Economic Research Associates

Economic Analysis of WACC Analysis for School Bus Operations in WA.

A report prepared for Economic Regulation Authority

April 2007

Principal Author:

Dr Paul McLeod

Economic Research Associates

Economic Research Associates Pty Ltd
A.B.N 90 009 383 173
97 Broadway
Nedlands WA 6009
Phone: (09) 386 2464
Email: era@daa.com.au

CONTENTS

Introduction

1. This report looks at the use of the weighted average cost of capital (WACC) in the setting of operator remuneration for school bus services in Western Australia. In particular it looks at the findings of the report by PriceWaterhouseCoopers (PWC) undertaken in 2002-2003 in which the use of the WACC was recommended as the most appropriate way to allow for a return on capital component in setting the allowed revenue streams for school bus contracts. Prior to this recommendation, the rate of return to the owner/operator was embedded in the Standard Rate Model and Consolidated Rate Model based on either an allowed rate of return on the historical cost of the bus (ROHC) or rate of return on current cost of the bus (ROCC).
2. The rate of return to be allowed on capital committed to the school bus business is but one component of the total cost of owning and operating a school bus and hence only one component in the estimation of an appropriate revenue stream to allow school bus operators. To see how the WACC approach fits into the context of a school bus operation we start with a simple business structure.
3. As a general rule, for any small business such as school bus operators, the operator will make an ongoing economic profit if the revenue received (either annually or over a defined period such as bus replacement cycle) is such that it covers:
    1) Variable operating costs, including such costs as hired labour, maintenance and repairs.
    2) Fixed costs including such items as licences and insurance.
    3) Costs associated with the wear and tear on capital equipment.
    4) An income for the operator.
    5) A return to the operator for the capital invested including an appropriate allowance for risk.
4. The simple objective for Government is to decide what revenue stream to award school bus operators who incur the legitimate costs as set out in cost items 1 to 5.

5. In economics, the approach to finding this appropriate revenue stream would be based on finding competitive market benchmarks for each component where these benchmarks reflect the opportunity costs of tying up the resources involved.

6. With competitive markets, the prices paid for inputs are determined by market forces and operators purchase them at these market prices. Hence allowed revenue streams should ensure that all such cost elements can be recouped.

7. The allowance for wear and tear is typically recouped via an appropriate depreciation charge. An allowance for the income of the operator is typically set by reference to the market value of labour with skills similar to that of the operator – this defines the opportunity cost of the operator committing this labour time to the operation.

8. The return allowed on capital investment can similarly be tied to the concept of opportunity cost. If the operator chose not to invest in the operation then the capital invested would have a measurable rate of return elsewhere and this is the opportunity cost that the operator forgoes by committing resources to the operation.

9. Hence to implement this approach we would need:

    1) A complete specification of operating costs – variable and fixed.

    2) Market values for these operating costs.

    3) A valuation of all capital equipment (e.g. buses) and a method to provide for replacement .

    4) An estimate of wage/salary costs to assign to operators.

    5) An estimate of the rate of return to allow operators on the capital invested.

10. There are a number of ways to get to the same end point of determining an appropriate revenue stream to allow small businesses like school bus operators in a regulated environment.

11. A common approach is to estimate the costs in items 1 and 2 in detail and then assign a profit markup (usually a markup on unit costs) that is set to achieve a specified outcome that covers items 3, 4 and 5. Some models does this be setting a profit margin that can be included against all cost items. Other approaches attempt to specify all costs and then set a profit margin as a percentage of revenue which covers the owner's salary and a return on investment. Some models focus on a benchmark return on either the historical

cost of the assets (ROHC) or the current cost of the assets (ROCC) to allow the operator to cover their own wages and a return on capital.

12. The PWC report noted that the consolidated revenue model incorporates cost markups. It was estimated that cost markups of between 15% and 20% on eligible costs would result in a profit margin of 43% of revenue to cover the owner's salary and a return on capital invested, with the 43% derived from the Business Benchmarking Guide for Bus and Coach Operators (EBC, 2001).

13. Approaches based on cost markups and profit as a percentage of revenue can be equally well expressed as a return on investment (ROI) where this is related to either the historical cost or current cost of assets. The industry submitted that the approach used should be the ROI model not markups.

14. PWC noted that all approaches are seeking to reach the same point – allow the operator an adequate return on capital allowing for the business risks involved where the opportunity cost of operator time has been allowed for as a salary.

The PricewaterhouseCoopers Recommendation

15. However the PWC report took the view that these "short cut" approaches were difficult to justify because the relevant markup concepts and rate of return concepts had no ability to be benchmarked to the market. This is the view they took of the proposed ROI of 20% on historical bus cost.

16. PWC adopted a well established economic approach which was to determine all items by reference to the market. Most notably this includes market benchmarks for the allowed return on capital. In this way the recommended approach is consistent with the approach to pricing adopted in most modern regulatory environments.

17. The approach takes each of items 1 to 5 as a separate item to be estimated by reference to market benchmarks, with the aggregate indicating allowed revenue. Under this approach the role for the weighted average cost of capital (WACC) is to provide guidance (a benchmark) that will assist in the determination of item 5.

18. This is argued to be the appropriate model even if, for purposes of implementation, the rate of return assessed in this way is translated back into a return of historical cost (ROHC) or return on current cost (ROCC) or a profit markup.

19. It needs to be recognized that the regulatory decisions about pricing and revenue that incorporate WACC considerations typically relate to publicly listed companies providing infrastructure services and related products in monopoly situations. Hence we could legitimately ask what is the relevance of the approach for school bus operations? The simple answer is opportunity cost. If school bus capital resources were allocated to capital markets and invested in low risk companies, they could earn the appropriate WACC. A rate of return at least equal to the WACC is needed to justify having the resources committed to school buses. By adopting the approach recommended in the PWC report we can better define the minimum revenue stream consistent with economic efficiency.

20. As the PWC report noted the work on operating costs and allowances for depreciation/replacement are essentially the same under all approaches. The key area of difference between the principles underlying the standard rate model, the consolidated rate model, the ROI model and the model recommended lie in the approach to fixing the allowed rate of return – that is, fixing item 5 above.

21. Therefore in the following sections we consider;

    - The basic elements of the recommended WACC approach.
    - The actual estimates of the WACC developed.
    - The role of key assumptions in determining the WACC estimates.
    - Approaches to setting WACC benchmarks for school buses.
    - Some comparative rates of return and how they compare to the rates estimated by PriceWaterhouse Coopers.

Basic Approach Using WACC

22. We can define the weighted average cost of capital (WACC) as the minimum acceptable return on investment required by lenders and shareholders associated with a firm. It is premised on the idea that capital inputs are funded by a mix of debt and equity. The WACC is the weighted average cost of debt and equity funded capital.

23. Assuming competitive markets, the returns required by lenders and shareholders can be thought of as market determined. Hence the WACC is a reflection of the opportunity cost to investors and lenders of tying up resources in the business.

24. There are a number of ways to define the WACC. A common formulation is as follows:

$$WACC = R_e.\frac{E}{V}\frac{1-T}{(1-T(1-\gamma))} + R_d\,(1 - t).\ \frac{D}{V}$$

25. where:

Re = cost of equity capital to school bus operators

Rd = cost of debt to school bus operators

E = market value of equity in school bus businesses

D = market value of debt in school bus businesses, and V = D + E = total value of business

t = corporate tax rate on debt, and

γ = proportion of dividends that have franking credits

26. Publicly listed companies pay dividends to shareholders out of after tax profits and shareholders receiving these franked dividends can claim a credit for the corporate tax already paid – the effect is to avoid double counting and only have recipients pay personal tax. The γ accounts for this and reflects the proportion of dividends paid to shareholders that are accompanied by franking credits. Typically the value of γ is set to 0.5 although the literature contains estimates as low as 0.3 and there is debate as to whether this should be allowed for at all, that is γ should be zero.

27. PWC used a simplified form of the model in which effectively γ is assumed to be zero. With this assumption the basic WACC equation implemented by PWC takes the form:

$$WACC = R_e.\frac{E}{V} + R_d\,(1 - t).\ \frac{D}{V}$$

28. This appears a reasonable simplification in this case. School bus companies are not listed so we have no ability to test γ. In fact the ownership arrangements could vary from sole operator to partnerships to private companies. It seems reasonable to work on the premise that γ =0.

29. Using this simplified form of the WACC equation, the cost of debt can be given a relatively simple interpretation in the market place, but the cost of equity is a little more complicated. Typically it is assessed by reference to the Capital Asset Pricing Model (CAPM).

30. We can think of the cost of equity capital as the return required by investors to compensate them for providing resources to the business.

31. There is risk associated with the provision of such equity capital. Investors need to be compensated for business risk (arising from the variability of operating cash flows) and financial risk (arising from the variability of residual cash flows after paying interest payments out of uncertain profits).

32. From the standpoint of equity investors, the financial risk can be thought of as a magnification of the basic business risk due to the presence of debt in the capital structure. If there was no debt (i.e. the business was unlevered) we would only be dealing with the business risk.

33. Applying the Capital Asset Pricing Model (CAPM) involves deriving an estimate of the following equation:

    $R_e = R_f + ß_e [R_m - R_f]$

    where:

    Rf = risk free rate of return in the market place

    Rm = return on the market portfolio of shares

    (Rm-Rf) = equity market risk premium and

    ße = equity beta (levered) which is a measure of the extent to which there is non-diversifiable risk – the beta of the market is 1.

34. Each of the above parameters needs to be determined in order to estimate the required return to equity.

35. The equity beta is especially significant. It is a market related risk measure that is derived, usually as a statistical estimate, from data for publicly listed companies. The more a stock moves up and down with the market, the more non-diversifiable risk it has.

36. Assets with betas less than one demand lower returns than the market and assets with betas greater than one demand higher returns than the market.

37. Equity betas can be expressed in terms of asset betas, which are a measure of relative business risk alone (the financial risk of leverage is excluded from asset betas).

38. The relationship of equity betas to asset betas is:

$$ß_e = ß_a \left(1 + \frac{D}{E}\right)$$

where: ße = equity beta (levered) ßa = asset beta (unlevered).

39. If the WACC is to be determined and applied for revenue setting then we have to deal with a range of issues. These include having appropriate estimates of:

- the risk free rate
- the debt/equity ratio
- the cost of debt
- the market premium, and
- the beta value to be used.

From the Market to the Project/Firm in a Pricing/Revenue Regulation Context – Application to the School Bus Operators

40. In order to develop WACC estimates for school bus operators we need to find suitable reference points and comparators because school bus services are typically not supplied by listed companies.

41. The WACC and the CAPM are set in a market situation where we have publicly traded companies. In the case of the school bus operators we have the situation where we are dealing with non-traded small businesses. Typically these will be single operator/single product businesses. A challenge therefore is to consider how parameters can be derived that are relevant to the operators in the school bus industry but are at the same time consistent with the WACC approach.

42. Conceptually this is the same as the problem that confronts larger companies trying to estimate a WACC for a non-traded division or even a project.

43. How do you estimate the beta of a project or division? There is a considerable discussion about this in the literature, but largely it comes down to applying the peer method – with a fair amount of judgment and experience.

44. From the perspective of estimating beta, this involves collecting data on publicly listed companies that are essentially like the project or business being assessed (in the sense that they face the same sort of systematic risk). In our case we would need estimates of equity betas for companies that face the same ***business risk***, as school bus operators.[1]

45. Finding suitable comparators is not straightforward. Any decision on beta in this case is, like any assessment or a non-traded division or project, going to require considerable judgment. PWC made the judgment that school bus operators are relatively low business

[1] For example, in the United States where school buses are provided by publicly listed companies there may be information on the market assessment of risk. Companies like Laidlaw International Inc. specialise in the provision of bus services in the United States and Canada. Laidlaw operates in education services, intercity services (Greyhound) and local (public transit) services. It operates school bus transportation throughout the US and Canada. This is the core business. Laidlaw has a market capitalisation of $2.27 billion, a return on equity of 8.78% and a beta of 0.72.

risk and assigned a beta value of 0.8, although they also reported the results of using a beta value of 1, thereby assuming that bus operators bore risks exactly equivalent to overall market risk.

46. The peer method might also be used in assessing the debt/equity ratio to use. This could be based on a sample of comparable small firms or, if the number was large enough, an analysis of the school bus operators themselves. PWC had access to financial data for bus operators with varying sized buses from industry data submitted on a range of bus contracts as well as the EBC (2001) survey. They adopted an average debt/equity ratio based on these data.

PWC Results

47. The WACC calculation is mechanistic. The key is the selection of parameter values.

48. In assessing the WACC for school buses the PWC report used the following assumptions:

    - The risk free rate = 5.08%.
    - The market risk premium = 6%.
    - The debt/equity ratio = 50%.
    - The cost of debt = 8%.
    - The equity beta = 0.8.

49. First, the risk free rate. The recommendation is always that this be based on the long term government bond rate. This rate (5.08%) was the rate prevailing on 13 March 2003. The current rate is 5.74%. If the current rate was used the WACC would go above the PWC estimate.

50. Second, the market premium used was 6%. This is consistent with the historical evidence from a variety of studies which puts it in the range 6-7%. Regulators in Australia have typically adopted 6%. Again, if the higher end was used the WACC would go above the PWC estimate.

51. The market premium is known to vary over time. Whilst there are no cases put for it being higher, some analysts have suggested that going forward it might be as low as

3.8% to 4% (AMP 2006). If this view were adopted the WACC would be lower. However, consistent with current practice and the dominant evidence 6% is a reasonable parameter estimate.

52. Third the debt/equity ratio. This is the first parameter where we need to introduce industry and firm specific information. The debt/equity ratio was set at 50%. The debt/equity ratio was derived as an average from data submitted by industry on bus contracts. It will of course vary across operators. The PWC report makes reference to a data base on the contracts and their financial attributes. Such a data base would be valuable because the whole suite of contracts and bus types would be included and the debt/equity ratio could be modelled to take account of the mean and variance in the debt/equity ratio across operators. At this stage it appears that the data base has not been assembled.

53. Fourth the equity beta. This is perhaps the most controversial area of application of the WACC/CAPM framework. As already noted the concept of the model is based on publicly listed companies where we can observe the market assessing risk and return across sectors and setting prices in the market accordingly. The beta data derived from the market is typically for an industry (e.g transportation) or a company (e.g. Toll Holdings). Application of these betas to non-listed sectors, companies and projects for WACC determination requires an assessment of the extent to which the business risk associated with these companies/projects can be said to be equivalent to any of the listed operations. Some authors have argued that for small business sectors this is such a difficult task that alternative approaches should be used. This was the argument used in Hensher et al in their analysis of contract bus services in NSW. On the other hand, the WACC approach is commonly used by regulators, there are a number of WACC based price determinations and we have a clear understanding of the issues surrounding key parameters. As the PWC report argues, on most parameters we have market reference points – on others we have market based starting points. We can of course sensitivity test the WACC as set out below.

54. The PWC report assessed the relevant beta at 0.8. A beta of 1 is market risk so the assessment is that the school bus operators as a group are less risky that the market. Is this reasonable? Many articles have commented on the difficulty of estimating firm

specific betas in situations where there are no reference points in listed companies (see Alexander, 1999). If we are using the WACC, this problem needs to be addressed.

55. The starting point for considering risk is the market – ße = 1. Is transport and in particular regulated transport more or less risky than the market?

56. The evidence in Alexander et al is that it is less risky. The table below summarises the results for equity betas for listed transport companies from the Alexander paper. The conclusion is that this is not a very risky sector. The risk level is even lower once gearing is taken into account. In the table, Australia is in Oceania.

Table 3-2 Summary of equity betas by region and sector

Region	Airports	Roads	Rail	Ports	Buses	Other	All
Europe	0.745	0.5826	0.4318			0.3851	0.5824
	4	7	4			6	21
Asia		0.9089	0.4801	0.8278	0.6664	0.6964	0.564
		2	21	1	4	3	31
Oceania	0.76668	0.5157	0.5795	0.4944		0.7118	0.5562
	1	2	1	5		1	10
America			0.9047				0.9047
			90				9
All	0.7494	0.6298	0.5866	0.55	0.6664	0.5111	0.5955
	5	11	35	6	4	10	71

57. Other studies put the equity beta for transport as a whole close to one. Rahunathan et al (2000) put the equity beta for transport at 1.14.

58. We need to consider how such values might translate into a risk assessment for school bus operators with Government contract revenues.

59. First, for an equity beta we are dealing with business risks as opposed to financial risks. More particularly, we are dealing with the extent to which there is variability in business cash flows. For school buses the variability of business revenues is limited by the nature of the operation. School bus operators have a local monopoly for the duration of the contract and revenue calculated by formula. Hence the cash flows are not subject to forces such as the business cycle, etc. On this basis the average would be expected to be no riskier than the market and probably less risky (<1). However, whether this is 0.8 or 0.9 or lower is a moot point.

60. Two further points need to be made. Just as a market beta for a sector like transport is an average of component betas, so using 0.8 or 0.9 implies that this is an average for school buses.

61. A simple interpretation is that the assigned beta would be the weighted average of firm betas with weights equal to asset shares. On this interpretation some firms are higher risk and others lower risk. Whether using the average is an appropriate way to assess risk for any individual firm is questionable – judgment is required when looking at individual cases. However, in this case because of the nature of the contracts awarded we would not expect a wide distribution of business risk. Hence applying an average may be appropriate in the case of school buses.

62. There are some specific risks that can arise which illustrate the role of beta. Some operators may have contracts that expose them to more risk, for example in locations with transient school populations, but to the extent that these influences are allowed for in specifying the individual contracts, this risk is managed. Similarly, there may be cases where contract life is not a simple multiple of bus life. Hence there is a risk that a contract will end with a still usable bus that is not fully depreciated. This is a risk faced by transport contractors in other industries. Its significance will be related to how robust the second hand market is for school buses. Moreover because beta is a weighted average concept, it already incorporates aspects of such risks.

63. If there is a distribution of such circumstances across the school bus sector, the average beta should be interpreted to encompass this. However, if any of these risks apply uniquely to school buses and apply relatively uniformly across the firms there may be an argument that business risks are higher than a simple adjustment of a market average implies. Realistically there is limited or no third party data to go to as a way of assessing this, making an ad hoc adjustment dangerous.

WACC Estimates for School Buses

64. For regulatory purposes, most regulators focus on the real pre-tax WACC.

65. Using the parameters documented in paragraph 48, and a beta value of 0.8, PWC estimated the ***real pre-tax WACC to be 8.4%.*** This is based on the various parameters as specified.

66. There are three variations that might be considered. PWC used an inflation rate of 2.5%, a risk free rate of 5.08% and a cost of debt of 8%. At the current time the risk free rate is at 5.74%, inflation closer to 3% (estimated 3.11%) and cost of debt closer to 9% (estimated 8.87%). If we use these values then the ***real pre-tax WACC to be 8.58%***

67. The assumption regarding γ (the proportion of dividends that have franking credits) makes a difference. At a γ of 0.5, typically used by regulators for listed companies, the ***real pre-tax WACC would be reduced to 7.29%.*** However, as was noted above, PWC effectively used a γ of zero and this has been accepted in this analysis.

Implications for Bus Operators

68. A full analysis for bus operators would require a detailed investigation of cost structures for different bus categories and for firms at various points in the income distribution within those bus categories. The analysis in this section is illustrative and uses data for a standard B bus taken from the PWC report (Appendix 5) to highlight the implications of applying the WACC approach.

69. Although regulators use the real pre-tax WACC in price setting, to illustrate the impact in comparison with alternative ROI measures suggested it is appropriate to use a nominal pre-tax WACC. The real pre-tax WACC of 8.58% is equivalent to a nominal pre-tax WACC of 11.96% and a nominal post-tax WACC of 8.37%.

70. In order to apply the estimated WACC to a bus operation we need a market value for a bus business. This is a potentially difficult area. As a going concern with expectations of ongoing contracts, there will be a goodwill component. The PWC report accepted this notion and valued the business at two times actual bus value based on the bus being 50% of the ongoing business value.

71. For pricing purposes, the real pre-tax WACC is then applied to the market value of the business (assets). This is a value that should increase in line with inflation. PWC effectively assumed that two times the bus value would do this.

72. Taking a standard B bus, the comparisons would be as set out below. It is based on the data from Appendix 5 of the PWC report and the WACC estimates as outlined above.

Illustration of the Application of the Estimated WACC for a Standard B Bus

Average historical cost	$ 120,201		
Average current cost	$ 170,723		
Age of bus	$ 7		
Average depreciated value	$ 91,052		
	beta = .8	beta = 1	
Real pre-tax WACC	8.80%	9.60%	
Market value of business	$ 182,104		

	For a 20% ROI	ROI using WACC Beta =0.8	ROI using WACC Beta =1
Income	$ 83,370	$ 74,995	$ 76,466
Cash costs	$ 33,446	$ 33,446	$ 33,446
Depreciation	$ 7,613	$ 7,613	$ 7,613
Imputed owner salary	$ 18,271	$ 18,271	$ 18,271
Surpluses before depreciation, interest and tax	$ 31,653	$ 23,238	$ 24,749
Surplus after depreciation, before interest and tax	$ 24,040	$ 15,625	$ 17,136
Return on historical cost (ROHC)	20%	13%	14%
Return on current cost	14%	9%	10%

73. Clearly there are differences. A 20% ROI implies annual income of $83,000, a WACC based ROI at 8.58% implies annual income of $75,000 and a WACC based ROI at 9.41% implies annual income of $75,500. If we assumed a positive value for γ, say at 0.5, the WACC and the implied annual income would be lower again.

74. Firms at different points in the distribution would be affected differently. The most likely variation across firms is the debt to equity ratio. Compared to the 8.58% real pre-tax WACC with beta = 0.8 and a debt/ equity ratio of 50%, if the debt/equity ratio was 80% and not 50%, the real pre-tax WACC would fall to 6.8%. If it was 30% the real pre-tax WACC would increase to 9.8%. This result arises from the WACC being a weighted average and the cost of equity exceeding the cost of debt in the modelling.

Hence higher debt relative to equity reduces the weighted average cost of capital. Hence firms with different approaches to ownership/financing will fare differently when the average is used. To the extent that debt/equity ratios vary across the school bus operators, the WACC based on averages will approximate the situation for individual operators better or worse.

75. An issue here is that the WACC based regulatory decisions are typically dealing with a single company not a range of companies. Where a company is complex with say multiple divisions and distinct geographic markets a parallel problem arises to that which is identified above for school buses. Would it be reasonable to assume the average debt/equity ratio for all divisions? Is it reasonable to assume the same debt/equity ratio for all school bus operators? In the case of a large company a division may be looked at separately for regulatory purposes. For school buses, it would be desirable to have a knowledge of the distribution of debt/equity ratios – by operator, by bus type, by region – so a determination of the merits of using the average, as opposed to some other measure, like the median, could be made.

76. Once a ratio is agreed upon, operators who use relatively more debt are increasing their capital costs unnecessarily, all other things being equal, and would be encouraged to move to the ratio built into the WACC.

How Should we Interpret the Results?

77. The WACC approach adopted by PWC is consistent with the approach taken by regulators generally. Application of reasonable parameters suggest using a real pre-tax WACC of 8.58%. Most importantly, this is based on treating the industry as relatively low risk with an equity beta of 0.8.

78. Setting revenue benchmarks using either a higher WACC or 20% ROI could be interpreted as implying subsidy. This is based on the view that the WACC as calculated is a market based return on capital commensurate with the risks involved. An income stream at least equal to the one based on the WACC is needed to justify the resources being utilized in the school bus sector. If the calculations are appropriate the market should be willing to commit the needed resources.

79. There are a number of reasons why the revenue stream based on the WACC as calculated might not be debated.

80. First, technical arguments as to risk and the value of beta. To assign a beta is a matter of judgment. The PWC assessment seems consistent with the limited market evidence, making 0.8 not unreasonable and a number greater than 1 difficult to justify.

81. Second, the market value of the business. The above illustration uses the PWC approach of taking 2 times current bus value based on assuming an ongoing business. There is limited evidence for this view. Current market values are a reflection of the revenue streams available and an independent market value is difficult to obtain. The PWC report recognizes this fact.

82. Both of the above items are of a technical nature and changes to the chosen beta or assigned market value of the business might result in revenue adjustments up or down compared to the illustrated case.

83. The Government may believe that a higher revenue stream is justified because there are community benefits, and related intangible benefits, that are not adequately captured in the various cost items including the imputed owner's salary. Such a judgment might imply a higher revenue stream than that illustrated but this is likely to vary by operation/area.

84. There may be specific risks not adequately captured by the way costs are measured and the contracts currently specified. An example would be the risk of losing passenger numbers if families relocate and school numbers fall. These risks would be better dealt with, if possible, through specific contract arrangements.

85. School buses are small businesses with revenue streams set by government. Their market value is connected to this revenue stream. Benchmark ROIs (e.g 20%) are quoted as the basis for setting sale prices. Any change that reduces revenue streams will, all other things being equal, reduce business market values and generate capital losses with a variety of consequences for operators which Government may see as undesirable.

86. The use of the WACC as the basis for setting revenue streams presuppose that the WACC as calculated and the business values calculated are well specified and

appropriate. The possible caveats discussed above, whilst relevant, run the risk of being treated as ad hoc adjustments.

87. There is a potentially a role for the market in resolving some of these issues. Ultimately, the best test of whether a revenue stream based on the WACC as calculated will induce the required resources to be committed to the school bus sector is to go to market via a tendering processes.

88. In the interim, contract revenue streams over and above those based on the WACC ROI approach need to be decided upon based on the sort of considerations highlighted in paragraphs 83 and 85 above.

Other Jurisdictions

89. IPART has recently reviewed fares for metropolitan buses and approved a revenue base for non-commercial bus services which was derived by using a return on investment based on allowing an 8 per cent margin over the 10-year government bond rate. This would equate to around 14% in current terms. The PWC report interpreted this equivalent to the ROHC measure which they assessed at 12% consistent with their WACC calculations.

90. There are very few jurisdictions where a WACC approach has been documented in bus regulation consistent with the objectives in the current study.

91. Recently (2006) the price regulation system for buses in Hong Kong was changed from a system based on average net fixed assets (ANFA) measured at historical cost net of depreciation to one based on WACC. In summary, the allowed rate of return (including net profit and borrowing costs) on average net fixed assets for bus companies had been 13%. The review proposed changing to a WACC system based on a WACC for bus operations of 9.3%. The equivalent rate of return on ANFA was assessed to be 9.7%. Taking this to be nominal post-tax WACC it is comparable to the estimate of 8.97% (beta = 1) using current parameters. It is higher than the beta = 0.8 estimate of 8.37%.

92. In its review of Sydney fares, IPART determined a user cost of capital determined based on using a WACC of 6.5% applied to the value of Sydney Buses' fixed assets. This rate is more consistent with the figures used in regulation generally but less than the PWC calculation and the Hong Kong determination.

References

93. Alexander, I. Estache, A. and Oliveri, A. (1999), *A Few Things Transport Regulators Should Know About Risk and the Cost of Capital,* World Bank.

94. AMP Capital Investors (May 2006), *The Equity Risk Premium: Is it Enough?*

95. Entrepreneur Business Centre (2001), *Business Benchmarking Guide for Bus and Coach Operators*.

96. Hensher, D. and Pointer, G. (May 2003), *Non-Commercial Contract Reimbursement - The Institute of Transport Studies Model. A Report Prepared for the Bus and Coach Association of NSW*, The Institute of Transport Studies, Sydney.

97. IPART (December 2006), *Review of Fares for Sydney Metropolitan Bus Services from 2 January 2007*.

98. Legislative Council Panel on Transport (November 2005), *Review of the Basis for Considering Bus Fare Adjustments*, Hong Kong: Environment Transport and Works Bureau.

99. Rahunathan, V. Faff, R. and Brooks, R. (2000), "Australian industry beta risk, the choice of market index and business cycles", *Applied Financial Economics*, **10**, pp49-58.

100. PricewaterhouseCoopers (2002-2003), *Independent Analysis and Benchmarking of the Proposed Composite Rate Model as the Basis of School Bus Contractors*, report to the Department for Planning and Infrastructure (DPI), January 2002, and further comments to the DPI in February and March 2003, "School Bus Pricing – Submission by Industry".