Effect on the Australian economy of altering the effective life of buses for tax purposes

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An ideal tax depreciation schedule for an asset should provide a tax deduction profile over time that mimics the assets economic depreciation over the life of the asset. Current tax depreciation schedules for tax purposes allow the purchase price of a bus to be written off over either five years or six and two third years depending on the type of bus operation undertaken.

The Australian Taxation Office has proposed that the effective life for tax purposes of a bus be increased to a uniform 15 years. This proposal is not supported by data on the work profiles of the Australian bus fleet. A survey of bus operators undertaken by the Bus Industry Confederation (BIC) clearly indicates that the kilometres travelled by a bus falls as the age of the bus rises and that the majority of buses are replaced by the time they reach 11 years of age. Consequently, using the BIC survey data it can be calculated that about 80 per cent of the lifetime work of a bus is undertaken in the first 7 years of the life of a typical bus in operation.

Thus the BIC survey data does not support the proposition that an effective life of 15 years would provide a depreciation schedule for tax purposes that more closely mimics the economic depreciation of a bus than does the depreciation schedule based on existing arrangements.

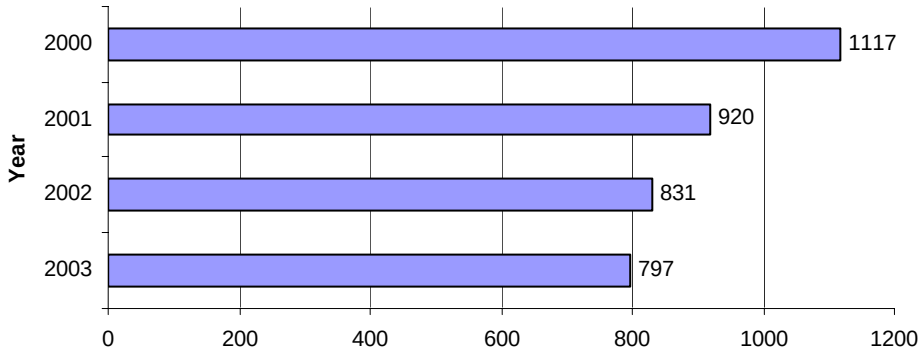
Consequently, the proposal to increase the effective life of a bus for taxation purposes to 15 years would, if implemented, impose a tax on the commercial component of the Australian bus industry. This tax is likely to be significant as bus operations are a relatively capital intensive operation. We calculate for example, that on a typical school bus operation involving a bus with a value of around $370,000, the extension of the effective life from 5 to 15 years would reduce the net present value of depreciation deductions by 15 per cent. As depreciation accounts for about 40 per cent of the total cost of a typical bus operation, the extension of the effective life of a bus to 15 years would eventually be equivalent to a tax on the industry of 6 per cent.

A tax of this order of magnitude would be particularly damaging to the Australian economy. It would distort input use in the bus industry and could lead to a fare increase that would reduce activity in the bus industry with flow on effects to industries that sell their outputs to the bus industry. Industry experts believe for example, “that the general feel is that School and Route Service bus replacement would go from current 5-7 years to 10-12 years and coaches would go from 3-5 years to 7-10 years”. That is, the tax on new

bus capital would cause a substitution of old bus capital for new bus capital. There would be an economic cost associated with this substitution.

The tax on the industry would come on top of recent requirements for new buses to have better access for disabled persons and to conform to new emission standards. These changes are estimated to add up to $105,000 to the cost of a new bus. So a tax on the industry would place the industry under further pressure at a time when the local bus body building industry is "doing it tough" as indicated by the recent decline in demand for buses (see Chart 1) and the collapse during the last year of bus body building firm Dennings.

Chart 1 **New buses delivered (number)**



Data source: BIC estimates

It is unlikely that the bus industry will be able to mitigate all of the tax on new bus capital by a greater reliance on the existing fleet of buses. Eventually, new buses would be purchased and there would be pressure for the tax on these purchases to be passed on to commuters via a rise in fares. This would damage the Australian economy. Our analysis suggests it would have a significant negative effect on international tourism in Australia and could increase pollution and congestion problems in Australia's capital cities.

The average international tourist visiting Australia likes to travel extensively within Australia. Of expenditure of about $3,700 dollars per trip, around 45 per cent is spent on some form of transport. While it is not possible to precisely estimate the proportion of this expenditure that is spent on bus travel we believe it is of the order of about 2 percentage points.

Past research has shown that an increase in the cost of a holiday in Australia deters international tourists from visiting Australia. Using the results of this research along with the data on the importance of bus travel in international tourist holidays, we have calculated that the tax on the bus sector will reduce by approximately 1,300 the number of international tourists visiting Australia each year. Over ten years we calculate the

expenditure lost as a result of these tourists not visiting Australia would reduce economic welfare in Australia by about $27 million in net present value terms.

The proposed extension of the effective life would also offset some of the effects of the Government's recent initiatives to reduce emissions generated by the bus industry. The industry estimates that new emission standards on buses will add approximately $40,000-$45,000 to the cost of a new bus.

While these new standards will reduce pollution, extending the effective life of a bus will contribute directly to increased pollution. This is because it will delay the purchase of new buses and thereby delay the introduction of buses that comply with new emission standards. But more importantly, the extension of the effective life of a bus has the real potential to cause a shift away from bus travel to other forms of transport, particularly cars, that are more damaging to the environment per passenger kilometre undertaken.

Australia has one of the highest rates of use of motor vehicles per head of population. Consequently, motor vehicles are estimated to generate about $15 billion in pollution and congestion costs in Australian cities. The tax on the bus industry would increase these costs unless State Governments were to increase subsidies to the bus industry. Thus in the no increase in subsidy case, we calculate that the tax would eventually reduce bus travel by about 34 million passenger trips per year. Most of these trips would then be undertaken using a passenger motor vehicle. Consequently, we estimate that the tax on the bus industry could lead to a $20 million increase per year in pollution and congestion costs in Australian cities.

Overall, the extension of the effective life of a bus to 15 years is unlikely to provide a depreciation profile for tax purposes that mimics the economic depreciation of a bus. Consequently, the proposed extension would effectively impose a tax on the industry that would have deleterious effects on the industry and the economy at large.

1 Introduction

Under the Australian taxation arrangements businesses can claim a deduction for eligible expenditure incurred in gaining or producing assessable income. Under these arrangements the effective life of a bus is assessed at either 6 2/3 years or 5 years depending on the nature of the bus operation undertaken (Table 1).

Table 1 **Effective life of selected vehicles for tax purposes**

Asset	Life (years)	Date of application
Motor Vehicles, etc		
Buses, lorries and trucks:		
Generally	6 2/3	1 January 2001
Heavy haulage of goods or passengers (long distance and inter-city)	5	1 January 2001

As part of an ongoing review of depreciation rates for business, the Australian Taxation Office has recommended that the effective life of a bus for tax purposes be increased from the rates currently prevailing to a uniform value of 15 years. The option is available for bus operators to make their own determination with respect to the effective life of a vehicle. However, such determinations would require substantial empirical support should the particular bus operator be subject to an audit by the Australian Taxation Office.

Where the effective life of a bus is less than 15 years, the introduction of an effective life of 15 years would effectively impose an input tax on the industry. This would have several undesirable effects on the Australian economy. These include:

- A distortion in input use within the bus industry as bus operators adjust input use in response to the increased tax on new bus capital;
- A contraction in bus operations within Australia as bus operators pass on the added capital cost in terms of higher fares causing reduced use of buses;
- Contraction in other sectors of the Australian economy as a result of the contraction in the bus industry and fare induced contractions in industries that use bus services; and
- Increased congestion and pollution in Australian cities as commuters shift away from buses and into cars as fares rise to recover the tax imposed on the industry.

The effects of higher bus fares on the Australian economy are likely to be significant as Australia is a large and sparsely populated country. Consequently, travel is an important component of everyday life in Australia. Any increase in travel costs will have significant

effects on the economy. For example, it could force potential international tourists to seek holiday destinations other than Australia.

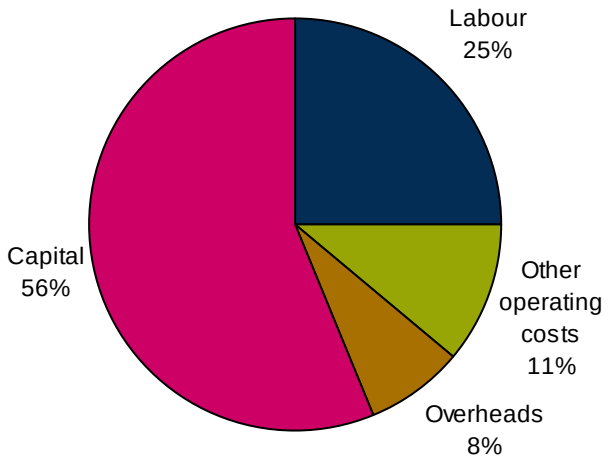
In addition, Australia has one of the highest rates of car usage in the world. Consequently, cars account for the bulk of the estimated costs arising from pollution and congestion in Australian cities. Any policy change that makes buses less attractive to commuters will force a substitution away from bus travel to travel largely by car. This will impose a cost on the Australian community via the cost associated with increased levels of congestion and pollution in Australian cities.

This report provides estimates of these costs. In the following section the tax effect of changing the effective life of a bus to 15 years is estimated. The effect of such a tax on the Australian economy is considered in section 3. Section 4 concludes the paper.

2 Effect on bus operating costs of changes in the effective life of a bus

Bus operations are relatively capital-intensive (Chart 2). Consequently, changes to taxation arrangements which impact on the capital cost of operating buses are likely to have a significant impact on the cost of operating a bus and hence on fares charged to passengers and/or significantly alter resource use within the bus industry.

Chart 2 **The cost structure of a typical school bus operation (%)**



Data source: NECG calculations

Consequently, a change to taxation arrangements relating to the bus industry should only be implemented if there are strong economic reasons for such changes. In particular, the effective life for tax purposes of a bus should not be altered unless;

- It can be demonstrated that the proposed effective life for a bus yields a depreciation schedule for tax purposes that better mimics economic depreciation of a bus than does existing arrangements; and
- The efficiency of resource use within the economy would not be reduced by any change in effective lives of buses for taxation purposes.

2.1 The economic life of a bus

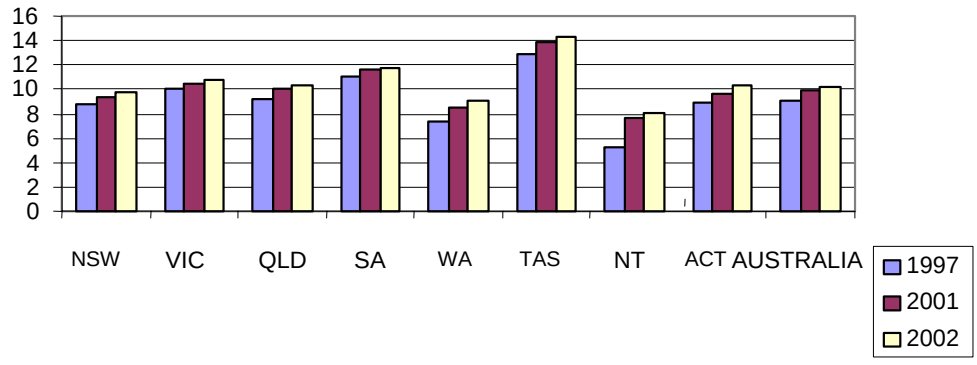
The economic life of a bus is influenced by a variety of factors including its daily workload, the work conditions it faces, the regulatory environment it operates in, the quality of the bus itself and changing technology.

Buses undertaking passenger operations between Australia's capital cities, for example, will have very high daily workloads compared to a small bus that takes patrons home from a club each night. Similarly, as a bus ages the workload it is required to undertake can fall significantly. For example, many of the buses undertaking school runs in outback Australia are buses that were retired from metropolitan work because their age and or condition made further metropolitan work uneconomic.

In addition, approximately 60 per cent of the bus and coach fleet in Australia are classified as small and would typically be used for services such as community transport and for transporting patrons to and from local clubs etc.[1] These buses would undertake relatively few kilometres of travel per day compared to large commercial buses and consequently would have longer economic lives. Consequently, many small buses operating in the community sector would, on average, be older than large commercial buses.

Despite the large number of small buses in the Australian bus fleet, the average age of a bus has been rising through time and was 10 years in 2002 (Chart 3)[2]. However, the average figure disguises significant variation in the age of the fleet. States that are sparsely populated such as Western Australia and the Northern Territory have relatively young bus fleets. This reflects the relatively long distances buses in those states are required to travel per journey. Consequently, buses are replaced more frequently in those states and the fleet is consequently of a lower age on average.

Chart 3 **Average Age of Bus and Coach Fleet**



Data source: Institute of Transport Studies, 2004, "2003 Fact Sheet: Passenger Transport Activity in Australia", Version 27 January, Figure 22.

[1] A 'small' bus is defined by the ABS as a bus with gross vehicle mass of 5 tonnes or less. If gross vehicle mass is not available, size is determined by seating capacity with a small bus defined as one with 20 or less seats. If seating capacity is unavailable, a small bus is defined as one with a tare weight of 3.1 tonnes or less.

[2] The rising age of the fleet suggests that the fleet is not in a steady state and may be still adjusting to some previous event that led to a large scale renewal of a significant proportion of the fleet.

To obtain further information on the age structure of the bus fleet and information on the usage of buses through their lives, BIC undertook a survey of bus operators (Box 1). The results suggest that route buses were on average about 10.7 years of age while charter and school buses were about 11 years of age on average. The 253 small buses in the survey were about 8 years of age on average. An overall weighted average age of 8.5 years was found[3].

The survey results also clearly indicate that the kilometres travelled by a bus falls as the age of the bus rises and that the majority of buses are replaced by the time they are 11 years old. Consequently, using the BIC survey data it can be calculated that about 80 per cent of the lifetime work of a bus is undertaken in the first 7 years of the life of a typical bus in operation[4].

Consequently, the BIC survey data could not be used to support the proposition that an effective life of 15 years would provide a depreciation schedule for tax purposes that more closely mimics the economic depreciation of a bus than does the depreciation schedule based on existing arrangements (see Appendix A).

This would suggest that increasing the effective age of a bus for tax purposes from 5 years to 15 years would, on average, effectively impose a tax on the use of capital in the bus industry. This is because the change effectively reduces the amount of capital bus operators are assumed to have used below the actual amount consumed in providing bus services.

We estimate the size of this tax in the following section.

2.2 Estimating the tax on the bus industry

To estimate how the change in the effective life of a bus for tax purposes changes the cost of a bus operation, the extent of this tax allowable depreciation was calculated assuming an economic life of 5 years, and effective lives for tax purposes of 5 and 15 years. The bus was assumed to cost $370,000 and have a salvage value of $90,000.

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[3] The weighted average was found by multiplying the age of each bus by the kilometres travelled and then dividing the sum of these products by the total kilometres travelled.

[4] The typical bus in operation was assumed to be retired at 10 years of age and had a work profile through its life equal to the average kilometres travelled by buses of particular vintages. Thus for example, in year 1 the typical bus was assumed to travel the average distanced travelled by buses of one year of age in the BIC survey. Similarly, in year 2 the kilometres travelled by the typical bus were assumed to be the average kilometres travelled by all buses of two years of age in the BIC survey.

Box 1 **BIC survey of bus operations in 2002-2003**

The way a bus is used over its lifetime reflects the rate of consumption of resources that are included in the vehicle and, therefore, the diminution in its economic value.

To shed some light on this issue, BIC undertook a survey of a wide range of Australian buses that were operating in 2002-2003. Operators from five states responded to BIC's request for data and usage information on over 1600 buses was obtained. These include:

- 1114 route buses;
- 79 school buses;
- 256 charter/tour buses; and
- 235 small buses (<25 passengers).

Route buses
The 1,114 route buses were on average 10.7 years of age and travelled on average 49,869 kilometres in 2002-03. The usage rate of new route buses was about 85,000 kilometres per year.

School Buses
The 79 school buses were on average 11.9 years old and travelled an average 25,774 kilometres in 2002-03.

Charter/tour Buses
The average age of the 256 charter/tour buses was 11.4 years and the annual kilometres travelled per vehicle were 38,913. For vehicles aged 1-9 years, annual average kilometres travelled were 50,294, while the figure for vehicles older than 9 years was 30,061 per year.

Small Buses
The 235 small buses travelled an average of 43,193 kilometres a year. Vehicles aged 1-9 years averaged 49,316 kilometres while vehicles aged 10 years or over travelled 22,664 kilometres per year on average. The average age of small buses was 8.2 years.

Source: BIC

In this example, it can be calculated that the capital cost of using the bus for a year is equal to $82,863, which when discounted at 10 per cent[5] over five years, gives a net present value of $ 314,117[6]. This represents the discounted return on capital plus the return of capital. From a tax perspective, the net present value of allowable depreciation is

[5] The discount rate can be interpreted as an estimate of the real pre tax weighted average cost of capital for the bus industry.

[6] This is less than the assumed purchase price of the bus as the bus is scrapped at the end of year 5 for a value of $90,000. Hence, the discounted present value of the $90,000 plus the discounted present value of the annuity equals $370,000.

$224,635 (Table 2). Consequently, the proportion of capital costs accounted for by depreciation over the life of the bus is about 70 per cent, that is $224,635/$314,117=0.71.[7]

Table 2 **Calculated value of depreciation for tax purposes under alternate assumptions and assuming straight-line depreciation**

Year	Opening Value	Depreciation	Written Down Value	Market price	Pre tax benefit	Tax benefit
5 year effective and economic life						
1	$370,000	$74,000	$296,000		$74,000	$22,200
2	$296,000	$74,000	$222,000		$74,000	$22,200
3	$222,000	$74,000	$148,000		$74,000	$22,200
4	$148,000	$74,000	$74,000		$74,000	$22,200
5	$74,000	$74,000	$0	$90,000	-$16,000	-$4,800
			Net Present value		$224,635	$67,391
5 year economic life, 15 year life for taxation purposes						
1	$370,000	$24,667	$345,333		$24,667	$7,400
2	$345,333	$24,667	$320,667		$24,667	$7,400
3	$320,667	$24,667	$296,000		$24,667	$7,400
4	$296,000	$24,667	$271,333		$24,667	$7,400
5	$271,333	$24,667	$246,667	$90,000	$181,333	$54,400
			Net Present value		$190,784	$57,235

Source: NECG calculations

If the economic life for tax purposes is raised from 5 to 15 years it can be calculated that the net present value of depreciation for tax purposes would be $190,784 (Table 2). This is 15 per cent less than net present value of economic depreciation of the bus. The 15 per cent can be viewed as a tax on the use of capital by the bus industry, as it is a cost incurred by the industry that is not fully recovered in tax arrangements provided the industry[8].

Armed with this information it can be calculated that the tax on the use of capital in the bus industry will raise the effective cost of operating a bus over its life by 6.0 per cent (Table 3)

Table 3 **Impact on the total cost of bus operations of an artificial extension of the economic lives of buses from 5 to 15 years (percent)**

Share of capital in bus costs (proportion)	(1)	0.56
Share of depreciation in capital costs (%)	(2)	71.51
Increase in cost of depreciation as a result of longer economic life (%)	(3)	15.07
Effect on bus operating costs (%)	(4)=(1)*(2)*(3)/100	5.99

Source: NECG calculations

[7] The analysis was also undertaken with depreciation calculated using a diminishing value methodology which indicated that the choice of effective life has a greater impact when diminishing value methodologies are used.

[8] To the extent that existing arrangements provide, for some buses more depreciation than economic depreciation, this tax will be overestimated.

Thus, when the existing bus fleet is finally replaced the cost of bus operations will be 6.0 per cent higher than they need to be as a result of the tax on buses.

We consider in the following sections the impact this tax would have on certain sections of the Australian economy.

3 Impact on the Australian economy of a tax on the bus industry

In the previous section it was calculated that extending the effective life of a bus for tax purposes from 5 to 15 years would effectively impose a tax on the bus industry equivalent to about 6.0 per cent. In this section we evaluate the impact of such a tax on certain sections of the Australian economy. Specifically we consider:

- the effect of the tax on the Australian bus industry;
- the effect of the tax on international tourism in Australia; and
- the effect of the tax on the cost of pollution and congestion in Australian cities.

3.1 Impact on the Australian bus industry

According to the Institute of Transport Studies[9] BIC represents over 3000 businesses that employ more than 30,000 people. This is made up of bus and coach operators who employ drivers, administrative staff, workshop mechanics and other staff.

The 30,000 employees also include those engaged in industries directly related to the provision of bus services. This includes 8 chassis suppliers to bus operators, 11 major Australian bus body manufacturers and 55 associated businesses, such as seat manufacturers, air conditioning manufacturers, fabric manufacturers, destination display signs, etc.

Whilst the BIC does not represent government-owned fleets, the International Public Transport Association estimates that a further 12,000 people are employed by government fleets as drivers, administration and workshop workers.

The informal bus industry, made up of community transport programs funded by the Federal and State Governments, and other bus operators operating outside the accreditation systems[10] also contribute to levels of employment. However, it is difficult to calculate the employment levels associated with community transport work as its funding is embedded within the costs of providing home and community care services as a whole. In addition, bus operations that are operating outside existing regulatory frameworks are not monitored or recorded.

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[9] Institute of Transport Studies 2004, '2003 Fact Sheet: Passenger Transport Activities in Australia', Report prepared for BIC, Version 27 January.

[10] Non-accredited bus operations are largely involved in charter work in the tourism sector.

Thus the minimum level of employment in the bus industry is at least 42,000, consisting of 30,000 employees employed by organisations affiliated with BIC, and 12,000 employees employed by governments.

It is difficult to calculate what the tax on the industry would mean in terms of lost employment. This is because the effect of the tax will vary through time. In the short term, there will be a strong incentive for bus operators to mitigate the impact of the tax through the substitution of old bus capital for new bus capital. As one operator put it, "the general feel is that School and Route Service bus replacement would go from current 5-7 years to 10-12 years, and coaches would go from 3-5 years to 7-10 years".

This process can only take place for a relatively short period of time, as the quality of the bus fleet will fall, driving passengers to other modes of transport. Thus, eventually, bus operators will not be able to mitigate the tax. Eventually, there will be pressure for fares to rise, to enable operators to obtain a market return on capital invested in the industry. The rise in fares would contract the industry below what it would otherwise have been, leading to lost employment in the industry[11].

Some idea of the potential pressure that bus operators may eventually come under can be gained by calculating the drop in passenger numbers that would flow from a tax of 6 per cent imposed on the bus industry. If all this tax was passed on to passengers and the price elasticity of demand for bus travel is –0.4, as suggested by econometric work[12], then bus travel could fall by about 2.4 per cent. In 2002–2003 approximately 1.4 billion[13] bus passenger trips were undertaken, suggesting that the tax on the bus industry would result in a loss of about 34 million passenger journeys per year.

The effect of the tax on employment in the bus industry would thus vary through time. In the short run, industries that supply buses to bus operators would be hit hardest as bus operators substitute old bus capital for new bus capital. Eventually, however, if there is no change in subsidies provided to the industry, bus operations will also need to shed labour, as a fare rise induced substitution of other transport for bus travel takes place. This will make some routes uneconomic to supply, and services to these areas will cease.

Because old buses are good substitutes for new buses, at least for a short period of time, we would expect that the introduction of a 15-year effective life would see a significant

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[11] Alternatively, State Governments could provide a subsidy to the bus industry to offset the added cost of bus operations. Raising the revenue to pay this subsidy would impose an economic cost on the economy.

[12] See, for example, American Public Transit Association 1991, 'Fare Elasticity and its Application to Forecasting Transit Demand', August, p xv.

[13] Institute of Transport Studies 2004, op. cit., p.2.

drop in new bus orders. Such an occurrence would be particularly stressful for the bus body building industry. As one of the largest body builders indicated;

> It is no secret that most, if not all, body builders are doing it tough. A quick look at deliveries over the last few years shows the market for new buses is reducing, despite DDA compliance laws.
>
> | New Buses | Delivered: |
> |---|---|
> | 2000 | 1,117 |
> | 2001 | 920 |
> | 2002 | 831 |
> | 2003 | 797 |
>
> We have this year seen the collapse of Dennings, with probably more to come. The 2 largest builders, Custom Coaches and Volgren have both suffered from reduced sales (not reduced market share). Since 2000, Customs deliveries have reduced from 393 buses to 264 in 2003. During the same period Volgren have reduced from 276 to 234.

Quantification of the short term and long term employment impacts would require detailed modelling of the sector. This has not been possible in the time available. However our analysis suggests that the extension of the effective life of buses will impact most heavily on the bus body building industry, and the extent of these effects would depend on how many bus builders cease operations. In the longer term, we would expect a contraction in employment opportunities in bus operations as well.

The loss of activity within the bus industry would also have flow on effects to other sectors of the economy.

As indicated above, we believe that in the longer term a change in the effective life of a bus could lead to fare rises. In the following section we examine possible impacts on the Australian economy assuming that the tax on the use of capital in the bus industry is passed on to passengers. The impact on the tourism sector in Australia is used as an illustrative example.

3.2 Impact on international tourism to Australia

The average international tourist visiting Australia likes to travel. Of expenditure per trip of $3,700 dollars for tourists visiting Australia for a holiday, around 45 per cent is spent on some form of transport.

It is difficult to estimate the proportion of this expenditure that is directly related to bus travel, as bus travel is not separately recorded in the survey of visitors. However, we can

approximate this expenditure by the proportion of expenditure classified as "Other transport fares" as most other forms of transport are separately recorded[14].

On this basis bus transport accounts for approximately two per cent of expenditure by international tourists visiting Australia for a holiday. A rise in the cost of this transport by 6 per cent would increase the cost of a holiday for an international tourist by about 0.1 per cent.

Table 4 **Average expenditure per night by item for all visitors and main purpose 1999 ($)**

	Purpose				Total
Item	Holiday	VFR	Business	Other	
Package Tour	70	6	25	9	34
Pre-Paid international Airfares	36	47	149	17	37
Organised Tours	8	3	2	1	4
International Airfares bought in Australia	1	1	2	2	1
Domestic Airfares	1	1	3	1	1
Other transport fares	4	2	8	2	3
Self Drive, rent-a-car, campervan	4	1	5	1	2
Petrol & oil for self drive cars	2	1	2	1	1
Shopping-for use in Australia	3	4	4	4	3
Shopping-for items to take home	20	13	26	4	13
Total Shopping	23	17	30	8	17
Food, drink and Accommodation	36	20	96	26	32
Horse racing and gambling	2	1	4	1	2
Entertainment	3	2	2	2	2
Motor vehicles	1	2	4	3	2
Education fees	1	3	2	23	9
Phone, internet, fax, post	2	1	6	3	2
Other	1	2	5	2	2
Total expenditure per night	196	109	345	103	152
Average stay (nights)	19	26	12	64	26
Total expenditure ($/stay)	3,737	2,795	4,168	6,592	3,974

Source: IVS, 1999.

[14] Train travel is also not separately recorded so other fares includes both train and bus travel. However, a significant proportion of "Packaged Tours" and "Organised Tours" would involve bus travel. Thus overall using other transport fares to approximate tourist's use of buses is likely to be conservative.

In a study of the effects of promotion of Australia on arrivals, Crouch et al[15] found that while promotion of Australia in overseas markets encouraged tourism, an increase in the cost of the stay in Australia reduced tourism. In fact, for every 1 per cent increase in the price of a visit to Australia relative to the price of a holiday in the country of origin, arrivals in Australia were estimated to fall by between 0.92 per cent for United States tourists down to 0.37 per cent for United Kingdom tourists. No significant effect could be found in the German and Japanese markets.

Assuming an elasticity of arrivals with respect to the cost of a stay in Australia of –0.6[16], the 0.1 per cent rise in the cost of tourism in Australia would reduce the number of international tourists visiting Australia by 0.07 per cent or approximately 1,200 tourists per year.

Based on the expenditure figures previously reported (Table 4), these tourists would each have spent approximately $3,700 per visit, or about $5 million in total. To estimate the additional welfare this expenditure would have generated for Australia, we used the results of simulations with the MONASH model of the Australian economy. The simulations involved a given increase in tourism expenditure, and the results are reported as deviations from the base case results from the model[17].

In the simulation, the economy-wide stock of capital achieved in the base case is required to be maintained in the long run in the simulations. The investment required to achieve this is factored into the model results. Consequently, the change in real consumption observed in the simulation results can be viewed as an increase in welfare, as it represents the amount consumers would need to be paid to make them indifferent between a world without increased tourism, and an economy with increased tourism.

To evaluate the impact of the increased tourism on real consumption, an $A100 million increase in exports of tourism was simulated, and the results are summarised in Chart 4.

The figures also demonstrate that the initial impact of the increase in tourism is significantly higher than the long run impact. This reflects the modelling assumptions of a slack labour market. Thus, in the short run, the expansion in tourism leads to an expansion in employment. However, once employment rises to the level observed in the base case, it is held at base case levels. Consequently, over the longer term, the increased demand for

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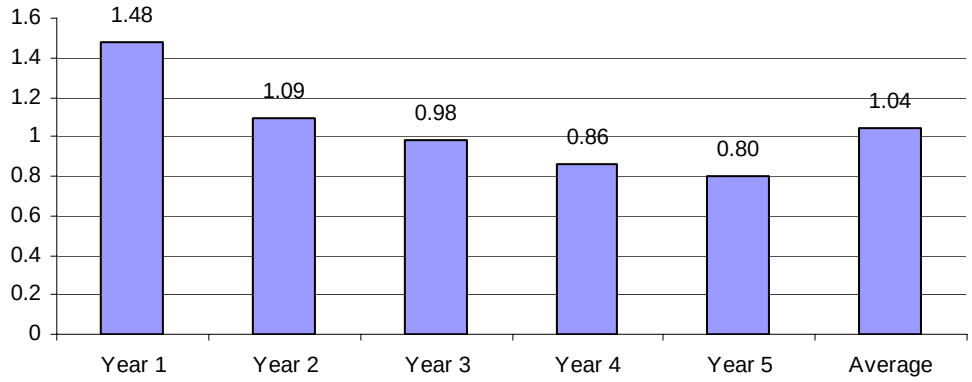
[15] Crouch, G. I., L. Schultz and P. Valerio 1992, 'Marketing international tourism to Australia, A regression analysis', *Tourism Management*, June, pp. 196-208.

[16] This is the simple average of the elasticities found to be significantly different from zero in the Crouch, et. al. study.

[17] Dixon, P. B., and M. T. Rimmer 2003, 'Three tourism simulations with the MONASH model', Paper prepared for NECG, February.

Chart 4 **Impact on real consumption of increased exports of tourism ($/$ expenditure)**



Data source: Dixon and Rimmer (2003).

labour is expressed in terms of increased real wages. The rise in real wages contracts other sectors, allowing the expansion in tourism to take place. However, the contraction in other sectors, particularly export-orientated sectors, leads to an increase in the terms of trade. Consequently, in the longer term, the benefits from an expansion in tourism are driven more by terms of trade effects than increases in employment.

Using these results it can be calculated that the reduction in tourism that would flow from higher bus fares would reduce welfare in Australia in the first 10 years after the changes were made, by about $27 million in net present value terms.

3.3 Impact of the tax on the bus sector on pollution and congestion

The Institute of Transport Studies has argued that, **"**the economic, social and environmental impacts of our dependency on cars strongly compel action for increasing the use of public transport"[18]. The proposed changes to the effective life of buses have the potential to achieve the opposite result.

The Institute of Transport Studies detailed the following estimates of noise, pollution and congestion costs associated with road travel in Australia:

- congestion cost of $12.8 billion per annum, rising to $29.7 billion by 2015 if improvements are not made;

[18] Institute of Transport Studies 2004, op. cit., section titled 'Economic sustainability and the Cost of Cars'.

- air pollution from cars in 2001 of $1.35 billion, or 31% of the cost of air pollution from road transport; and
- noise pollution from cars of approximately $850 million per year[19].

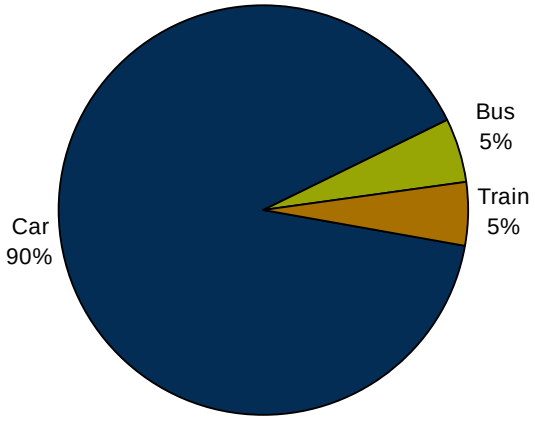
These costs would rise if car travel were to increase. Recent econometric work suggests a demand elasticity for bus travel of –0.4. This elasticity implies a reduction in bus travel of 2.4 per cent, assuming fares were to rise by 6 per cent to recover the implicit tax imposed on the bus industry by the artificial extension of the economic life of buses from 5 to 15 years.

As bus travel accounts for approximately 5 per cent of passenger kilometres of travel in the metropolitan area, the reduction in bus travel of 2.4 per cent represents approximately 0.1 per cent of the metropolitan passenger transport task.

If this task were to be diverted to car and train travel, according to the metropolitan transport shares indicated in Chart 5, it can be calculated that "the social and environmental impacts" generated by cars would rise by about $20 million per year.

While this is a relatively small number, it is still a loss to Australia that results from an incorrect policy towards the Australian bus industry. In addition, the policy will undermine the Governments recent initiatives to improve emission standards in the bus industry. New Emission Standards will add around $40-45,000 to the cost of a bus, and see reduced passenger capacity that will reduce productivity.

Chart 5 **Urban transport share of passenger kilometres**



Data source: Institute of Transport Studies, op. cit., Figure 4.

[19] Ibid., section titled 'Economic sustainability and the Cost of Cars'.

Of course, these costs would be avoided if State governments were to offset the higher bus costs through a subsidy to bus travel. However, tax revenues would need to be increased to pay this subsidy. There would be an economic cost associated with the higher State Tax revenue.

3.4 Implications of the analysis

The proposal to extend the economic life of a bus to 15 years would significantly reduce the economic efficiency of the Australian economy. It would impose a tax on the bus industry that would have significant adverse effects on the cost structure of the Australian bus industry, and would have negative effects on other sectors of the Australian economy, particularly the tourism sector.

4 Conclusions and Further Work

Available data does not support the proposition that an effective life of 15 years would provide a depreciation schedule for tax purposes that more closely mimics the economic depreciation of a bus than does the depreciation schedule based on existing arrangements. Accordingly, extending the economic life to 15 years would effectively impose a tax on the bus industry of about 6 per cent. Such a tax would reduce economic welfare in Australia. It would reduce the level of international tourism to Australia and the lost tourism expenditure would reduce welfare in Australia by $27 million in the first ten years after the change was made. In addition, the tax would cause a shift away from buses towards a greater use of cars in metropolitan areas. This would impose additional costs on the Australian economy via increased pollution and congestion in Australian cities.

Further work could be undertaken to consolidate the research findings contained in this report. Up-to-date estimates of the cost structure of different bus types could be derived to obtain more accurate estimates of the tax on the industry. Finally, an analysis could be undertaken to establish if the estimated effects of the tax on the bus industry are particularly sensitive to the assumptions made .

Pending further work, the findings of this study indicate that the proposed change in the effective life of a bus to 15 years would be an inappropriate policy change, as it would effectively impose a tax on the industry that would have deleterious effects on the industry and the economy at large.

A Derivation of economic depreciation for a typical bus

The results from the BIC survey were used to derive an estimate of the economic depreciation of a typical bus. The analysis commenced with the specification of the expected economic life of a typical bus. The BIC data indicates that the number of buses in an age category rises gradually until the age category 7 years. Thereafter bus numbers decline in most years until year 11 when numbers dramatically drop. Thus in year 11 the number of buses is around a third of numbers in year 7 (Table A1).

Using this age profile we conservatively assume that the typical bus is replaced at the end of its tenth year.

Table A1 **Summary of results from BIC survey**

Age in years	Kilometres travelled	Number of buses	Average kilometres Travelled per bus per year
1	4,828,961	67	72,074
2	5,525,013	81	68,210
3	4,443,278	62	71,666
4	4,398,164	71	61,946
5	5,742,295	81	70,893
6	6,026,124	97	62,125
7	9,546,629	159	60,042
8	4,127,244	94	43,907
9	6,243,920	134	46,596
10	5,191,577	114	45,540
11	2,113,397	47	44,966
12	1,661,013	57	29,141
13	1,653,485	53	31,198
14	3,369,703	88	38,292
15	2,661,178	75	35,482
16	2,562,631	93	27,555
17	2,082,382	69	30,179
18	1,384,776	71	19,504
19	708,020	36	19,667
20	942,315	42	22,436
21	481,952	21	22,950
22	754,313	22	34,287
23	679,894	24	28,329

Source: BIC

The workload the typical bus undertakes over its life is not uniform. Kilometres travelled are around 70,000 per annum for the first 5 years of a bus's life, thereafter annual kilometres is on average about 15,000 less than in the first 5 years of a bus's life (Table A2).

We assumed that the typical bus would have a work profile per year over its life equal to the average kilometres travelled by buses of different vintages in the BIC survey. Thus, for example, in year 1, the typical bus was assumed to travel the average distanced travelled by buses of one year of age in the BIC survey, that is 72,074 kilometres. Similarly, in year 2 the kilometres travelled by the typical bus were assumed to be the average kilometres travelled by all buses of two years of age in the BIC survey, and so on for each year.

It was then assumed that the economic depreciation would decline linearly with the kilometres of work undertaken. This gave the economic depreciation profile given in Table A2. This depreciation profile can be compared to the profile associated with the 15 year effective life proposed by the ATO, and alternate profiles associated with the current effective life of 6 years for some buses, and alternate profiles associated with an 8 and 10 year economic life.

Table A2 **Alternate depreciation profiles for a typical bus**

Age in years	Assumed cumulative distance travelled	Cumulative share of lifetime travel	Economic depreciation	15 year life	6 year life	8 Year life	10 Year life
1	72,074	0.12	0.12	0.07	0.17	0.13	0.10
2	140,284	0.23	0.11	0.07	0.17	0.13	0.10
3	211,950	0.35	0.12	0.07	0.17	0.13	0.10
4	273,896	0.45	0.10	0.07	0.17	0.13	0.10
5	344,788	0.57	0.12	0.07	0.17	0.13	0.10
6	406,913	0.67	0.10	0.07	0.17	0.13	0.10
7	466,955	0.77	0.10	0.07		0.13	0.10
8	510,862	0.85	0.07	0.07		0.13	0.10
9	557,458	0.92	0.08	0.07			0.10
10	602,998	1.00	0.08	0.40			0.10
		Total depreciation	1	1	1	1	1
		NPV	$0.64	$0.54	$0.73	$0.67	$0.61
		Difference	$0.00	$0.10	-$0.09	-$0.03	$0.03
		Tax/subsidy	0.00%	-15.88%	13.47%	4.24%	-3.95%

To enable the depreciation profiles to be compared, we calculate the net present value of the depreciation profiles, and compare these to the net present value of economic depreciation of the typical bus. These calculations indicate that the proposal to extend the effective life of a bus to 15 years would impose a large tax on the bus industry, as indicated by the fact that the net present value of allowable depreciation is 15 per cent below the net present value of economic depreciation (Table A2). Interestingly, setting an effective life of 10 years would also involve a tax on the typical bus operation, as it would not capture the fact that buses are used more intensively in the first five years of their lives.

Overall, existing depreciation arrangements for some buses that allow for an economic life of 6 years more closely mimics the profile of economic depreciation than does a depreciation profile based on an effective life of 15 years. This can be seen by comparing the net present value of the different depreciation profiles to the net present value of economic depreciation (Table A2).

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