NSW Treasury

2025 GST Methodology Review

Tranche 1 Consultation: Wage costs

13 November 2023

Acknowledgement of Country

We acknowledge that Aboriginal and Torres Strait Islander peoples are the First Peoples and Traditional Custodians of Australia, and the oldest continuing culture in human history.

We pay respect to Elders past and present and commit to respecting the lands we walk on, and the communities we walk with.
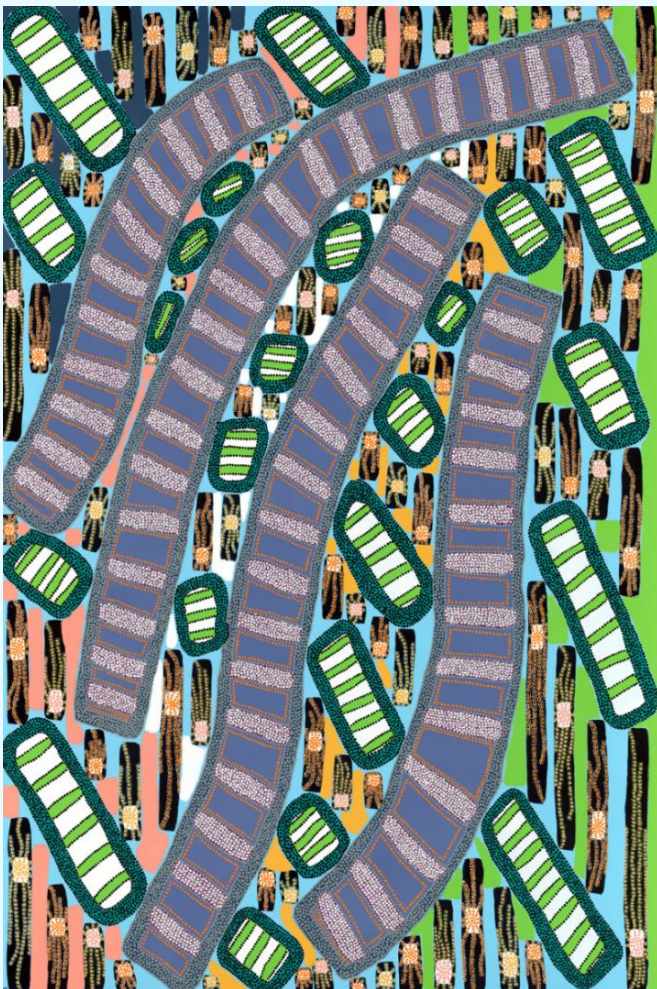
We celebrate the deep and enduring connection of Aboriginal and Torres Strait Islander peoples to Country and acknowledge their continuing custodianship of the land, seas and sky.

We acknowledge the ongoing stewardship of Aboriginal and Torres Strait Islander peoples, and the important contribution they make to our communities and economies.

We reflect on the continuing impact of government policies and practices, and recognise our responsibility to work together with and for Aboriginal and Torres Strait Islander peoples, families and communities, towards improved economic, social and cultural outcomes.

Artwork:
Regeneration by Josie Rose

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List of Acronyms

ABS: Australian Bureau of Statistics

ANZSCO: Australian and New Zealand Standard Classification of Occupations

ANZSIC: Australian and New Zealand Standard Industrial Classification

CGC: Commonwealth Grants Commission

COE: Characteristics of Employment

GST: Goods and Services Tax

Wage costs

The wage costs assessment addresses a cross-cutting driver of interstate difference in cost pressures, rather than the expenses associated with an individual category of service delivery (such as schools or health spending).

Overview of category

- Public sector wage levels vary between states. There are many factors influencing these differences. The Commission's task is to identify differences resulting from factors outside a state's control. It does this by measuring the differences in private sector wages across states and using them as a proxy for the non-policy driven differences across states in public sector wages. The model assumes that geographic effects will have the same impact on public sector wages as on private sector wages.

- The Commission uses a regression to estimate the differences in wages between individuals attributed to a wide range of characteristics. A state dummy variable is included to estimate the wage difference attributed to state level geographic effects. The model uses extensive controls to account for differences in industry, occupation, education, experience, and other non-geographic factors that influence individual wages. The model excludes all public sector employees to eliminate any direct effects of state government policy on wages, however there is still potential for high public sector wages to drive up private sector wages in a state.

- The Commission uses a regression to calculate coefficients. It converts these to provide a wage cost factor for each state. A state's wage cost factor reflects the percentage difference from the national average wage level that is driven by geographic cost pressures.

- In the 2020 Review a 'low' discount of 12.5% was applied to the wage cost factors. This reflected some uncertainty around the reliability of the survey-based coefficient estimates, the precision of the econometric model and the strength of the correlation between private sector and public sector wages.

NSW Treasury position

NSW Treasury:
- supports continued use of the Characteristics of Employment (COE) survey data and using all private sector employees to estimate policy neutral wage pressures experienced by states.

- agrees with using hourly wages as the dependent variable in the regression.

- supports a more parsimonious model specification where omitted variables do not have a jointly material impact on assessed expenses. The Commission's proposed specification suffers from omitted variable bias due to the exclusion of detailed industry variables.

- agrees that reducing year-to-year volatility of estimated annual wage factors is appropriate to minimise sampling error and match the slow-moving nature of regional wage cost relativities. Professor Preston's recommended approach of pooling estimates over 3 years is preferred over the Commission's proposal due to simplicity and practicality.

- disagrees that a 'low' discount of 12.5% to the wages assessment remains appropriate. The low level of econometric uncertainty and use of proxy variables do not provide adequate justification for the use of a discount.

1   Private sector regional wages

> **The Commission asks:**
> - Do states agree on continuing to use private sector wages as a policy neutral proxy for the market pressures faced by public sector employers?
> - Do states agree that the Commission should continue to use all private sector employees to proxy for public sector drivers of costs?
> - Do states support the continued use of the Characteristics of Employment survey data?

- NSW Treasury supports continued use of the COE survey data as it provides a good balance of detail and reliability of individual earnings and jurisdictional pressures in Australia. Moreover, private sector wages are a valid and necessary proxy for policy neutral wage pressures in the public sector.

- While there is likely to be some level of cross-dependency and feedback effects between public and private sector employee earnings, NSW Treasury accepts that private sector earnings are an appropriate proxy for the public sector. Both sectors are believed to share common drivers (e.g. labour market conditions, living costs and the presence of natural resources) and this is a sufficient condition for the validity of using private sector wages as a proxy.[1]

- Within the private sector, industries with a high proportion of public sector employment are likely to respond more strongly to wage-setting policy, which impacts the policy neutrality assumption for these industries. Therefore, use of all private sector employees as a proxy is appropriate to balance policy neutrality and comparability.

- Alternatively, the consultant's report offered female private sector wages as an alternative proxy. However, there is limited evidence that this provides a more reliable measure of public sector wage pressures, particularly when controlling for detailed industry categories in the model specification. We also note the Commission's concerns that restricting the sample to female private sector employees would result in higher standard errors of estimated wage differentials – although this is expected to be at least partially offset by the proposal to pool estimates across multiple years (section 3).

- The clearest indication of labour market cost pressures faced by states is represented by private sector wages in each jurisdiction standardised for differences in employee, industry and occupational characteristics. The COE survey is the only source of data with adequate detail to undertake an appropriate level of standardisation to ensure wage cost factors are consistent.

- Nevertheless, the private sector sample for the ACT remains a concern. Given the scale of Commonwealth employment within the ACT, a purely private sector benchmark may be biased. Resolving this matter would involve combining private and Commonwealth employment when undertaking the regression analysis. We understand that such an approach is not possible given the data available from the ABS.

- Given the frequency, sample size and available detail of individual characteristics in the COE survey, NSW Treasury supports its continued use in the wage costs assessment.

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[1] A. Preston, *Wage Costs Consultant Report*, August 2023, page 12.

2 Model specification

- NSW Treasury supports:
    - Use of hourly wages as the dependent variable in the Mincer equation. This is consistent with the Commission's preliminary views, Professor Preston's recommendation, and empirical literature. Hourly wages can be inferred based on paid hours in the COE survey data.
    - Including usual hours of work in the model as 3 categories, part-time, full-time and more than full-time hours. This is expected to be a simple but effective way to account for different hourly wages received by workers under different contracts and expectations from their employer.
    - Replacing imputed work experience and imputed work experience squared with 5-year age groups. This is expected to sufficiently capture the non-linear effects of work experience on earnings while reducing complexity of the model.

- NSW Treasury agrees that a more parsimonious model should be preferred so long as the model does not suffer from omitted variable bias which materially impacts assessed expenses. The Commission has followed advice from Professor Preston, estimating a base model specification and incrementally adding in control variables. This is a useful approach to comparing alternative model specifications and analysing the progression of coefficients. However, stepwise analysis cannot be relied on entirely, as the Commission acknowledges; the order in which variables are added makes a difference to the final model selection.[2] It also states that the chosen order was based on the relative conceptual strength of each variable.

- The Commission has not sufficiently justified its baseline ordering of variables, nor has it considered the cumulative impacts of omitted variables. Table 1 shows the impact of sequential models on GST distributions. In an ideal scenario, the omitted variables would have a net impact of close to $0 per capita. However, we find that this is not the case, and that the NT would gain $56.80 per person from the omission of variables. The main driver of the omitted variable bias is

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[2] Commonwealth Grants Commission, *Wage costs consultation paper – addendum*, September 2023, paragraph 43

the detailed industry variable. This suggests that this variable is material, a necessary inclusion in the model, and its position in the sequence should be higher.

Table 1: Average impact of coefficients on assessed expenses per capita, 2018-2022

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
State and Sex	-	-	-	-	-	-	-	-
Education	(145.7)	(186.6)	160.3	41.0	143.9	262.4	(249.4)	130.7
Employment	(43.4)	(46.1)	28.4	4.5	(49.2)	(56.7)	71.6	154.9
Age	26.3	5.4	5.4	(35.8)	(6.8)	19.5	49.1	(129.3)
Person Characteristics	39.8	38.7	(88.2)	(28.3)	(39.4)	(82.1)	28.5	208.9
Occupation (broad)	(54.0)	(9.5)	16.9	20.9	31.8	91.4	(78.9)	8.5
Occupation (detailed)	(39.8)	5.4	(3.1)	(67.1)	32.6	104.1	(53.7)	83.8
Industry (broad)	8.5	32.6	1.5	(140.1)	21.2	32.2	44.4	(11.4)
Usual hours	1.4	6.1	(11.5)	(8.2)	9.1	26.2	5.3	(48.3)
Omitted variables total	**12.8**	**5.4**	**14.6**	**(7.5)**	**(7.6)**	**16.1**	**(4.0)**	**(56.8)**
Family by sex	(0.7)	(2.0)	(0.8)	0.7	(3.0)	(5.1)	(2.7)	24.2
Education by age	6.4	10.2	2.3	(8.2)	(2.3)	8.5	2.7	(36.9)
Age by sex	2.8	0.7	4.6	-	-	(1.7)	-	(15.6)
Industry (detailed)	7.8	7.5	4.6	(11.2)	1.5	6.8	10.0	(52.6)
Everything by sex	(3.6)	(10.9)	3.8	11.2	(3.8)	7.6	(13.9)	24.2

Note: Average coefficients applied to average state population 2017-18 to 2021-22.
Source: CGC analysis derived from ABS COE data; NSW Treasury calculation

- Following the logic used with the occupation variables (broad and detailed), the detailed industry variable should be tested following the broad industry variable. This would place it in the 9th position of the sequence, rather than the 13th position currently (Table 2).

Table 2: Proposed ordering of model progression

Position	Commission	NSW Treasury
1 (base)	State and Sex	State and Sex
2	Education	Education
3	Employment	Employment
4	Age	Age
5	Person Characteristics	Person Characteristics
6	Occupation (broad)	Occupation (broad)
7	Occupation (detailed)	Occupation (detailed)
8	Industry (broad)	Industry (broad)
9	<u>Usual hours</u>	Industry (detailed)
10	Family by sex	<u>Usual hours</u>
11	Education by age	Family by sex
12	Age by sex	Education by age
13	Industry (detailed)	Age by sex
14	Everything by sex	Everything by sex

- Table 3 shows the effects of introducing 3-digit industry immediately following 1-digit industry in the model progression. The combined impact of omitted variables on assessed expenditure is lower than those indicated by Table 1, with materiality falling to a maximum of $12.70 per capita (ACT). This shows that omitted variable bias is indeed significantly reduced with the inclusion of detailed industry variables.

Table 3: Revised average impact of coefficients on assessed expenses per capita, 2018-2022

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Industry (broad)	-	-	-	-	-	-	-	-
Industry (detailed)	10.0	9.4	2.8	(14.7)	2.1	6.7	11.4	(56.5)
Usual hours	0.4	4.6	(11.1)	(6.7)	8.5	24.8	3.0	(40.9)
Omitted variables total	**3.6**	**(2.6)**	**11.6**	**5.5**	**(9.1)**	**11.1**	**(12.7)**	**(7.9)**
Family by sex	(0.7)	(1.9)	(0.0)	1.5	(3.6)	(5.0)	(2.4)	23.1
Education by age	5.2	9.2	2.7	(7.9)	(2.0)	9.1	3.5	(38.6)
Age by sex	2.5	1.2	4.6	0.5	(0.1)	(0.5)	0.1	(16.1)
Everything by sex	(3.4)	(11.0)	4.4	11.4	(3.5)	7.5	(13.9)	23.7

Note: Average coefficients applied to average state population 2017-18 to 2021-22.
Source: CGC analysis derived from ABS COE data; NSW Treasury calculation

- Accordingly, NSW Treasury supports removal of the interaction terms with gender and every other independent variable – but does *not* support replacing industry group categories with industry division categories.

- Finally, The Commission proposes that each sequential addition to the model should satisfy 4 criteria:

    1. there should be a strong conceptual case for it to affect an individual's wages

    2. it should affect average state coefficients over the 5 years for which consistent data exist

    3. it should improve the overall fit of the model

    4. it should not increase the average standard error of state coefficients over the 5 years for which consistent data exist.

- We support criteria items 1 and 2 as these have direct implications for the assessed coefficients and resulting wage factors. We do *not* support items 3 and 4 because model fit and the standard errors of state coefficients are of secondary importance, and the proposed changes in section 3 largely address the concerns relating to these. The criteria should be more focused on minimising bias in state coefficients, such as those highlighted in Table 1 and Table 3.

- Should the inclusion of 3-digit industry detail in Table 3 still present major concerns for the Commission relating to standard errors and model fit, it may consider the inclusion of 2-digit occupation and industry detail. Table 4 shows the number of possible variable categories at each level of detail available in the COE.

Table 4: Number of possible categories by job classification detail

Level of detail	Occupation[1]	Industry[2]
1-digit	8	19
2-digit	51	105
3-digit	148	292
4-digit	455	

Notes: includes 'nfd' categories in the COE survey.
[1] ANZSCO 2013, Version 1.3
[2] ANZSIC 2006 (Revision 2.0)

3   Improving accuracy and reducing volatility

> **The Commission asks:**
> - Do states agree with the proposed approach to combine estimates of relative differences in states' wages across years?

- NSW Treasury supports efforts at reducing year-to-year volatility of relative wage cost estimates. Professor Preston's recommended approach is preferred over the CGC proposal due to differences in complexity, and the latter's sensitivity to the inclusion of future data.

- The Commission's proposal can be characterised as pooling estimates via a weighted average of all annual estimates from 2017 onwards, with weightings determined by two factors:
    1. The standard errors of annual estimates for each state. This reflects relative uncertainty levels in different survey years.
    2. Number of years between the annual estimate and the year of interest. This is for the purpose of maintaining contemporaneity.

- While this approach achieves the aim of reducing year-to-year volatility of estimates, there are some practicality concerns. Firstly, individual coefficients do not necessarily receive a cumulative weight of 100%. This has the attractive feature of overweighting estimates with higher certainty levels and underweighting estimates with lower certainty levels. It reduces sampling error; however, it adds an additional layer of complexity and asymmetry. Moreover, we do not expect extraordinary circumstances (e.g. pandemic) to materially impact survey sampling error from year to year, so the benefits of heterogenous weighting are limited.

- Secondly, the weighted estimates are sensitive to the inclusion of future data. For example, the wage factors for 2017-18 include small weights from the 2022 survey estimates. This would be subject to further revisions as the full sample perpetually grows. This raises uncertainty as to how the Commission intends to handle revisions to historical wage factors.

- Professor Preston's recommendations included a simpler alternative of pooling the sample across a moving 3-year period for each estimate.[3] This broadly achieves the same result as the weighted coefficients, with modest differences in contemporaneity and standard errors. This approach is not prone to constant revisions and maintains a uniform weighting across years. For these reasons, NSW Treasury prefers pooling the sample across three years to reduce year-to-year volatility of wage factor estimates.

4   Discounting of the wage costs assessment

> **The Commission asks:**
> - Do states agree that a 12.5% discount remains appropriate?

- NSW Treasury disagrees that a 12.5% discount remains appropriate in the wage costs assessment. The low level of econometric uncertainty and use of proxy variables do not provide adequate justification for the use of a discount.

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[3] A. Preston, *Wage Costs Consultant Report*, August 2023, page 25.

- NSW Treasury generally supports the use of discounting where it is for the purpose of correcting known biases that are troublesome to measure. However, discounting with respect to modelling uncertainty should only be used sparingly.

- We have previously advocated for continual improvement of methods where discounts have been used. We believe the changes implemented following Professor Preston's review of the wage cost model justify removal of the current discount.

- In practice, it is not possible for any assessment undertaken by the CGC to precisely model individual state expenditure needs or its revenue raising capacity. Given this, there is a general level of uncertainty with all GST assessments. This uncertainty arises from a variety of sources including:
    - The possible exclusion within the CGC assessments of relevant cost drivers or the mistaken inclusion of irrelevant cost drivers.
    - The inability to accurately measure cost drivers or the policy neutral revenue base of each state.

- Currently the CGC applies a 'low-level' discount of 12.5 per cent to the modelled outcomes arising from its analysis of differences in private sector wages across jurisdictions. In the 2020 Review, the CGC justified this discount as follows:
    - 'In adopting this discount, the Commission had regard to:
        - how accurately the data measured wage costs
        - how accurately the econometric model controlled for differences in productivity
        - how well private sector wages can be used as a proxy for wage pressures in the public sector.'[4]

- NSW would point out that:
    - The ABS data on which the wage assessment is based is as accurate as most other data used by the CGC in other assessment categories.
    - The econometric model goes to considerable lengths to adjust for specific worker characteristics which impact on productivity. No evidence of any systematic bias has been provided by jurisdictions or the Commission.
    - The Commission has already received multiple reports supporting the link between private and public sector wages.

- While private sector wages are not a *perfect* proxy for public sector wages, it is the closest and most reliable proxy available that maintains policy neutrality. Given this, we believe the continuation of the current discount in this assessment category simply introduces a systematic bias in the Commission's assessments and the discount should be discontinued.

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[4] Commonwealth Grants Commission, *2020 Review*, Volume 2 (Part B), page 426.

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