



Response to 2010 Review Draft Report:

Location – Interstate location

Department of Treasury and Finance

September 2009

Tasmanian Position

Interstate wages

- We have argued consistently throughout the 2010 Review against the assessment of interstate wage differentials. Those arguments are not replicated here. We refer the Commission to earlier submissions.
- If an interstate wages disability is to be assessed, we support the SET model as the preferred model relative to other alternatives judged viable.
- The proposed 15 per cent general discount is too low, given modelling uncertainty and distributional sensitivity in addition to on-going SET data uncertainty.
- A 25 per cent general discount can be readily justified by reference to the specific modelling approach.
- We consider the proposed Tasmanian-specific discount is justified by reference to Tasmania's specific circumstances. There is case to consider that the discount should be 50 per cent, rather than the 30 per cent discount proposed by the Commission.
- The attached consultancy report provides a conceptual rationale, supported by empirical data, as to why an unadjusted Tasmanian location factor is expected to overstate Tasmania's relative wage cost advantage.
- This report provides independent support for the Commission judgment that there are likely to be bounds within which public sector wages lie.
- We accept the use of LPI to update the SET factors but request that the potential materiality of future differentials due to the differing compositions of the two data sets be monitored and adjusted for if found material.

Interstate non-wages

- We support the Commission's judgment that equalisation is better served by the inclusion of interstate freight and travel disabilities.
- We consider the Commission's proposed discounts within the interstate freight calculation appropriate, in response to the measurement issues.
- While Tasmania cannot provide independent evidence to corroborate the interstate freight relativities produced by the Commission's placeholder model, we consider that it combines reasonable assumptions and independent freight cost data with informed Commission judgment.
- Tasmania is currently seeking to collect data on interstate travel costs from a number of Tasmania departments to assist with estimation of an interstate travel factor.

Interstate wage costs

1. The draft assessment report SET-based assessment includes a general discount for all states (15 per cent because of SET data uncertainty) and state-specific adjustments to the private sector wage relativities for Tasmania (30 per cent discount of raw outcome) and the ACT (average of the ACT and New South Wales raw outcomes).

Support for a general discount

2. Tasmania anticipates that some states may seek to argue that the general discount should not be continued for the 2010 Review.
3. On the contrary, Tasmania considers there is a strong case that the proposed 15 per cent general discount is too low, taking into account not just on-going data uncertainty, but modelling uncertainty and distributional sensitivity.
4. In the context of the 2004 Review method, the ABS deemed the SET data “fit for purpose”¹ but noted:

“There are some issues associated with the CGC’s use of SET. These largely relate to the use of sample data, especially for the smaller states and the territories. The CGC acknowledges this issue by making adjustments which discount modelling results to account for the use of sample data.”

5. There is little difference between the proposed 2010 Review model and the 2009 Update model, in which the Commission considered that data uncertainty warranted a general discount of 15 per cent.
6. However, the ‘bar’ is significantly higher for the 2010 Review with regard to data reliability. A case for a larger discount could therefore be argued on a stronger basis.
7. In this context, Tasmania considers the proposed 15 per cent general discount due to data uncertainty establishes a minimum base line for discounting within the 2010 Review context.
8. Econometric modelling provides approximation at best. Typically, econometric output is used to support academic research. However, the Commission is using the SET econometric output as the basis to distribute hundreds of millions of dollars.
9. The SET model is econometrically complex. Econometric modelling uncertainty increases with econometric complexity.
10. The Commission has previously acknowledged that even small shifts in location relativities have material re-distributional consequences. Tasmanian sensitivity analysis of the SET econometric model confirms that the location effect estimates are sensitive to minor changes in specification.

¹ ABS Report to the HFE Review

11. Consistent with the assessment guidelines, the effect of econometric modelling uncertainty and distributional sensitivity is to further reinforce the case for discounting over issues of data deficiency.
12. Tasmania has previously argued for a 25 per cent discount. This can be justified as a conservative measure, as it would discount the model by the amount of variation in interstate wages not explained by the model (a result generated by the modelling itself).

Support for the Draft Report's proposed Tasmanian-specific discount

13. The Commission noted in support of the proposed Tasmanian specific discount "we consider Figure 22-1 indicates there are constraints on the variation in public sector wages and that there are likely to be bounds within which public sector wages lie..."² That is, there is a floor to the extent that public sector wages follow private sector wages.
14. This is consistent with Tasmania's own observations. A consultancy conducted for Tasmania by the Centre for Labour and Market Research within Curtin University provides further support for this case (refer paragraphs 22-27 below and Attachment 1).
15. Tasmania has previously argued in relation to Figure 22-1 that the visual "scatter" of the data is consistent with a non-linear (right sloping "j" shaped) relationship. That is, those states with lower private sector wage outcomes (those in the lower left hand quadrant) face relatively "flat" (contained) public sector wage differentials but more variable private sector market outcomes.
16. Tasmania has also argued that this is consistent with anecdotal evidence through Heads of Treasuries and other forums that all states increasingly seek to target/contain their public sector wage outcomes to national public sector average wage growth outcomes.
17. Labour market differentiation between the public and private sector is more pronounced in Tasmania.
18. Logically, private sector wage relativities derived for Tasmania are likely to be less indicative of non-policy influenced Tasmanian public sector wages relativities than is the case for other states. That is, while our state public service employee profiles could reasonably be expected to be relatively consistent with those of other state public services in terms of occupational structures and related education, skills, and productivity, Tasmanian private sector employee profiles are likely to be very different to private sector employee profiles in other states (reflecting lower average educational attainment, and differing industry and occupational distributions etc).
19. The Tasmania-specific interstate wage adjustment is not new.

² Refer paragraph 26 of Attachment 22, page 464 of the Draft Report

20. In rationalising its 2004 Review Tasmania-specific adjustment, the Commission observed that although Tasmania was a state and required the necessary public sector staffing and infrastructure to provide the full range of state services, the depth and breadth of its economic activity suggested that it had economic features that were broadly comparable to the regional areas of other states.
21. The consultant we commissioned undertook a review of the interstate wages model from the conceptual perspective of the underlying theory of compensating differentials after reviewing the Commission's 2004 Review detailed judgment.
22. In summary³, the consultant concluded that the compensating wage differentials between states might vary between persons according to one or more personal characteristics. If this is the case, then estimating a constant location factor from the private sector data and applying this to the public sector means that the compensating differential for public sector wages is over/under stated if the composition of the public sector workforce differs, in some relevant aspect from the private sector workforce.
23. For Tasmania, he noted these two points imply that:
- the (unadjusted) estimated location effect reflects the average compensating differential for a private sector worker with a lower skill level than the other states.
 - Applying this compensating differential to a public sector workforce comparable to that of other states is likely to understate what Tasmania has to pay public sector workers of a quality similar to that in other states.
24. In reaching this position, the consultant had previously reviewed the available empirical evidence and noted in respect of educational attainment that:
- private sector workers in Tasmania have a distinctly lower level of educational attainment than private sector workers in Australia as a whole; and
 - public sector workers in Tasmania and Australia as a whole, have a significantly higher level of education than workers in the private sector.
25. Following from this, the consultant observed that the difference in educational attainment between the public and private sectors is much greater in Tasmania than in Australia as a whole.

³ The full consultant's report is provided as Attachment 1 to this submission

26. The consultant further noted that the composition of these sectoral differences is also significant in the estimation of the location effect. To the extent that the location factor differs between persons, estimating a constant location factor implies that this estimate would be the average for the private sector workforce. In a state with a small proportion of highly educated workers and a small proportion of high income earners, this means that these workers have only a small weight in the estimated average. The estimated location effect would reflect mainly the compensating differential required by less educated private sector workers. While all state governments employ proportionally more graduates than the private sector, what is particular about Tasmania is that the difference in the respective proportions is larger than for any other state.
27. In conclusion the consultant stated that while in principle it would be possible to estimate how the location effect varies with one or more individual characteristics, such estimates are likely to lack precision and give rise to other difficulties. The consultant therefore recommended that the Commission continue to exercise judgment in fixing the location factor for Tasmania.
28. Given the size of the redistribution of this assessment, and that it is particularly sensitive to data and modelling uncertainty, the Commission should ensure that its judgements produce a conservative outcome. In this context, Tasmania considers there is a case that the Tasmania-specific discount should be 50 per cent, rather than the proposed 30 per cent.

Use of the LPI to adjust interstate wage cost factors between SET surveys

29. Tasmania accepts the Commission reasoning for choosing LPI, in preference to AWE or some other updating approach, as sound.
30. At the technical detail level, we previously queried the robustness of the LPI industry structure impact analysis.
31. Our understanding is that the two data series have different compositional bases but that the data required to support the technically appropriate adjustment to convert the LPI structure to a same basis as the SET data does not exist. The adjustments that can be derived are approximations and will be subject to some measurement error.
32. Measurement of the impact of the structural differences using one of these approximations has suggested that these compositional differences do not have a material impact overall (material for one state on a single year basis, but immaterial for all states on a five year average basis).
33. Given the apparent overall immateriality of the impact together with the measurement complexities, the Commission staff, therefore, proposed no adjustment be undertaken for the structural compositional differences within the LPI relative to the SET.

34. We accept the Commission staff position but note this as a residual concern and request that the materiality of this continue to be monitored into the future, albeit on an imperfect approximation basis, as the LPI updating will be undertaken on an on-going, effectively annual, basis.

35. The Commission is also referred to the discussion in paragraphs 57-69 of our response to the CGC *Position Paper 2008-14 Location wages costs*.

Attribution of proportion of wages by expense category

36. The Draft Report indicates (paragraph 44, Attachment 22) that in the roads and transport services expenditure assessments interstate wage weightings, national average labour component weights have been assumed to overcome otherwise apparent understated labour cost weights for these specific categories due to contracting out. Implicit in this treatment is the assumed localised embedded wage costs of these contracted out services.

37. Tasmania notes some caveats with this assumption. Contracting out of roads construction/maintenance by the Tasmanian Government is typically to “big business” contractors (given the high investments in capital equipment involved) either operating in a national market or operating with localised market power because of their market dominance. Even if these contractors are able to hire local labour at localised prices it is far from evident that the Tasmanian Government captures the assumed wage cost advantage that this treatment assumes. Similar arguments could apply within transport services provided by private operators.

38. In this context, in response to the previously mooted “embedded labour non-labour cost” (Staff Discussion Paper 2008/15-S), Tasmania undertook an interrogation of our procurement data base and noted that:

- a significant proportion of state government non-wage expenditure, which may be sourced “locally” in larger states, must be sourced from interstate (at a higher than “national” cost) because the particular service/expertise cannot operate sustainably at the local level (for example, servicing of medical equipment, contracting of legal, accounting or other business specialists);
- even if the employees are being paid local wages, the local provider may be part of a national chain/franchise using a national charging regime and charging the state governments a national price (for example, Bunnings, Officeworks etc);
- where there is a predominantly local provider employing local labour, market contestability issues may result in the local provider, rather the state government, capturing any cost advantage/absorbing any cost disadvantage (the retail electricity market is a case in point);
- in at least some industries/occupations, employees have the market power to be able to demand (and receive) national wage rates due to

specific characteristics related to factors such as scarcity, isolation or specialisation (for example, medical staff)

39. In sum, the measurement of non-wage employee costs is unavoidably contaminated by the overlaying interaction of small state isolation costs, which impact different states either negatively or positively.
40. As a result, not only is there a lack of certainty about what part of any non-wages embedded labour cost advantage would be captured by state governments, there is also likely to be significant asymmetry in the accuracy of its measurement across states.

Interstate non-wage costs

41. The Draft Report notes that the Commission “is convinced a better equalisation outcome would be served by making an assessment [of freight and travel costs] than not”. However, finding robust administrative data to support their measurement has proven problematic.
42. Accordingly, the draft assessment includes a judgment-based “placeholder” assessment derived according to the following assumptions:
- half of state freight expenses (that is, \$400 million of the \$800 million in the ABS input-output tables) are affected by these interstate non-wage disabilities;
 - the allocation of that expense among states broadly reflects the state populations, the proportion of goods manufactured in the state or entering the country through the state and the distance of the state capital from Sydney, Melbourne and Brisbane;
 - the disabilities for interstate travel would be the same as those for interstate freight.
43. The disabilities (discounted by 15 per cent because of data uncertainty) were then derived by comparing states population shares with their assumed shares of freight and travel costs.
44. The Commission considers these disabilities to be conservative, reflecting the data quality.
45. Tasmania has no alternative approach to propose to the measurement of freight needs.
46. In defence of the placeholder freight assessment, we consider that the model combines reasonable assumptions and independent freight cost data with informed Commission judgment.
47. Tasmania agrees with the Commission judgments as to the 50 per cent data discount and 15 per cent disability discount as being appropriately conservative.

ATTACHMENT 1 Consultant's report:

STATE GOVERNMENT WAGE COSTS IN AUSTRALIA AND TASMANIA

A REVIEW OF THE USE OF ESTIMATED LOCATION FACTORS TO ASSESS DIFFERENCES IN WAGE COSTS ACROSS STATES

**A report to the Department of Treasury and Finance
Government of Tasmania**

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1. Introduction

The Commonwealth Grants Commission (CGC) advises the Australian Government on the relativities for use in the distribution of Goods and Services Tax (GST) revenue to the states and territories. The CGC's recommendations are based on an assessment of revenue and expenditure needs of each state and territory. On the expenditure side, the most important need is the need to pay wages compatible with the wage levels in the relevant state or territory.

To assess this need, the CGC estimates the effect of location on individual earnings in the private sector controlling for a wide range of individual characteristics. This location effect is taken as a measure of the amount by which private sector wage cost in one state is higher or lower than the national average and is then used as an indicator of the relative wage costs a State Government faces.

This report provides a conceptual assessment of whether private sector wages in Tasmania is a reliable indicator of the wage costs facing the Tasmanian State.

The method used by the CGC to assess the wages input cost factors has been the subject of continuous review and debate. To maintain some order to this debate, the CGC has classified the issues arising into a small number of groups. Using this grouping, the issues taken up in this report can be classified as falling under the “composition effect” heading; the part of the argument is that the composition of the private and public sector workforces are different. However, and in contrast to most of the points made in the past, this report argues that it is not the composition *per se* that matters. Instead the crucial issue is whether or not the compensating differentials across states differ between persons.

The point of departure is the estimation of state location effects set out in the following section. We then consider the reasons for applying a location effect estimated from the private sector wage data to the public sector. This discussion highlights the crucial role played by the assumption that a location effect is the same for all persons. Having identified the issue, the report then provides a preliminary analysis of the reasons for and consequences of a location factor that varies between persons.

To develop the arguments in more detail, we summarise the main theoretical results on compensating differentials, draw on this theory to develop a relevant example, and provide an overview of relevant empirical results. This analysis suggests that there are strong reasons to believe that the location effect varies with the skill level of persons. We highlight the large differences in the skill level between private and public sector for Tasmania in particular and draw out the implications.

The final section of the report summarises the arguments and concludes with the recommendation that the CGC should continue to exercise judgement in fixing the location factor for Tasmania.

2. State location effects

The core of the CGC's approach to wage costs is the estimation of state specific location effects from data on individual earnings. The model used has the following form:

$$y_{ij} = X_i \beta + \alpha_j + e_{ij} \quad (1)$$

According to this model, the earnings of individual i in state j are determined by three sets of effects: (1) the individual characteristics of an individual, X_{ij} ; (2) a state specific or location effect α_j ; and (3) a set of unobservable variables subsumed in the term e_{ij} .

This model is then estimated from a sample of persons drawn from the Australia wide private sector workforce.

The vector X includes the set of variables that reflects the productive characteristics of persons. Hence, the parameter β represents the effect on earnings of each of these characteristics. The elements of β can also be viewed as the implicit prices of these characteristics. Since β is the same for individuals in all states, the specification implies that there is a national labour market in which the law of one price applies. Given these assumptions, the variation in individual earnings between states is then captured by the state specific location effect α_j .

Given the estimates of β and α , the predicted earnings of an individual i in state j are given by:

$$y_{ij} = X_i \beta + \alpha_j \quad (2)$$

and in state k by:

$$y_{ik} = X_i \beta + \alpha_k \quad (3)$$

Thus the model implies that a person moving from state j to state k would experience a change in earnings of $-\alpha_j + \alpha_k$. By assumption, this effect is the same for all persons. This effect is normally interpreted to represent a compensating differential; meaning that a person would be indifferent between earning y_{ij} in state j and y_{ik} in state k . This interpretation requires interregional labour markets to be in equilibrium. While this is a strong assumption that is unlikely to be satisfied in practice, the resulting errors in the estimates of the compensating differentials are likely to be relatively minor.

2.1 Private and public sector location effects

Public sector wages are, at least partially, within the control of the States. As such, any estimate of State effects from public sector wage data would reflect both a geographical location effect and the wage policies of the states. This is the case when the location effects estimated from private sector are deemed to apply to the public sector as well.

The arguments for this have been stated in many different ways. At a general level, the rationale has been that private sector wages provide a policy neutral benchmark for the wages that State Governments have to pay. More recently, the CGC has relied on a more specific argument - that location effects estimated from public sector data are approximately the same as those estimated from private sector data. However, if we accept the proposition that public sector wages are partly within the control of State Governments, compensating differential (a pure location effect) cannot be identified from data on public sector wages. Noting that the estimated state effects are almost the same, or that there are many similarities between the estimated location effects in the two sectors may be an interesting observation. It does not validate the hypothesis that the location effect for public sector workers is the same as the location effect for private sector workers. It may be that a differential location effect is neutralised by a state policy effect of the opposite sign. In passing, one may also note that in this analysis, public sector state effects are estimated from public sector data only. That is, the effects of the productive characteristics in the public sector are allowed to be different from their effects in the private sector. This implies the public sector is a different market in that the implicit prices - the effects of the productive characteristics on earnings - differ from the implicit prices in the private sector.

A more compelling argument is the assumption on which the estimation of the location effect is based: the effect is a constant and hence the same for all individuals in the private sector. If this assumption is valid, it seems plausible that the same effect should apply to public sector workers as well. The location effects reflect the compensating differential that has to be paid to workers in different states to compensate them for the differences in the cost of living and location specific consumption amenities. If, for example, the difference in the location effects between Victoria and Tasmania is 5 per cent, then a Victorian private sector worker would be indifferent between staying in Victoria at their current wage and moving to Tasmania to take up a job that pays 5 per cent less. The 5 per cent lower pay is exactly compensated for by some combination of the lower cost of living in Tasmania and the differences in location consumption amenities in the two states. Since all private sector workers require the same compensating differential, it stands to reason that the same differential applies to public sector workers. We note that this is an argument by default; absent any reason why private sector workers are different from public sector workers. It is difficult to think of a reason why their compensating differentials should be different.

2.2 *Individual specific location effects*

The above discussion points to the important role played by the compensating differential being the same for all persons. On priori grounds, there is much to be said for the more general specification allowing the location effect to vary between individuals:

$$y_{ij} = X_{ij} \beta + \alpha_{ij} + e_{ij} \quad (4)$$

This is not a particularly novel extension. If we assume that individual location effects are a linear function of just one of the X variables, x_k say, then:

$$\alpha_{ij} = \alpha^*_j + \gamma_j x_{ki} + e_{ij} \quad (5)$$

The result is a standard linear model with an interaction term between state location and the variable x_k . One possibility is that the compensating differential varies with the level of education, but this is just one of many plausible assumptions.

With one exception, the extensive empirical analysis carried out by the CGC has so far not considered the possibility that the compensating differentials may be different for different workers. In the analysis of the “dominant occupation effect”, the CGC estimates a model for public sector wages allowing for the location effect to differ between dominant and non-dominant occupations. These point estimates reveal that the location effects are substantially different between the two occupational groups. However, none of the estimated location effects were significantly different from zero in the data set that was first used to examine this issue.⁴ Similar results using more recent data have also been obtained⁵.

A preliminary rationale for individual specific location effects

In its 2004 assessment, the CGC noted a number of differences between Tasmania and other states and adjusted the estimated location effect on the basis of judgement. In particular, they pointed out that the estimate of the location effect for Tasmania, using private sector wages, did not appear to reflect an isolation effect. It further stated that “a major difference between the public and private sector in terms of the effect of isolation of wages could therefore affect the assessment”.

Regarding the first point, it is not clear if the CGC thought that the (negative) location effect was too large in absolute terms, implying that Tasmanian private sector workers were not sufficiently compensated for their isolation. But this is a moot point since it has no direct bearing on the CGC's deliberations. In regard to the second point, the meaning is more clear-cut: it is suggested that the location effect for the public sector could well be different from the location effect that has been estimated for private sector workers. It is, in other words, the recognition that a location effect is not necessarily a constant.

To set this in the appropriate context, we first note that even if the location effect differs between persons, estimating a constant effect for each State may be of little consequence. Alternatively, and easier to explain, there may be little point in allowing for the location effect to vary.

With reference to (5) above, and given estimates of α^* and γ from private sector data, we compute the average location effect for private and public sector workers from:

$$\begin{array}{ll} \alpha^*_j + \gamma_j (1/n) \sum x_{ij}^P & \text{for the private sector, and} \\ \alpha^*_j + \gamma_j (1/n) \sum x_{ij}^G & \text{for the public sector.} \end{array}$$

⁴ Wages Input Costs, CGC Discussion Paper 2003/04, p. 89.

⁵ Figures depicting the location effects are given in R 2004 Volume 7 Figures 10 and 11, but we have not been able to locate the source for these Figures.

Thus, if the private and public sector workers have the same characteristics on average, nothing is gained by allowing for the location effect to vary between persons.

If, as may be the case for Tasmania, the public sector workforce has, on average, different observable characteristics from the private sector workforce, the situation is different. In this case, the last terms in the two expressions will in general be different, implying that the average public sector worker requires a different compensating differential than the average private sector worker.

In principle, whether the location effect differs between individuals is a testable hypothesis. If we want to test the hypothesis that the location effect for one state (Tasmania, say) differs according to the values of one of the X variables (the level of education), only one additional parameter has to be estimated. However, from the analysis of the dominant occupation effect, we already know that the estimates of the location effect parameters α^* and γ will be imprecise. This precision will be even less for a small state for which the sample size is only a few hundred persons. More generally, what applies to one state might apply to all states. This means that there is not just one additional parameter but seven. Furthermore, the location parameters might not vary with just one of the X variables, but with most or all of them. Taking this possibility into account, it multiplies the already large number of parameters to be estimated (about 50) by a factor of seven. Needless to say, a more general analysis of whether and how location effects vary with individual characteristics would be a pointless exercise.

In practice, it is then uncertain that a small sample could yield precise evidence about how the location effect varies with even one individual characteristic in one state. This means that an argument why the location effect might vary between private and public sector in Tasmania can only be based on more indirect evidence.

3. Location effects and compensating differentials

Before continuing, it is useful to spell out the logic of the reasoning which has been used so far. The point of departure is the possibility that public sector wages reflect a policy influence. This means that a location effect for the public sector cannot be estimated from public sector wage data. Hence, a location effect can only be estimated from private sector wage data. If this location effect is a constant, then the location effect in the public sector is necessarily the same as in the private sector. For the location effect to be observably different in the public sector, two conditions must be satisfied:

- (i) the location effect varies with one or more observable characteristics; and
- (ii) public and private sector workers differ, on average, with respect to these characteristics.

This logic might be used to rationalise one of the arguments used by the CGC in its 2004 judgment. Many, or perhaps most, people in Tasmania might not think of Tasmania as being isolated and hence, they do not require an isolation premium to live and work there. Indeed, the opposite may be the case, which would then partly account for the relatively low private sector wages. However, public sector workers

might see things differently, not because they work in the public service, but because they differ from private sector workers in significant respects - notably their higher level of education. As such, some, and particularly those in public service jobs, might require a significant isolation premium. This is one particular reason why the location effect might be different for public sector workers.

To develop the argument that the location factors might differ between persons in more general terms, in what follows we: (i) summarise the main theoretical results on compensating differentials; (ii) draw on this theory to develop a relevant example; and (iii) consider the relevant empirical results

3.1 The theory of compensating differentials

The theory of compensating differentials, first set out by Adam Smith, is on the face of it both simple and intuitively plausible.

"The whole of the advantages and disadvantages of the different employment of labour and stocks must, in the same neighbourhood, be either perfectly equal or continually tending to equality." (Smith 1776, Book 1 Chapter X).

Pecuniary wages and profit are, however, everywhere different and this difference "arises partly from certain circumstances in the employment themselves, which either really, or at least in the imaginations of men, make up for some small pecuniary gain in some, and counterbalance a great one in others"(ibid.).

In other words, a pecuniary advantage (disadvantage) is compensated for by a lower (higher) wage, and hence, in the modern terminology, the theory of compensating differentials.

When applying this theory to regional wage differences, it is usual to invoke the notion of regional amenities (or dis-amenities) as representing the non-pecuniary aspects of a job. But the regional dimension introduces complicating factors which were not considered by Adam Smith. The first factor is that, if workers in a region need to be compensated by a higher wage due to a regional dis-amenity, firms in that region must have some productivity advantage to pay the higher wage. The second factor is that the labour market cannot be analysed in isolation of other regional specific markets of which the market for land is clearly the most important. There is, in other words, a further market, the market for land, which must clear simultaneously with the labour market, raising the question of how a compensating differential is apportioned between wages and the price of land (rent). This is further complicated by rent which is an important component of the cost of living. As pointed out by Rosen (1979), there is an important interaction between equalising differences in wage rates and in the cost of living, any equalising differences in wages must feed back into the cost of living because the wage is an important factor in the cost of production.

To resolve these issues, Roback (1982) introduced a distinction between production and consumption amenities. In line with Rosen's reasoning, she showed that amenities

are reflected in both wages and rent. The precise decomposition depends on how the amenity affects production and the strength of the workers' preference for the amenity as consumption good. This implies a quite complex relationship between regional amenities and wages. Roback's model suggests that where an amenity/dis-amenity has no effect on production, the compensating differential should materialise in the form of a land rent differential. A dis-amenity which has a positive productivity effect should result in a positive compensating wage differential. Conversely, an amenity which hinders production attracts a negative compensating differential. For regional characteristics which are considered a positive amenity by workers and producers alike, the distribution of compensating differentials among rents and wages is ambiguous.

Taking this reasoning a further step, Roback (1988) dropped the assumption that all workers are identical. In particular, allowing for two types of workers (skilled and unskilled, say) who are complementary, she showed that the preference of one type of workers now has an effect on the wages of the other type of workers. This effect arises because the preferences of one type of workers have an effect on the cost of production which in turn constrains the wages that can be paid to the other type of workers. The presence of this linkage means that the predictions of how a location amenity and wages and rent are further diluted.

3.2 *Compensating differentials: An example*

To make the argument more concrete, we consider a particular configuration that is consistent with the Tasmanian situation. Suppose that Tasmania lacks a productive amenity that the other states possess. For the sake of the argument, we take this to be a large city. Strictly speaking, a large city is not an amenity. Rather there are some underlying geographical or other features which have resulted in Hobart being different from most of the other Australian capital cities.

If there are no consumption benefits from a large city, the absence of this amenity would then result in lower wages and lower rents in Tasmania. To be more particular, the lower rents would exactly compensate for the lower wages so that the real, rent adjusted, wage would be the same as in other states.

If a large city is now also a consumption amenity, the lack of this amenity in Tasmania has to be compensated for. According to the Roback's model, this compensation would be reflected in lower rents, but the effect on wages is ambiguous: wages may be higher or lower than in other states. The precise outcome depends on whether the lower rent compensates for the higher cost of production. If we take it that the share of land is small compared to other factors of production, this ambiguity then vanishes. As above, we would expect wages as well to be lower than in other states.

Finally, we now allow for the production process that uses two types of complementary workers. Drawing on the above, we maintain the assumption that the absence of the amenity increases costs. Hence wages are necessarily lower, and in what follows we only consider how this prediction is modified.

One possibility is that the high skilled workers value the amenity, but the unskilled ones do not. The consequence of this assumption is that only the skilled now have to be compensated for the absence of the amenity. This compensation results in higher wages for the skilled than otherwise would be the case. Now these higher wages increase the cost of production which drives down the wages for the low skilled. This implies that the rent has to fall to maintain the real income of the unskilled. This of course benefits the skilled workers so their compensation is not reflected in the wage alone. In conclusion, given the assumptions about the nature of the amenity, the absence of the amenity would result in lower rent, lower wages for the unskilled and higher wages for the skilled in comparison to the previous case. In the previous case, because both wages and rent were lower, the net effect is a lower rent and lower unskilled wages while the effect on the wage of skilled workers is ambiguous. For the purpose at hand, it is not the sign that matters but the difference in the wage effect for the two groups. On that issue, the implication is clear cut. If the above was a correct characterisation of the Tasmanian situation, we would expect a negative location effect for unskilled workers while the location effect for skilled workers would be less negative.

3.3 *Differences in compensating differentials*

The argument above was that it is possible different persons place different values on location amenities. Hence the required compensating differentials might be different. Whether they are is ultimately an empirical matter. Nevertheless, there is a very common argument for why difference might exist. If an amenity is a normal good, then the demand for the amenity is increasing with income, and hence, workers' willingness to pay for that amenity. Based on this reasoning, the expectation is that the value of such an amenity is higher for persons in higher level occupations and/or with a higher level of education.

Empirical evidence about the differences in compensating differentials is limited. One study with some relevance is Menke (1987), who found statistically significant differences in the effect of amenities between white and black persons. This finding is broadly consistent with the hypothesis set out above in that the higher earners appear to place a higher value on positive location amenities. Further and more direct evidence is provided by Roback (1988). By separating her sample into groups defined by their level of education, she found that the regional effects on earnings differed according to the level of education. More particularly, the region effects on earnings were not statistically significant from zero for the group with the highest level of education. This finding is consistent with this group placing a low value on the regional amenities. However, the results do not imply this. According to her theoretical model, how wages of one group vary between regions depends not just on the value that this group places on the regional amenities, but also on the valuations of the other group. This is because the valuations of the other group have an effect on their wage and hence affect the cost of production which in turn determines how the amenity effect is apportioned between wages and rents. In short, a regional wage effect of one group cannot be interpreted as reflecting the willingness to pay for the amenity by that group.

Another reason for why the compensating differential differs according to skill level derives from the urban density effects. That wages are much higher in large cities is most striking and enduring feature of spatial wage differences. In line with the arguments previously advanced, these higher wages can only be traced to workers in cities being more productive, the density of population in large cities must somehow increase productivity.

Several reasons for this higher productivity have been put forward in the literature. Of most relevance is the possibility that urban density enhances the accumulation of human capital. This reason for why wages are higher in large cities was first put forward by Marshall (1890). In large cities, he said, "the mysteries of the trade become no mysteries; but are, as it were, in the air". As further developed by Glaeser (1999), urban density speeds up the rate of interaction between individuals and hence the rate at which knowledge and skills are diffused.

The consequence of this is that, the choice of location affects is not only the current pay, but also the future pay via the effect of the location on the accumulation of human capital. Empirical evidence for this can be found in Glaeser and Mare (2001). The finding with particular relevance is that the high wages in large cities are a result of both a level and growth effect. Moving to a large city makes workers more productive (a level effect). In addition, earnings increase at a faster rate (the growth effect). For the low skilled workers, the latter effect is less important than for the highly skilled workers. This is implied by the differential age-earnings profiles by skill level. For the less skilled, earnings peak at around 30 years of age, meaning that little accumulation of human capital takes place beyond that age. In the case of the highly skilled, earnings, and hence human capital accumulation, continue to increase until much later in life. This means that a compensating location differential for the highly skilled must include a compensation for the effect of location on future earnings. In particular, locating in an area which impairs skill development needs to be accompanied by a positive compensating differential.

To make this argument more concrete, we return to an example used previously. A low-skilled Victorian private sector worker might well be indifferent between staying in Victoria at their current wage and moving to Tasmania to take up a job that pays 5 per cent less because the lower rent compensates for the lower pay. But for the low-skilled workers, there are no career consequences of the move. For the high-skilled, on the other hand, there are. By staying in Victoria, their earnings would increase at a faster rate than in Tasmania. As such, this difference must be taken into account in the comparison. As for the low skilled, the lower rent provides some compensation, but not for the lower future earnings. Thus, for high skilled worker to be indifferent between Victoria and Tasmania, their Tasmanian wage must be relatively higher than for a low-skilled worker.

4. Characteristics of private and public sector workers

As pointed out above, a compensating differential that varies with individual characteristics is not a sufficient reason for this differential to differ between private and public sector workers. It must also be the case that public and private sector workers differ, on average, with respect to these characteristics.

The most striking difference is the much higher level of education among public sector workers. This difference in the level of education is most pronounced in Tasmania. Tasmania has by far the lowest proportion of graduates in the private sector workforce. In contrast, the graduate proportion in the State public sector is on par with that in the other states (Table 3 Queensland Treasury: Additional Response to CGC Staff Discussion Paper 2006/23: Assessing Location Disabilities). Another feature particular to Tasmania is the low proportion of high income earners in the private sector

To document the relevant characteristics in more detail the Appendix to this report tabulates data on income and educational attainment using the 2006 Census.

Table A1 compares the distribution of income across income ranges for workers in the private sector in Tasmania and Australia. The table shows that in the higher level occupations the proportion of Tasmanian private sector workers in the upper end of the distribution is much smaller than for all Australia workers. In the case of the lower level occupations, however, the Tasmanian distribution is very similar to the distribution in Australia as a whole.

For Managers and Administrators the difference is most striking. Only 8.6 per cent of Tasmanian managers earn more than \$2000 per week compared to 20.1 per cent for all Australian managers. In the case of Professionals the difference is not quite as large but still substantial (8.3 per cent compared to 13.4 per cent). At the other end of the scale, 5.5 per cent of Tasmanian labourers earn more than \$1000 per week compared to 8.1 per cent of all Australian labourers.

In respect of educational attainment the data reveals that (Table A2):

1. Private sector workers in Tasmania have a distinctly lower level of educational attainment than private sector workers in Australia as a whole.
2. Public sector workers in Tasmania, and Australia as a whole, have a significantly higher level of education than workers in the private sector
3. Following from the above, the difference in educational attainment between the private and public sector is much greater in Tasmania than in Australia as a whole.

Examining the details in Table A2 it is evident that most of the differences referred to above relate to workers in the higher level occupational groups; managers and administrators, professionals and associate professionals. Thus it is Tasmanian private sector managers in particular who are less qualified than their Australian counterparts. Likewise, Tasmanian private sector managers are much less qualified than their counterparts in the Tasmanian public sector. The same pattern applies to professionals and associate professionals but the magnitudes of the differences are smaller.

Submissions by states have in the past pointed out that the education and occupation profile of private and public sector differ, but why that should matter has not been clearly articulated. For example, submissions from Queensland have regularly drawn attention to differences between the private and public sector labour markets generally and the particular differences in Queensland. However, many comments previously

made by the states are clouded by the failure of distinguishing between differences in wages on the one hand, and compensating differentials on the other. For that reason, it is difficult to relate the points we made in this report to other similar comments made in the past.

Above we have provided a substantial reason for why the profile of the private and public sector differs. To the extent that the location factor differs between persons, estimating a constant location factor implies that this estimate would be an average for the private sector workforce. With a small proportion of highly educated private sector workers, and a small proportion of high income earners, it means that these workers have a small weight in the estimated average. In other words, the estimated location effect would reflect mainly the compensating differential required by the less educated private sector workers. Of course, all state governments employ proportionally more graduates than the private sector. What is particular about Tasmania is that the difference in the respective proportions is larger than for any other state. Hence, the impact of the compositional difference is largest for Tasmania.

5. Summary

The argument of this report is that the compensating wage differentials between states might vary between persons according to one or more personal characteristic.

If this is the case, the method used by the CGC - to estimate a constant location factor from private sector wage data and apply this constant factor to the public sector - means that the compensating differential for public sector wages is over/under stated if the composition of the public sector workforce differs, in some relevant aspect, from the private sector workforce.

Regarding the first point, we have cited theoretical considerations and empirical evidence drawn from the literature. This material provides considerable support for the idea that the compensating differential differs according to skill level.

In respect of the second point, we have pointed to the most obvious facts which show that the composition of the public sector workforce has a much higher level of skill than the private sector workforce.

For Tasmania, these two points imply that:

- The estimated location effect for Tasmania reflects the average compensating wage differential for a private sector workforce with a lower skill level than the other states.
- Applying this compensating differential to a public sector workforce comparable to that of the other states is likely to understate what Tasmania has to pay public sector workers of a quality similar to that in other states.

While the method used to arrive at these implications has not previously been used in the CGC's deliberations, the arguments we advance are not new.

In its 2004 judgement, the CGC noted:

1. The pattern of economic activity was not comparable with that of the other states.
2. Private sector wages in Hobart were similar to elsewhere in Tasmania.
3. Referred to a number of similar points made in an academic study:
 - a. Very few of the newly created ‘gold collar’ professionals earning very high incomes in the business and technology sectors are located in Tasmania.
 - b. Centralisation of head office functions in the major capitals has depleted ranks of managers and professionals which developed in Tasmania’s larger towns and cities in the post-war era.
 - c. In 2001, Tasmania continued to have a heavier reliance on the primary production and community services sector than the national average.
 - d. The State also has a lower than average reliance on the business and finance sector.
 - e. The occupational structure of the Tasmanian workforce tends to be skewed towards the less skilled end of the labour market.
 - f. The structure of the Tasmanian workforce reflects the state’s low educational status and low post-school qualification rate.
4. Thought that Tasmania had economic features broadly comparable to regional areas in other states.
5. Noted that the observed private sector wages did not seem to reflect an “isolation” effect.
6. Noted the low interstate migration into Tasmania of working age persons.
7. Noted the high interstate migration out of Tasmania of police, education and health professional.
8. Compared interstate migration in and out of Tasmania with that of other states.

Based on this examination, the CGC concluded that it should adjust the estimated location effect for Tasmania on the basis of judgement.

The arguments developed in this report provide an analytical basis for this judgement:

- Points 1-5: all refer to the regional character of the Tasmanian economy (including Hobart) and the associated comparatively low skill level in the private sector as reflected in occupation, level, industry or education. Our argument is that the low skill level in the private sector makes the private sector compensating differential inappropriate to the public sector.
- Points 6, 7 and 8 lead to an unbalanced flow of workers to and from Tasmania which is consistent with Tasmanian wages being low. Because this report does not explore the connection between estimated location effects and mobility, it provides no argument for why Points 6 and 8 justify the adjustment of the location effect. In respect of the outflow of police, education and health professionals, however, the suggestion is that Tasmanian public sector wages are too low relative to the other states. Our argument is that a possible reason for this is that the location factor applied to Tasmania makes it difficult for the

Tasmanian Government to pay public sector workers a wage which equalises the advantages and disadvantages of between working and living in Tasmania and other states.

Likewise, the arguments in this report also support a central tenet of Tasmania's submissions to the CGC. Tasmania has always accepted that the wages in the private sector are low relative to other states, but argued that the Tasmanian private sector labour market is not a good proxy for the public sector labour market because the two sectors have fundamentally different employment profiles. This report provides the justification for this argument. The reason that the private sector is not a good proxy for the public sector is because the compensating differentials in the two sectors are likely to be different. In turn, this difference can be traced to the fundamentally different employment profiles in the private and public sectors.

Finally, we note that, in principle, it would be possible to estimate how the location effect varies with one or more individual characteristics and to use this information in computing location factors. However, such estimates are likely to lack the required precision, and would give rise to a host of complex technical issues. For this reason we recommend that the CGC continue to exercise judgment in fixing the location factor for Tasmania.

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Appendix

Income and the level of education in Tasmania and Australia

This appendix complements the conceptual discussion in the text with data on the level of income and education of workers in Tasmania and Australia as a whole.

Table A1: Distribution of income by occupation in the private sector: Tasmania and Australia – Census 2006

| Occupation | Income range | Distribution across income ranges | |
|------------------------------------|-----------------|-----------------------------------|-----------|
| | | Tasmania | Australia |
| Managers and Administrators | Negative income | 0.009 | 0.012 |
| | Nil income | 0.014 | 0.012 |
| | \$1-\$149 | 0.021 | 0.017 |
| | \$150-\$249 | 0.041 | 0.027 |
| | \$250-\$399 | 0.080 | 0.053 |
| | \$400-\$599 | 0.143 | 0.100 |
| | \$600-\$799 | 0.146 | 0.104 |
| | \$800-\$999 | 0.136 | 0.110 |
| | \$1,000-\$1,299 | 0.148 | 0.143 |
| | \$1,300-\$1,599 | 0.097 | 0.108 |
| | \$1,600-\$1,999 | 0.058 | 0.092 |
| | \$2,000 or more | 0.086 | 0.201 |
| | Not stated | 0.020 | 0.020 |
| | Not applicable | 0.000 | 0.000 |
| | Total | 1.000 | 1.000 |
| Professionals | Negative income | 0.001 | 0.001 |
| | Nil income | 0.004 | 0.004 |
| | \$1-\$149 | 0.022 | 0.018 |
| | \$150-\$249 | 0.036 | 0.026 |
| | \$250-\$399 | 0.066 | 0.049 |
| | \$400-\$599 | 0.122 | 0.098 |
| | \$600-\$799 | 0.154 | 0.122 |
| | \$800-\$999 | 0.157 | 0.140 |
| | \$1,000-\$1,299 | 0.204 | 0.190 |
| | \$1,300-\$1,599 | 0.095 | 0.126 |
| | \$1,600-\$1,999 | 0.047 | 0.079 |
| | \$2,000 or more | 0.083 | 0.134 |
| | Not stated | 0.009 | 0.011 |
| | Not applicable | 0.000 | 0.000 |
| | Total | 1.000 | 1.000 |
| Associate Professionals | Negative income | 0.005 | 0.004 |
| | Nil income | 0.010 | 0.008 |
| | \$1-\$149 | 0.027 | 0.023 |
| | \$150-\$249 | 0.040 | 0.030 |
| | \$250-\$399 | 0.090 | 0.068 |
| | \$400-\$599 | 0.195 | 0.162 |
| | \$600-\$799 | 0.220 | 0.198 |
| | \$800-\$999 | 0.156 | 0.154 |
| | \$1,000-\$1,299 | 0.122 | 0.139 |
| | \$1,300-\$1,599 | 0.056 | 0.075 |
| | \$1,600-\$1,999 | 0.029 | 0.049 |
| | \$2,000 or more | 0.036 | 0.075 |
| | Not stated | 0.013 | 0.015 |
| | Not applicable | 0.000 | 0.000 |
| | Total | 1.000 | 1.000 |

Table A1: (Cont)

| Occupation | Income range | Distribution across income ranges | |
|---|-----------------|-----------------------------------|-----------|
| | | Tasmania | Australia |
| Tradespersons and Related workers | Negative income | 0.002 | 0.002 |
| | Nil income | 0.006 | 0.006 |
| | \$1-\$149 | 0.019 | 0.018 |
| | \$150-\$249 | 0.053 | 0.043 |
| | \$250-\$399 | 0.135 | 0.110 |
| | \$400-\$599 | 0.235 | 0.198 |
| | \$600-\$799 | 0.211 | 0.194 |
| | \$800-\$999 | 0.149 | 0.153 |
| | \$1,000-\$1,299 | 0.108 | 0.134 |
| | \$1,300-\$1,599 | 0.039 | 0.062 |
| | \$1,600-\$1,999 | 0.015 | 0.034 |
| | \$2,000 or more | 0.010 | 0.024 |
| | Not stated | 0.018 | 0.023 |
| | Not applicable | 0.000 | 0.000 |
| | Total | 1.000 | 1.000 |
| Advanced Clerical and Service Workers | Negative income | 0.001 | 0.002 |
| | Nil income | 0.009 | 0.010 |
| | \$1-\$149 | 0.044 | 0.033 |
| | \$150-\$249 | 0.068 | 0.050 |
| | \$250-\$399 | 0.138 | 0.110 |
| | \$400-\$599 | 0.240 | 0.202 |
| | \$600-\$799 | 0.229 | 0.204 |
| | \$800-\$999 | 0.125 | 0.161 |
| | \$1,000-\$1,299 | 0.070 | 0.127 |
| | \$1,300-\$1,599 | 0.028 | 0.044 |
| | \$1,600-\$1,999 | 0.016 | 0.020 |
| | \$2,000 or more | 0.017 | 0.024 |
| | Not stated | 0.013 | 0.015 |
| | Not applicable | 0.000 | 0.000 |
| | Total | 1.000 | 1.000 |
| Intermediate Clerical, Sales and Service Workers | Negative income | 0.002 | 0.001 |
| | Nil income | 0.005 | 0.006 |
| | \$1-\$149 | 0.053 | 0.057 |
| | \$150-\$249 | 0.080 | 0.074 |
| | \$250-\$399 | 0.187 | 0.149 |
| | \$400-\$599 | 0.301 | 0.264 |
| | \$600-\$799 | 0.215 | 0.210 |
| | \$800-\$999 | 0.084 | 0.110 |
| | \$1,000-\$1,299 | 0.042 | 0.066 |
| | \$1,300-\$1,599 | 0.011 | 0.024 |
| | \$1,600-\$1,999 | 0.005 | 0.011 |
| | \$2,000 or more | 0.003 | 0.012 |
| | Not stated | 0.013 | 0.015 |
| | Not applicable | 0.000 | 0.000 |
| | Total | 1.000 | 1.000 |

Table A1: (Cont)

| Occupation | Income range | Distribution across income ranges | |
|---|-----------------|-----------------------------------|-----------|
| | | Tasmania | Australia |
| Intermediate Production and Transport Workers | Negative income | 0.003 | 0.002 |
| | Nil income | 0.004 | 0.006 |
| | \$1-\$149 | 0.034 | 0.037 |
| | \$150-\$249 | 0.051 | 0.040 |
| | \$250-\$399 | 0.101 | 0.081 |
| | \$400-\$599 | 0.251 | 0.225 |
| | \$600-\$799 | 0.228 | 0.226 |
| | \$800-\$999 | 0.131 | 0.143 |
| | \$1,000-\$1,299 | 0.115 | 0.114 |
| | \$1,300-\$1,599 | 0.042 | 0.053 |
| | \$1,600-\$1,999 | 0.011 | 0.031 |
| | \$2,000 or more | 0.010 | 0.020 |
| | Not stated | 0.019 | 0.022 |
| | Not applicable | 0.000 | 0.000 |
| Total | 1.000 | 1.000 | |
| Elementary Clerical, Sales and Service Workers | Negative income | 0.002 | 0.002 |
| | Nil income | 0.007 | 0.009 |
| | \$1-\$149 | 0.185 | 0.209 |
| | \$150-\$249 | 0.145 | 0.134 |
| | \$250-\$399 | 0.224 | 0.192 |
| | \$400-\$599 | 0.246 | 0.230 |
| | \$600-\$799 | 0.109 | 0.116 |
| | \$800-\$999 | 0.039 | 0.048 |
| | \$1,000-\$1,299 | 0.019 | 0.024 |
| | \$1,300-\$1,599 | 0.004 | 0.008 |
| | \$1,600-\$1,999 | 0.002 | 0.004 |
| | \$2,000 or more | 0.002 | 0.005 |
| | Not stated | 0.016 | 0.018 |
| | Not applicable | 0.000 | 0.000 |
| Total | 1.000 | 1.000 | |
| Labourers and Related Workers | Negative income | 0.002 | 0.003 |
| | Nil income | 0.007 | 0.009 |
| | \$1-\$149 | 0.097 | 0.097 |
| | \$150-\$249 | 0.115 | 0.098 |
| | \$250-\$399 | 0.191 | 0.160 |
| | \$400-\$599 | 0.303 | 0.282 |
| | \$600-\$799 | 0.156 | 0.170 |
| | \$800-\$999 | 0.053 | 0.078 |
| | \$1,000-\$1,299 | 0.037 | 0.049 |
| | \$1,300-\$1,599 | 0.011 | 0.019 |
| | \$1,600-\$1,999 | 0.004 | 0.008 |
| | \$2,000 or more | 0.003 | 0.005 |
| | Not stated | 0.021 | 0.022 |
| | Not applicable | 0.000 | 0.000 |
| Total | 1.000 | 1.000 | |

Table A1 source: Australian Bureau of Statistics, Census 2006
Government/Non-Government Employer Indicator (GNGP), Occupation 93 (ASCO2) (OCC93P) and
Individual Income (weekly) (INCP) by State/Territory (STE). [Counting: Persons, Place of Usual Residence](#)

**Table A2. Distribution of highest level of educational attainment by occupation
Private Sector and State and Territory Government employees**

| Occupational groupings (1 digit) | Highest level of educational attainment | | | | Total |
|--|---|------------------------------------|-------------------|----------------|-------|
| | Bachelor degree or higher | Advanced Diploma and Diploma Level | Certificate Level | Not applicable | |
| <u>Private sector: Tasmania</u> | | | | | |
| Managers and Administrators | 0.16 | 0.11 | 0.27 | 0.41 | 1.00 |
| Professionals | 0.59 | 0.14 | 0.09 | 0.13 | 1.00 |
| Associate Professionals | 0.11 | 0.13 | 0.28 | 0.43 | 1.00 |
| Tradespersons and Related Workers | 0.01 | 0.02 | 0.60 | 0.33 | 1.00 |
| Advanced Clerical and Service Workers | 0.08 | 0.08 | 0.18 | 0.60 | 1.00 |
| Intermediate Clerical, Sales and Service Workers | 0.06 | 0.07 | 0.25 | 0.56 | 1.00 |
| Intermediate Production and Transport Workers | 0.01 | 0.02 | 0.20 | 0.70 | 1.00 |
| Elementary Clerical, Sales and Service Workers | 0.03 | 0.03 | 0.14 | 0.75 | 1.00 |
| Labourers and Related Workers | 0.02 | 0.02 | 0.15 | 0.75 | 1.00 |
| <u>State and territory government: Tasmania</u> | | | | | |
| Managers and Administrators | 0.61 | 0.11 | 0.10 | 0.15 | 1.00 |
| Professionals | 0.74 | 0.12 | 0.05 | 0.05 | 1.00 |
| Associate Professionals | 0.21 | 0.19 | 0.22 | 0.32 | 1.00 |
| Tradespersons and Related Workers | 0.04 | 0.06 | 0.62 | 0.24 | 1.00 |
| Advanced Clerical and Service Workers | 0.08 | 0.07 | 0.25 | 0.53 | 1.00 |
| Intermediate Clerical, Sales and Service Workers | 0.07 | 0.08 | 0.29 | 0.51 | 1.00 |
| Intermediate Production and Transport Workers | 0.03 | 0.02 | 0.26 | 0.60 | 1.00 |
| Elementary Clerical, Sales and Service Workers | 0.03 | 0.05 | 0.26 | 0.60 | 1.00 |
| Labourers and Related Workers | 0.01 | 0.01 | 0.15 | 0.75 | 1.00 |

Table A2. (Cont.)

| Occupational groupings (1 digit) | Highest level of educational attainment | | | | Total |
|---|---|------------------------------------|-------------------|----------------|-------|
| | Bachelor degree or higher | Advanced Diploma and Diploma Level | Certificate Level | Not applicable | |
| <u>Private sector: Australia</u> | | | | | |
| Managers and Administrators | 0.28 | 0.11 | 0.20 | 0.36 | 1.00 |
| Professionals | 0.63 | 0.13 | 0.08 | 0.12 | 1.00 |
| Associate Professionals | 0.17 | 0.14 | 0.24 | 0.39 | 1.00 |
| Tradespersons and Related Workers | 0.02 | 0.04 | 0.58 | 0.32 | 1.00 |
| Advanced Clerical and Service Workers | 0.13 | 0.13 | 0.16 | 0.52 | 1.00 |
| Intermediate Clerical, Sales and Service Workers | 0.11 | 0.10 | 0.21 | 0.52 | 1.00 |
| Intermediate Production and Transport Workers | 0.03 | 0.03 | 0.21 | 0.66 | 1.00 |
| Elementary Clerical, Sales and Service Workers | 0.07 | 0.05 | 0.13 | 0.70 | 1.00 |
| Labourers and Related Workers | 0.04 | 0.03 | 0.16 | 0.70 | 1.00 |
| <u>State and territory government: Australia</u> | | | | | |
| Managers and Administrators | 0.67 | 0.12 | 0.08 | 0.10 | 1.00 |
| Professionals | 0.75 | 0.14 | 0.04 | 0.04 | 1.00 |
| Associate Professionals | 0.24 | 0.24 | 0.22 | 0.25 | 1.00 |
| Tradespersons and Related Workers | 0.05 | 0.08 | 0.58 | 0.23 | 1.00 |
| Advanced Clerical and Service Workers | 0.13 | 0.13 | 0.19 | 0.48 | 1.00 |
| Intermediate Clerical, Sales and Service Workers | 0.11 | 0.10 | 0.25 | 0.48 | 1.00 |
| Intermediate Production and Transport Workers | 0.05 | 0.04 | 0.28 | 0.57 | 1.00 |
| Elementary Clerical, Sales and Service Workers | 0.09 | 0.06 | 0.21 | 0.58 | 1.00 |
| Labourers and Related Workers | 0.03 | 0.03 | 0.19 | 0.68 | 1.00 |

Source: Census 2006; Government/Non-Government Employer Indicator (GNGP), Occupation 93 (ASCO2) (OCC93P) and Non-School Qualification: Level of Education (QALLP) by State/Territory (STE)

Total includes level of education not stated or inadequately described