3%	0.1%
45-47	Wholesale Trade	0.0%	0.1%	0.2%	1.9%
51-53	Retail Trade	0.4%	0.5%	-0.1%	-0.1%
571	Accommodation	-2.2%	-0.9%	-2.5%	-4.6%
572-4	Restaurants, Hotels and Clubs	-0.5%	-0.3%	-0.6%	-1.5%
611	Road Freight Transport	-0.1%	-0.1%	-0.1%	-0.1%
612	Road Passenger Transport	0.1%	0.5%	-0.3%	-3.0%
620	Rail Transport	-0.4%	-0.4%	0.2%	2.2%
630	Water Transport	0.8%	0.4%	2.4%	3.2%
640	Air and Space Transport	0.1%	0.5%	0.8%	-1.7%
650	Other Transport	0.3%	0.4%	0.6%	-0.6%
661	Services to Road Transport	0.9%	1.5%	0.9%	-4.2%
662-4	Other Services to Transport	0.8%	0.8%	1.5%	-0.6%
670	Storage	0.9%	0.9%	0.8%	-2.9%
711	Postal and Courier Services	0.6%	0.7%	0.7%	-1.7%
712	Telecommunication Services	0.7%	0.9%	0.7%	-2.6%
731-2	Banking	2.0%	0.6%	1.7%	-0.5%
733	Other Financiers	0.6%	0.3%	0.7%	-0.5%
734	Financial Asset Investors	2.6%	0.9%	2.3%	0.0%
741	Life Insurance and Superannuation Funds	4.3%	1.3%	4.2%	-1.3%
742	Other Insurance	1.7%	0.5%	1.7%	-0.9%
751	Services to Finance and Investment	2.7%	1.1%	2.2%	-0.7%
752	Services to Insurance	4.2%	1.4%	3.7%	-1.4%
771	Property Operators and Developers	-0.3%	-0.2%	-0.1%	1.7%
772	Real Estate Agents	-0.9%	-0.8%	-0.2%	1.4%
773	Non-Financial Asset Investors	-0.2%	0.0%	-0.2%	-0.3%
774	Machinery and Equipment Hiring and Leasing	-0.1%	0.0%	-0.2%	-0.5%
781	Scientific Research	0.1%	0.0%	0.0%	-0.7%

Table C.1 (cont.)
EMPLOYMENT EFFECTS

(% change)

Code	Description	1. Abolish Payroll Tax	2. Reform Payroll Tax	3. Abolish industry-type Payroll Tax	4. Abolish Sales Tax
782	Technical Services	-0.2%	-0.2%	0.0%	1.2%
783	Computer Services	0.0%	0.0%	0.0%	0.3%
784	Legal and Accounting Services	-0.3%	0.1%	-0.3%	-1.2%
785	Marketing and Business Management Services	-0.1%	0.0%	-0.2%	0.3%
786	Other Business Services	-0.1%	0.1%	-0.2%	-1.1%
811	Government Administration	-0.3%	-0.1%	-0.2%	-0.3%
812	Justice	-0.3%	-0.1%	-0.2%	0.2%
820	Defence	-0.1%	0.0%	-0.1%	0.0%
84	Education	-0.5%	0.0%	-0.4%	-0.7%
861	Hospitals and Nursing Homes	-0.3%	0.0%	-0.3%	-0.9%
862-3	Other Health Services	-0.3%	0.1%	-0.2%	-0.8%
864	Veterinary Services	-4.0%	0.1%	-3.8%	-6.6%
871	Child Care Services	2.5%	0.5%	2.7%	3.9%
872	Community Care Services	1.6%	0.3%	1.7%	2.5%
911	Film and Video Services	-0.8%	-0.1%	-1.9%	-4.2%
912	Radio and Television Services	0.0%	0.0%	-0.7%	-0.6%
921-2	Libraries & Museums	-0.8%	-0.7%	-0.7%	-1.7%
923	Parks and Gardens	-0.7%	-0.6%	-0.7%	-1.6%
924	Arts	-2.1%	-1.4%	-2.5%	-5.5%
925	Services to the Arts	-1.9%	-1.3%	-2.2%	-4.7%
931	Sport	-1.2%	-0.2%	-2.5%	-6.1%
932	Gambling Services	0.6%	0.4%	-0.1%	-0.6%
933	Other Recreation Services	-1.1%	-0.2%	-2.4%	-6.0%
951	Personal and Household Goods Hiring	-2.6%	-1.2%	-3.1%	-6.5%
952	Other Personal Services	-2.2%	-1.1%	-2.6%	-5.1%
961	Religious Organisations	3.2%	-1.8%	2.7%	2.2%
962	Interest Groups	1.3%	-1.3%	1.5%	2.4%
963	Public Order and Safety Services	-0.5%	-0.6%	0.0%	0.3%
970	Private Households Employing Staff	-2.5%	-1.2%	-3.0%	-6.3%
7711	Residential Property Operators	NA	NA	NA	NA
	All Industries	0.0%	0.0%	0.0%	0.0%

Table C.1 (cont.)
EMPLOYMENT EFFECTS

(% change)

Code	Description	1. Abolish Payroll Tax	2. Reform Payroll Tax	3. Abolish industry-type Payroll Tax	4. Abolish Sales Tax
By Industry: 2-digit ANZSIC					
01	Agriculture (01)	-0.9%	-0.8%	-2.0%	-3.1%
02	Services to agriculture-hunting & trapping (02)	-0.7%	-0.8%	-1.7%	-2.5%
03	Forestry & logging (03)	-0.9%	-0.9%	-0.3%	1.5%
04	Commercial fishing (04)	-0.1%	0.1%	-1.3%	-2.6%
11	Coal Mining (11)	-0.5%	-0.9%	-0.9%	5.2%
12	Oil & gas extraction (12)	0.2%	0.0%	-0.8%	0.4%
13	Metal ore mining (13)	0.6%	0.2%	1.5%	3.9%
14	Other mining (14)	0.8%	0.6%	1.1%	1.2%
15	Services to mining (15)	-0.9%	-1.1%	0.4%	7.5%
21	Food, beverages & tobacco (21)	-0.1%	0.1%	-0.2%	-1.8%
22	Textile, clothing, footwear & leather (22)	0.3%	0.3%	0.7%	-3.2%
23	Wood and paper product (23)	0.2%	0.2%	0.2%	-0.4%
24	Printing, publishing & recorded media (24)	0.2%	0.4%	0.2%	0.5%
25	Petroleum, coal, chemical & associated product (25)	0.6%	0.3%	0.7%	1.6%
26	Non-metallic mineral product (26)	0.4%	0.2%	0.3%	-1.4%
27	Metal product (27)	0.0%	-0.1%	0.7%	3.3%
28	Machinery & equipment (28)	-0.1%	-0.1%	0.7%	8.7%
29	Other (29)	-0.2%	0.0%	0.3%	1.8%
36	Electricity and gas supply (36)	0.9%	1.0%	-0.9%	-3.5%
37	Water supply, sewerage & drainage services (37)	1.0%	1.0%	1.8%	-4.1%
E	Construction (411-425)	-0.4%	-0.8%	-0.3%	0.1%
F	Wholesale trade (451-479)	0.0%	0.1%	0.2%	1.9%
G	Retail trade (511-532)	0.4%	0.5%	-0.1%	-0.1%
57	Accommodation, cafes & restaurants (57)	-0.8%	-0.4%	-1.0%	-2.2%
61	Road transport (61)	-0.1%	0.0%	-0.2%	-0.7%
62	Rail transport (62)	-0.4%	-0.4%	0.2%	2.2%
63	Water transport (63)	0.8%	0.4%	2.4%	3.2%
64	Air & space transport (64)	0.1%	0.5%	0.8%	-1.7%
65	Other transport (65)	0.3%	0.4%	0.6%	-0.6%
66	Services to transport (66)	0.8%	0.8%	1.4%	-0.9%
67	Storage (67)	0.9%	0.9%	0.8%	-2.9%
71	Communication Services (71)	0.7%	0.9%	0.7%	-2.4%
73	Finance (73)	1.9%	0.6%	1.7%	-0.5%
74	Insurance (74)	3.3%	1.0%	3.2%	-1.2%
75	Services to finance & insurance (75)	3.0%	1.1%	2.6%	-0.8%
77	Property services (77 excl. 7711)	-0.3%	-0.2%	-0.2%	1.0%
78	Business services (78)	-0.1%	0.0%	-0.1%	-0.1%
81	Government administration (81)	-0.3%	-0.1%	-0.2%	-0.3%
82	Defence (82)	-0.1%	0.0%	-0.1%	0.0%
84	Education (84)	-0.5%	0.0%	-0.4%	-0.7%
86	Health services (86)	-0.4%	0.1%	-0.3%	-1.0%
87	Community services (87)	1.7%	0.3%	1.8%	2.5%
91	Motion picture, radio & television services (91)	-0.3%	0.0%	-1.0%	-1.6%
92	Libraries, Museums & the arts (92)	-1.4%	-1.0%	-1.6%	-3.6%
93	Sport & recreation (93)	-0.7%	-0.1%	-1.8%	-4.7%
95	Personal Services (95)	-2.3%	-1.1%	-2.7%	-5.3%
96	Other services (96)	0.3%	-0.8%	0.6%	1.0%
97	Private households employing staff (97)	-2.5%	-1.2%	-3.0%	-6.3%
7711	Residential Property Operators	NA	NA	NA	NA
	All Industries	0.0%	0.0%	0.0%	0.0%

Table C.1 (cont.)
EMPLOYMENT EFFECTS

(% change)

Code	Description	1. Abolish Payroll Tax	2. Reform Payroll Tax	3. Abolish industry-type Payroll Tax	4. Abolish Sales Tax
By Industry: 1-digit ANZSIC					
A	Agriculture, forestry, and fishing (011-042)	-0.9%	-0.8%	-1.8%	-2.7%
B	Mining (110-152)	0.0%	-0.3%	0.1%	3.7%
C	Manufacturing (211-294)	0.1%	0.1%	0.4%	2.2%
D	Electricity, gas and water (361-370)	1.0%	1.0%	0.1%	-3.7%
E	Construction (411-425)	-0.4%	-0.8%	-0.3%	0.1%
F	Wholesale trade (451-479)	0.0%	0.1%	0.2%	1.9%
G	Retail trade (511-532)	0.4%	0.5%	-0.1%	-0.1%
H	Accommodation, cafes and restaurants (571-574)	-0.8%	-0.4%	-1.0%	-2.2%
I	Transport and storage (611-670)	0.1%	0.2%	0.5%	-0.4%
J	Communication services (711-712)	0.7%	0.9%	0.7%	-2.4%
K	Finance and insurance (731-752)	2.5%	0.8%	2.2%	-0.7%
L	Property and business services (771-786 excl. 7711)	-0.2%	-0.1%	-0.1%	0.2%
M	Government administration and defence (811-820)	-0.3%	0.0%	-0.2%	-0.3%
N	Education (841-844)	-0.5%	0.0%	-0.4%	-0.7%
O	Health and community services (861-872)	0.0%	0.1%	0.0%	-0.4%
P	Cultural and recreational services (911-933)	-0.9%	-0.4%	-1.6%	-3.7%
Q	Personal and other services (951-970)	-0.4%	-0.9%	-0.3%	-0.7%
R	Dwellings	NA	NA	NA	NA
	All Industries	0.0%	0.0%	0.0%	0.0%
By State					
	NSW	0.1%	0.1%	0.1%	0.0%
	VIC	0.0%	0.0%	0.0%	0.3%
	QLD	-0.1%	-0.1%	-0.1%	-0.4%
	SA	-0.1%	0.0%	-0.1%	0.3%
	WA	0.0%	0.0%	0.1%	0.2%
	TAS	-0.1%	-0.1%	-0.1%	-0.6%
	NT	0.1%	0.0%	0.3%	0.1%
	ACT	-0.1%	0.0%	-0.1%	-0.9%
	AUS	0.0%	0.0%	0.0%	0.0%

Table C.2(i)
Replace Payroll Tax with VAT
(effects)

Industry Activity

Industry Divisions	Production (volume) % Change	Employment % Change
A. Agriculture, Forestry & Fishing	-1.1%	-0.9%
B. Mining	-1.0%	0.0%
C. Manufacturing	-0.5%	0.1%
D. Electricity, Gas & Water	-0.3%	1.0%
E. Construction	-0.5%	-0.4%
F. Wholesale Trade	-0.6%	0.0%
G. Retail Trade	0.0%	0.4%
H. Accommodation, Cafes & Restaurants	-0.7%	-0.8%
I. Transport	-0.5%	0.1%
J. Communication Services	-0.1%	0.7%
K. Finance and Insurance	0.4%	2.5%
L. Property and Business Services	-0.5%	-0.2%
M. Government Admin. and Defence	0.0%	-0.3%
N. Education	-0.4%	-0.5%
O. Health and Community Services	0.3%	0.0%
P. Cultural and Recreational Services	-0.8%	-0.9%
Q. Personal and Other Services	-0.3%	-0.4%
R. Ownership of Dwellings	0.3%	NA

Welfare & Selected Prices

Description	% Change
General Consumer Price Level (a):	
Essential Spending	0.10%
Supernumerary Spending	-0.30%
Other:	
Exchange Rate	4.29%
National Economic Welfare Gain ($ billion)	0.58

(b) Prices are measured relative to total nominal consumption expenditure.

Government Budget Effects

Description	Change in nominal amount, $b	Change in real amount, $b
VAT	7.5	7.6
Wholesale Sales Tax	-0.6	-0.4
Stamp Duty on Financial Transactions	-0.1	0.0
FID/Debits	0.0	0.0
Excises and Former State Franchise Taxes	-1.1	-0.7
Taxes on Insurance	0.0	0.0
Payroll tax	-7.7	-7.7
Land tax	-0.1	0.0
PAYE Income Tax	0.0	0.7
Other (indirect effects)	2.1	0.6
Total Budget Effects	0.0	0.0
VAT rate		3.5%

Table C.2(ii)
Reform Payroll Tax
(effects)

Industry Activity

Industry Divisions	Production (volume) % Change	Employment % Change
A. Agriculture, Forestry & Fishing	-1.1%	-0.8%
B. Mining	-1.3%	-0.3%
C. Manufacturing	-0.5%	0.1%
D. Electricity, Gas & Water	-0.2%	1.0%
E. Construction	-0.7%	-0.8%
F. Wholesale Trade	-0.5%	0.1%
G. Retail Trade	0.2%	0.5%
H. Accommodation, Cafes & Restaurants	-0.3%	-0.4%
I. Transport	-0.4%	0.2%
J. Communication Services	0.1%	0.9%
K. Finance and Insurance	0.1%	0.8%
L. Property and Business Services	-0.3%	-0.1%
M. Government Admin. and Defence	0.0%	0.0%
N. Education	0.0%	0.0%
O. Health and Community Services	0.1%	0.1%
P. Cultural and Recreational Services	-0.3%	-0.4%
Q. Personal and Other Services	-0.5%	-0.9%
R. Ownership of Dwellings	-0.1%	NA

Welfare & Selected Prices

Description	% Change
General Consumer Price Level (a):	
Essential Spending	-0.14%
Supernumerary Spending	-0.16%
Other:	
Exchange Rate	0.68%
National Economic Welfare Gain ($ billion)	0.47

(b) Prices are measured relative to total nominal consumption expenditure.

Government Budget Effects

Description	Change in nominal amount, $b	Change in real amount, $b
VAT	0.0	0.0
Wholesale Sales Tax	-0.1	-0.1
Stamp Duty on Financial Transactions	0.0	0.0
FID/Debits	0.0	0.0
Excises and Former State Franchise Taxes	0.0	0.0
Taxes on Insurance	0.0	0.0
Payroll tax	0.0	0.0
Land tax	0.0	0.0
PAYE Income Tax	0.0	0.1
Other (indirect effects)	0.2	0.0
Total Budget Effects	0.0	0.0
VAT rate		0.0%

Table C.2(iii)
Replace Industry-based Payroll Tax with VAT (effects)

Industry Activity

Industry Divisions	Production (volume) % Change	Employment % Change
A. Agriculture, Forestry & Fishing	-1.0%	-1.8%
B. Mining	0.1%	0.1%
C. Manufacturing	0.1%	0.4%
D. Electricity, Gas & Water	-0.1%	0.1%
E. Construction	-0.2%	-0.3%
F. Wholesale Trade	-0.1%	0.2%
G. Retail Trade	-0.1%	-0.1%
H. Accommodation, Cafes & Restaurants	-0.7%	-1.0%
I. Transport	0.1%	0.5%
J. Communication Services	0.1%	0.7%
K. Finance and Insurance	0.5%	2.2%
L. Property and Business Services	-0.2%	-0.1%
M. Government Admin. and Defence	0.0%	-0.2%
N. Education	-0.3%	-0.4%
O. Health and Community Services	0.3%	0.0%
P. Cultural and Recreational Services	-1.0%	-1.6%
Q. Personal and Other Services	-0.6%	-0.3%
R. Ownership of Dwellings	0.0%	NA

Welfare & Selected Prices

Description	% Change
General Consumer Price Level (a):	
Essential Spending	0.22%
Supernumerary Spending	-0.17%
Other:	
Exchange Rate	3.91%
National Economic Welfare Gain ($ billion)	0.19

(b) Prices are measured relative to total nominal consumption expenditure.

Government Budget Effects

Description	Change in nominal amount, $b	Change in real amount, $b
VAT	7.5	7.6
Wholesale Sales Tax	-0.6	-0.4
Stamp Duty on Financial Transactions	-0.1	0.0
FID/Debits	0.0	0.0
Excises and Former State Franchise Taxes	-1.0	-0.8
Taxes on Insurance	0.0	0.0
Payroll tax	-7.6	-7.6
Land tax	-0.1	0.0
PAYE Income Tax	0.0	0.6
Other (indirect effects)	1.9	0.7
Total Budget Effects	0.0	0.0
VAT rate		3.5%

Table C.2(iv)
Replace Sales Tax with VAT
(effects)

Industry Activity

Industry Divisions	Production (volume) % Change	Employment % Change
A. Agriculture, Forestry & Fishing	-0.3%	-2.7%
B. Mining	8.0%	3.7%
C. Manufacturing	4.8%	2.2%
D. Electricity, Gas & Water	1.0%	-3.7%
E. Construction	1.0%	0.1%
F. Wholesale Trade	4.3%	1.9%
G. Retail Trade	1.5%	-0.1%
H. Accommodation, Cafes & Restaurants	-1.1%	-2.2%
I. Transport	2.5%	-0.4%
J. Communication Services	0.8%	-2.4%
K. Finance and Insurance	0.4%	-0.7%
L. Property and Business Services	1.8%	0.2%
M. Government Admin. and Defence	0.2%	-0.3%
N. Education	-0.4%	-0.7%
O. Health and Community Services	0.4%	-0.4%
P. Cultural and Recreational Services	-1.9%	-3.7%
Q. Personal and Other Services	-1.2%	-0.7%
R. Ownership of Dwellings	-1.2%	NA

Welfare & Selected Prices

Description	% Change
General Consumer Price Level (a):	
Essential Spending	0.16%
Supernumerary Spending	-0.43%
Other:	
Exchange Rate	4.43%
National Economic Welfare Gain ($ billion)	0.81

(b) Prices are measured relative to total nominal consumption expenditure.

Government Budget Effects

Description	Change in nominal amount, $b	Change in real amount, $b
VAT	12.5	12.9
Wholesale Sales Tax	-13.2	-13.2
Stamp Duty on Financial Transactions	0.0	0.1
FID/Debits	0.0	0.0
Excises and Former State Franchise Taxes	-1.6	-1.0
Taxes on Insurance	0.0	0.0
Payroll tax	-0.1	0.2
Land tax	0.0	0.0
PAYE Income Tax	0.0	1.4
Other (indirect effects)	2.5	-0.4
Total Budget Effects	0.0	0.0
VAT rate		6.0%