Commonwealth Grants Commission — 2020 Review

CGC Draft Report

Submission by the South Australian Department of Treasury and Finance

September 2019

EXECUTIVE SUMMARY

South Australia has the following positions/views on the assessment approaches proposed in the 2020 Draft Report:

Supporting principles - The 2015 Review definition of the principle of Horizontal Fiscal Equalisation (HFE) should be retained without modification as the Commonwealth's legislated changes to GST distribution arrangements should not alter the fundamental concept of HFE.

Land tax - The Commission should request further information from states that have interest based aggregation arrangements in order to reconsider the need to retain any discount in the Land tax assessment. Fire and Emergency Services Levies (FESLs) should be assessed as a form of tax, based on capital values with application of a suitable discount.

Stamp duty on conveyances – The Commission should regularly monitor whether the separate assessment of stamp duty on the transfer of motor vehicles is material given the introduction of luxury vehicle surcharges in some jurisdictions.

Insurance duty – The Commission should be consistent with its treatment of duty on Compulsory Third Party (CTP) insurance premiums – if CTP premiums are removed from the insurance base, the corresponding duty should also be removed.

Schools – The proposed regression models do not seem to fully reflect the way schools are funded and have produced some counter-intuitive results, especially in relation to students from low-SES backgrounds. The Commission should consider the use of a single regression model based on both government school and non-government school data. Combining data from the two sectors may remove a sampling bias which is considered to be distorting the results when the sectors are separately modelled. This modelling could be used for the assessment of state funded government and non-government schools. If this approach is not considered suitable, the Commission may want to consider whether other variables (eg concentrations of low SES students) should be incorporated into the proposed regression model to better reflect how states fund schools. The Commission should also reconsider the assessment of school transport expenses in the urban transport component of the Transport assessment. The drivers of student transport are different to drivers of non-student transport. The application of the wage cost adjustment to the Schools assessment should also be re-examined. School funding arrangements use nationally consistent wage amounts.

Welfare – The Commission should assess non-NDIS disability expenses in the Other welfare component as the drivers of Other welfare (socio-economic disadvantage) are relevant for states' disability expenditure.

Roads – The Commission should include the Strzelecki Track on the assessed rural road network as this road is the only road link to the Cooper Basin gas/petroleum fields.

Transport - The Commission should address any data concerns it has about its new urban transport regression model through the application of a discount, rather than through the use of a blended assessment. This is more consistent with the Commission's established assessment framework and would provide a more transparent and appropriate response to data concerns. South Australia continues to have concerns about the lack of high-density population data points and believes that is justification for further discounting.

Services to Industry - South Australia believes that sector size for mining activities should be based on the number of operating mines as this provides a more accurate indicator of a state's regulatory task. Value of mining output is not appropriate as this measure simply reflects the number of large-output mines in a jurisdiction which is small when compared to the total number of mines in any state. In addition, the influence of uranium mining regulation should be reflected.

Wage costs - There is sufficient uncertainty with the conceptual validity of the wage cost assessment to support a reduction in the distributional impact of this assessment. Movements in private sector wages are not an accurate indicator of movements in public sector wages.

INTRODUCTION

South Australia remains a strong supporter of horizontal fiscal equalisation (HFE) and the Commonwealth Grants Commission's (CGC's) role as the independent body responsible for developing the recommended GST distribution relativities to give effect to HFE.

It is acknowledged that the Commonwealth's legislated changes to GST distribution arrangements have resulted in a disconnect between the relativities calculated on the basis of HFE and the relativities that are actually used to distribute GST revenue between the states. However, it is our belief that the principle of HFE adopted by the Commission in their methodology does not need to change.

South Australia provided its views on the principle of HFE and its implementation in July 2017 and provided comments on draft assessments in August 2018. Input has also been provided through the development of responses to specific assessment issues, the hosting of a state visit of CGC Commissioners and participation in multi-lateral telepresence meetings. We now welcome the opportunity to provide comment on the Draft Report.

This submission provides South Australia's views on proposed methodology changes outlined in the Draft Report. It is noted that CGC staff recommended that states provide comments through a pro-forma template but this presentation was not considered flexible enough to incorporate the type and nature of comments that South Australia wants to express.

This submission is broken into three main sections:

- The definition of HFE and supporting principles.
- Assessments where South Australia has issues with the proposed assessment approach.
- Assessments where there are no major concerns with the proposed assessment approach.

The definition of HFE and supporting principles

South Australia believes that the Commission should retain the 2015 Review definition of HFE and use this as the basis for considering all methodology issues. The 2015 Review definition represents what HFE, in its true form, is trying to achieve (ie equalisation of fiscal capacities).

The requirements of the Commonwealth's legislated arrangements for distributing GST revenue between the states should not alter the basis upon which the Commission views and defines HFE for the purpose of developing assessments. The requirement to implement ex-post adjustments to the "true" GST distribution relativities (in order to equalise to the stronger of New South Wales or Victoria and reflect a relativity floor) is not related to the achievement of HFE. These are arbitrary adjustments with other policy objectives that do not seek to equalise states' fiscal capacities.

South Australia does, however, support the retention of the term "same standard" in the proposed definition.

South Australia also supports the retention of the existing supporting principles of what states do, policy neutrality, practicality and contemporaneity for the 2020 Review without ranking or weighting. Alternative supporting and operational principles suggested by some jurisdictions could potentially undermine the achievement of HFE if the Commission had to distinguish between "selected" critical and non-critical government services. The existence of four equally weighted supporting principles provide the necessary framework and flexibility for developing assessments without a disproportionate focus on a single principle which could limit the Commission's ability to achieve its task.

Assessments where South Australia has issues with the proposed assessment approach

Land tax

South Australia notes that the land tax assessment methodology has not materially changed with the exception of the reduction in the discount applied. The proposed approaches of not separately assessing foreign owner surcharges and retention of adjustments to capture the progressive rates of tax are supported.

In relation to data sources and discounting, South Australia continues to hold the view that State Revenue Office (SRO) data is the only appropriate source of land value data upon which a land tax assessment can be accurately based to reflect the way in which the tax is levied.

It is clear that there has been significant improvement to SRO land value data over the last two review periods especially in relation to the data from Queensland. The Commission has recognised the improvement in data reliability and has proposed the current 25% discount be reduced to 12.5%. The justification for retaining any discount is due to adjustments made by the three most populous states to address differences in the treatment of jointly owned properties. Although South Australia is supportive of the reduction in the discount level, we believe that with the collection of additional information, the discount could be removed entirely.

The Commission has stated that it is open to a further reduction if it had further comfort that the effect of joint ownership aggregation adjustments in New South Wales, Victoria and Queensland were not having a material impact on SRO data.

South Australia believes that the Commission should request further detailed information from New South Wales, Victoria and Queensland to fully analyse the joint ownership aggregation effects and make appropriate adjustments, if at all required, to land values for those states. This would improve the accuracy of the current assessment and remove the need for any discount.

South Australia is currently in the process of implementing an interest based approach to aggregation for land tax, similar to New South Wales and Victoria (subject to the passage of legislation). As part of this process we have started to develop the reporting system required to implement this new approach to aggregation. Once we have switched to an interest based approach, we have not identified any system issues that would prevent us from providing the Commission with accurate data on the existing ownership basis. This supports the view that States with established aggregation arrangements should be able to provide the data in an accurate disaggregated form.

South Australia also considers that other land based taxes, including property based Fire and Emergency Services Levies (FESLs) should be differentially assessed based on the capital value of residences, including principal places of residence. The assessment of these taxes should be separate to land tax.

It has been argued that FESLs are more like a user-charge and that the driver of these levies are the cost of emergency services, not differences in states' taxable capacities. However, states only rely on FESLs to recover a portion of the total cost of providing emergency services. The balance is funded from a states' general revenue. As a result, it is not appropriate to classify FESLs as a user charge as it is the balancing component funded by general revenue that is driven by the cost of emergency services. FESLs have the characteristics of a tax rather than a user charge.

If the Commission continues to have some concerns about whether FESLs have all the characteristics of a land/property based tax, a suitable discount could be applied to the assessment. There should be no issues in sourcing reliable valuation data to support a differential assessment.

Stamp duty on conveyances

South Australia notes the Commission's assessment that stamp duty on motor vehicle transfers is no longer material and the proposal to assess these duties on an EPC basis in the Other revenue category. South Australia notes that some jurisdictions have announced increases to stamp duty rates for luxury cars. This may alter the materiality of the assessment in the future. Given that all states levy duty on the sale of motor vehicles, the materiality of this assessment should be monitored regularly to ensure the assessments accurately assess what states do.

South Australia has no other comments on the other assessment issues.

Insurance tax

South Australia believes that the Commission should be consistent with its treatment of duty on Compulsory Third Party (CTP) insurance premiums. If the Commission proposes to remove CTP premiums from the insurance base, then for consistency, the corresponding duty should also be removed. It is not appropriate for revenue to be assessed on a non-representative base. The Commission should further investigate how CTP insurance duty can be quantified for each state or request this information from jurisdictions so that an appropriate adjustment can be made. South Australia can provide this data and we believe that it should not be difficult to source this information from other jurisdictions.

Similarly, the Commission should not assess duty from workers' compensation insurance if workers' compensation insurance premiums are excluded from the base. The Commission should remove the duty revenue from the category and assess it EPC in the Other revenue category (as it did in the 2015 Review) for consistency purposes.

Schools

South Australia has concerns about what are considered to be counter intuitive outcomes for socio- educational (SES) disadvantage produced from the regression models developed by the Commission to assess state funding of government and non-government schools.

The South Australian Department for Education (DfE) funds SES disadvantage through a combination of measures including SEA for non-government schools (in accordance with the Commonwealth funding model) and for government schools, the MOSEN (measure of socio-economic need) which takes into account parent education and occupation, the Index of Education Disadvantage and School Card recipients (eligibility of parents for Centrelink payments).

The regression model proposed by the Commission, from review, is considered to have produced insignificant and negative results for students in the second most disadvantaged quartile. This result is counter to the acknowledged view that SES disadvantage is a major driver of the way state and Commonwealth governments fund schools as per the Commonwealth Funding Estimation Tool. The School Resourcing Standard (SRS) includes an SES disadvantage loading for the lowest two SEA quartiles.

South Australia is also concerned that the Commission's proposed model, based on individual student characteristics, may not reflect the expenditure impact of having larger concentrations of SES disadvantaged students in a school, which the current assessment approach may have better recognised. Concentration is a factor impacting on Quartile 1 and 2 funding pursuant to the Commonwealth funding model, and the CGC's method should be consistent with this model.

South Australia believes that the Commission should consider the use of a single regression model that incorporates student characteristics for both government and non-government schools, at the school level. It is understood that when the SRS was established, it was based on total schools without distinguishing between sectors.

We believe that this approach may produce loadings that are more consistent with how States are actually funding schools and systems and address the counter-intuitive loadings produced by using separate regression models for each sector.

We acknowledge that Commonwealth funding of non-government schools is out of scope and that the assessment of Commonwealth funding of government schools cannot unwind SRS loadings. However, loadings developed from a regression model based on funding to all sectors could be used as the basis for assessing state government funding to government and non-government schools.

To support this view South Australia has undertaken a regression analysis using both government and non-government public funded expenditure which has produced loadings for the most disadvantaged and second most disadvantaged quartile that are positive and significant.

If this approach is not considered suitable, the Commission may want to consider whether other variables (eg concentrations of low SES students) should be incorporated into the proposed regression model to better reflect how states fund schools.

Further discussion on the use of a single regression model and the results of modelling undertaken is provided at Attachment 1.

Wages

South Australia believes that the wage cost adjustment for the schools assessment should be discounted (even if the Commission decides not to discount the adjustment in other assessments) due to the nature of the sector and funding governance arrangements.

The *Australian Education Act* requires all state and territory governments to allocate funding to schools with reference to the SRS. The SRS does not reflect differences in actual wage levels between states and the indexation factor included in the model, which covers wages and goods and services, is consistent across jurisdictions. There is no opportunity for states to financially benefit from the payment of lower relative wages as overall expenditure has to be maintained. This legislation implies that the labour market for teachers has more of a national nature. As previously mentioned, enterprise agreements in each jurisdiction always take into account movements in the national market.

We understand that the Commonwealth Government did consider differential funding to States based on wage differentials prior to 2014 when the first round of Gonksi reforms were implemented. However, the Commonwealth was persuaded by states and territories to take a national approach. This implies that even if the Commission's view is correct and states like South Australia do have lower wages, all states are obliged by legislation to fund schools as if there was a standard national wage.

School transport

South Australia believes that the assessment of student transport expenses should remain in the schools category and not be differentially assessed in the urban transport component of the Transport assessment.

The drivers of student transport expenses differ from the drivers of general urban transport. Students are unlikely to travel the same distances as commuters to work as the majority of students attend schools in local or adjacent areas. Higher population density is likely to result in a higher proportion of students getting to school without the use of any public transport (e.g. walking). The influence of topography is likely to be less of an influence when distances travelled are not as great. Assessment under the urban transport component is also not valid for the costs associated with the transport of non-urban students.

South Australia believes that if the Commission has concerns with the assessment of this component it should retain school transport expenditure in the schools category and assess those expenses EPC. An assessment of this expenditure based on urban public transport factors would not be an improvement and not reflect the drivers of student transport.

Welfare

South Australia notes the Commission's intention to combine non-NDIS disability expenses with aged care expenses and assess them on an EPC basis. South Australia believes that non-NDIS disability expenses should be assessed in the Other welfare component as this component is primarily based on socio-economic disadvantage. South Australia believes that there is an established relationship between disability and socio-economic disadvantage and this should be recognised in the assessment approach.

Roads

South Australia believes that the Strzelecki Track should be included on the assessed rural road network. This road is the only link available for the movement of goods to the Cooper Basin oil/gas fields in the north east of South Australia. The Cooper Basin region (including SANTOS's Moomba facility) generates all of South Australia's petroleum royalties (estimated to be $120 million in 2019-20).

The inclusion of roads to mines with a significance score of 2 or above (per Geoscience Australia), means that only mineral mining operations are recognised and not oil/gas mining operations. Oil/gas mining operations are of equal economic significance as mineral mining operations.

It has been suggested by Commission staff that the Strzelecki Track is a "4WD track". The Department of Planning, Transport and Infrastructure (DPTI) has advised that the road is well-maintained and is certainly not a "4WD use only" road. DPTI conducted a traffic survey on the road earlier this year which found that it carries approximately 150 vehicles per day with more during the winter touring months. Furthermore, it carries a high proportion of heavy vehicles, including up to approximately 25 double and triple road trains per day.

The Strzelecki Track is also the main road access to the Malkumba–Coongie Lakes area which is classified as a National Park per the South Australian National Parks and Wildlife Service website.

Transport

South Australia acknowledges that the Commission has proposed a more comprehensive urban transport assessment approach that incorporates urban centre population (25% weighting) and a broader range of influences including population density, passenger numbers by mode of transport, distance to work and topography (75% weighting for urban centre characteristics). This is a move away from the existing assessment approach that was just based on the urban centre population.

South Australia questions why the Commission has decided to adopt a blended assessment rather than simply applying a discount to address concerns about the use of proxy data in the regression model. It is understood that Commission staff believe that blending the existing method is a more appropriate approach to account for the use of proxy data in the new model when compared to discounting as discounting is effectively introducing an element of EPC assessment.

South Australia would prefer the Commission to address its concerns through the application of a discount as it is consistent with the Commission's established discounting framework and would provide a more transparent and appropriate response to data concerns.

Notwithstanding the broader assessment approach for urban transport, the proposed assessment still suffers from a number of the same issues encountered by the existing assessment approach. Population density is now a key driver of the assessment and the lack of high density data points is an issue. There are only two cities that have relatively higher levels of population weighted density being Melbourne and Sydney, with Sydney having considerably higher density.

These two cities have vastly different per capita net transport expenses. As a result it is not possible to place a high level of reliance on population density as a measure of the urban transport needs for the two major cities in Australia.

Population density can also be viewed as being the result of land use and planning policy decisions of state governments rather than being a disability that a state government cannot control or influence.

Increased population density should also allow efficiency gains and a higher rate of cost recovery through higher utilisation. Data suggests that Sydney, with the highest rates of population density, has cost recovery rates similar to smaller Australian cities. Policy decisions appear to be a main driver in net public transport costs rather than just having high levels of population density.

These issues were discussed in the *South Australian submission on the Jacobs – Urban Transport Consultancy State 2 Report*.

South Australia believes that the Commission should consider moderating the distributional impact of this assessment through a transparent discount due to the lack of major city data points for the cost impacts of high population density.

Services to industry

South Australia accepts the Commission's intention to separately assess mining regulation costs but does not believe that the value of mining output alone (sourced from ABS National Accounts data) is an appropriate indicator of regulation activity. South Australia believes that there is stronger relationship between the number of mining operations and a state's regulatory task rather than the size of mines.

We note that Gross Value Added (GVA) for the mining sector is influenced not only by production levels but also commodity prices. Movements in commodity prices alone do not have an impact on regulatory activity.

South Australia's Department of Energy and Mines' data (see below) confirms that linking the value of mining output to the cost to regulate the industry is not reasonable. This approach incorrectly assigns a greater cost to service a mining industry where there is a greater proportion of very large mines.

In 2018-19, South Australia expended $2.8 million on approval and compliance activities required to regulate the mining industry. Over 90 percent of mining regulation expenditure was incurred in regulating the State's construction material quarries and small/medium mining operations. The value of production of these small and medium mines is only about 9% of South Australia's value of production for the mining industry in 2018-19. It is understood that the South Australian experience is similar to other mining states

The following table shows that mining value of production has a logarithmic scale that is significantly skewed to the very large major mines. The ratio of the average value of production of a small mine to the average cost of regulating a small mine in South Australia in 2018-19 was 13 times. The same ratio for a large mine is over 2,000 times greater than that of a small mine. This makes value of mining output an inappropriate measure of the regulatory task.

South Australian mining regulation expenditure by operation size – 2018-19

2018-19	% regulatory effort	OPEX	Number of operations (A)	Approx Cost to regulate per operation (B)	Mine Value of Production (C)	Average Mine value of of production per mining operation (D = C/A)	Ratio: (D/B)
Quarries & small mine operations	64%	$ 1,760,569	350	$ 5,030	$ 22,503,966	$ 64,297	13
Medium mine operations	30%	$ 825,267	167	$ 4,942	$ 396,291,303	$ 2,373,002	480
Major mines	6%	$ 165,053	13	$ 12,696	$ 4,352,532,916	$ 334,810,224	26,370
TOTAL	100%	$ 2,750,889	530		$ 4,771,328,184		

Note: Large mines are defined as "operations that have bonds in excess of $5m and OPEX is for mining assessments and mining compliance only.

South Australia also notes that states that mine uranium oxide face additional regulatory costs. Regulators are required to oversee radiation protection standards, health monitoring regimes for mine workers and strict transportation protocols. Regulatory agencies must also ensure compliance with international uranium mining and transportation requirements.

South Australia believes that sector size for mining activities should be predominantly based on the number of operating mines as this provides a more accurate indicator of a state's regulatory task. Value of mining output is not appropriate as this measure simply reflects the number of large-output mines in a jurisdiction which is small when compared to the total number of mines in any state. In addition, the influence of uranium regulation should be reflected.

Wage cost

South Australia notes that the Commission is proposing the continuation of the current assessment approach for wage costs without any material adjustment or change to the level of discounting.

South Australia's concerns regarding the conceptual basis for the current assessment were discussed in our submission on the Draft Assessment papers with reference to the National Institute of Labour Studies in their 2016 report *Public-private sector wage differentials in Australia: What are the differences by state and how do they impact GST redistribution decisions (*NILS Report). We continue to hold concerns about the key underlying assumptions being:

- Private sector wage movements in a state are a good proxy for public sector wage movements.
- Public sector wages are predominantly influenced by wage movements in local or regional labour markets.
- Comparability of public sector workers across jurisdictions.

Whilst private sector wage movements are an influence on public sector wages, this influence alone does not explain movements in the wages for the majority of public sector employees (e.g. nurses and teachers). Public sector wage movements reflect sectorial conditions in job specific labour markets (both locally and nationally) and fiscal strategies in each jurisdiction.

South Australia has previously argued that regional labour market factors have some impact on public sector wages but that for the majority of public sector employees, wage movements in other jurisdictions are an equally important factor.

Observed inter-jurisdictional wage differentials are more likely to be the result of differences in responsibilities, differences in employment status (e.g. tenure), timing differences from when pay adjustments take effect, the impact of non-wage benefits and other policy choice differences.

South Australia also believes that the physical movement of people across state borders is not an indicator of the influence that interstate wage levels can have on wages in a particular jurisdiction. The reference that 60 per cent of the people joining state public sectors between 2006 and 2011 come from the private sector, while only 3 per cent moved from another state public sector is not compelling evidence of national labour market forces.

South Australia has previously expressed concerns about the true comparability of employees across jurisdictions. Jurisdictions with larger labour markets can offer greater and more diverse employment opportunities than smaller jurisdictions. This can lead to highly skilled and ambitious individuals leaving smaller jurisdictions and moving to the larger cities. Governments in larger jurisdictions may have access to a labour supply that is relatively more productive compared to smaller jurisdictions. This raises the issue that workforce compositional differences will lead to differences in the standard or quality of services provided between jurisdictions.

South Australia is still of the view that that there is sufficient uncertainty with the conceptual validity of the wage cost assessment to support the Commission reducing the distributional impact of this assessment.

Should the commission proceed with the wage cost assessment, as discussed previously in the submission, there are strong arguments why the application of the wage costs assessments should be modified in its application to the school sector.

Assessments where no substantial methodology changes are proposed and where South Australia has no major concerns with the proposed assessment approach

South Australia has reviewed the proposed assessments for the following assessment areas and have no major concerns with either retaining the existing assessment approach or moving to the CGC's proposed assessment approach:

Commonwealth payments

South Australia notes the proposed assessment of Commonwealth in-lieu royalty payments with Commonwealth payments.

Payroll tax

South Australia notes that no changes have been proposed for the payroll tax assessment.

Motor taxes

South Australia notes that the split of light and heavy vehicle registrations has been updated.

Mining revenue

South Australia has expressed its concerns to the Commonwealth Treasurer about the supplementary terms of reference issued to the Commission to not make any changes to the Mining revenue assessment in this review. It is our view that such a direction undermines the 2020 Review process and the ability of the Commission to develop relativities that achieve HFE.

South Australia believes that all mining related revenues (royalty and non-royalty) should be assessed in the Mining revenue assessment. It is clear that any mining-related payments that are ad valorem in nature (directly related to mining output/production) should be included. Other mining related revenues, that are not user charges to primarily recover the cost of regulatory activity, should also be assessed.

South Australia does not impose charges or other fees on an ad valorem basis for mining related activities. All ad valorem mining revenue is royalty revenue. Other fees and charges are primarily to recover mining regulatory activities.

Other revenue

South Australia notes that the Commission has not been able to identify reliable drivers for an assessment of gambling revenue. South Australia has no other comments on the Other revenue assessment.

Post-secondary education

South Australia has no comments on the proposed assessment approach for post-secondary education.

Health

South Australia supports the Commission’s intention to retain the direct assessment approach adopted in the 2015 Review. This approach focuses on what state governments do rather than attempting to equalise the health outcomes of the whole community.

Housing

South Australia has no comments on the proposed assessment approach for housing.

Justice

South Australia believes that the proposed police assessment represents a more accurate and reliable framework compared to the 2015 Review approach that assumed a relatively arbitrary split between community and specialised policing.

South Australia has no comments on the proposed assessment approach for courts and prisons.

Other expenses (including Administrative Scale)

South Australia supports the Commission's intention to retain the 2015 Review definition of administrative scale which includes the core head office functions of departments and services that are provided for the whole state – minimum fixed costs which do not vary with service populations.

South Australia supports the re-estimation of administrative scale expenses, the first comprehensive re-estimation since the 2004 Review, as it now provides a more realistic and accurate reflection of non-scale related costs faced by the states.

Investment

South Australia has no comments on the proposed assessment approach for the Investment assessment.

Net borrowing

South Australia has no comments on the proposed assessment approach for net borrowing.

Other disabilities

South Australia has no comments on the proposed assessment approach for other disabilities.

Elasticity adjustments

South Australia supports the Commission's intention to not-implement elasticity adjustments in the 2020 Review. We are satisfied that the Commission's consultancy examined and modelled potential elasticity effects and support the view that equalisation may not be improved by applying single adjustments in some parts of an assessment but not in others.

Alternative regression model for the schools assessment

Proposed regression models

The CGC is proposing to use separate regression models for state funding of government schools and state funding of non-government schools based on individual student characteristics rather than school location characteristics. However, the use of separate models has produced what are considered to be counter-intuitive SES results when the second lowest SEA quartile (ACARA's index of Socio-Educational Advantage) is used.

In response to this, the Commission has proposed that only the bottom SEA quartile be used to develop loadings for low socio-educational disadvantage (SES). This outcome raises questions about the validity of the two regression models as the Schooling Resource Standard (SRS) loading is based on the percentage of students in the lowest two SEA quartiles.

The cost implications to governments for each student in Quartile 1 and Quartile 2 is more nuanced than a simple price per student. There is a sliding scale of expenditure requirements based on the concentration of students from each quartile in each school. The higher the percentage of a school's student population in each of the bottom two quartiles of the SEA, the greater the concentration, up to a maximum concentration factor of 50 per cent for Quartile 1 and 37.5 per cent for Quartile 2. This complexity means that the proposed regression analysis is not fully reflecting the cost of low-SES disadvantage to government.

The South Australian Department for Education (DfE) investigated a possible explanation of why the CGC regression model showed that Quartile 2 was not significant. The CGC have access to a national data set of factors that influence funding and the level of funding provided to each school in Australia. This data set is not available to the DfE, so it was not able to fully test the veracity of the statistical analysis undertaken by the CGC.

However, the DfE undertook a statistical regression analysis of a 2010-11 data set provided by the Commonwealth Government in 2013. This dataset included variables for 9,429 government and non-government schools in Australia and examined the degree to which variation in 2010 recurrent income from public sources per government school can be explained by the following variables:

- Number of Funded Indigenous Students
- Number of Disadvantaged LBOTE
- Number of Notional Funded SwD
- Funded Enrolments ACARA
- Number of Funded Students in SEA Q1
- Number of Funded Students in SEA Q2

For this analysis the DfE only examined data for government schools in Australia. The analysis examined total recurrent income as the dataset available to the DfE did not breakdown state and Commonwealth funding amounts. The analysis examined total recurrent income as the dataset available to the DfE and did not breakdown state and Commonwealth funding amounts. The following table provides summary statistics of the information used in this analysis.

Variable	No. of Observations	Mean	Std. Dev.	Min	Max
2010 Recurrent Income Public Sources (AU$'000)	6,710	$3,685	$3,350	$0	$32,000
Number of Funded Indigenous Students	6,710	21	43	0	1,645
Number of Disadvantaged LBOTE	6,608	13	46	0	1,082
Number of Notional Funded SwD	6,710	20	25	0	431
Funded Enrolments ACARA	6,690	341	328	0	3,595
Number of Funded Students in SEA Q1	6,710	121	137	0	1,550
Number of Funded Students in SEA Q2	6,710	68	72	0	809

The regression analysis examined the degree to which variations in public funding of government schools can be explained by SEA. The results (per the table below) showed a positive association with Quartile 1 and a negative and not significant association with Quartile 2. This is a similar outcome to the CGC analysis.

2010 Recurrent Income Public Sources (AU$)	Coef.	Robust Std. Err.	Z-value	P-value	95% Conf. Interval	
Funded Enrolments ACARA	$6,954	$129	54.10	0.00	$6,702	$7,206
Number of Funded Students in SEA Q1	$3,595	$213	16.91	0.00	$3,178	$4,012
Number of Funded Students in SEA Q2	-$745	$561	-1.33	0.18	-$1,845	$355
Number of Funded Indigenous Students	$8,751	$381	22.95	0.00	$8,004	$9,498
Number of Disadvantaged LBOTE	$2,178	$560	3.89	0.00	$1,081	$3,276
Number of Notional Funded SwD	$25,071	$1,101	22.78	0.00	$22,914	$27,228
School Location (1: Metro, 2: Provincial, 3: Remote and 4: Very Remote)	$176,531	$12,888	13.70	0.00	$151,270	$201,792
Base Amount	-$150,807	$29,145	-5.17	0.00	-$207,930	-$93,684
Robust R2	94.97%					

However, it is known that the number of students in both Quartile 1 and Quartile 2 of the SEA are major cost drivers for all governments in Australia.

The Quartile 1 and 2 data represents the relative disadvantage of students compared to all students in Australian schools. It is not a relative measure of the disadvantage of all students in government schools in Australia. So another possible reason for the Quartile 2 result being insignificant is that the data contains a sampling bias, by only looking at government schools.

DfE tested this possibility by a separate regression analysis of the same dataset but including all school sectors (not just government schools). A robust regression analysis was conducted including interaction terms between students in the two bottom SEA quartiles and the school sector they attended. The Quartile 1 and Quartile 2 data was replaced with the following additional variables:

- SEA Quartile 1 – Government Schools
- SEA Quartile 1 – Independent Schools
- SEA Quartile 1 – Catholic Schools
- SEA Quartile 2 – Government Schools
- SEA Quartile 2 – Independent Schools
- SEA Quartile 2 – Catholic Schools

As all the school sectors are included, the model has no selection bias. The results below shows positive associations with Quartile 1 and Quartile 2 for government schools and both are significant.

2010 Recurrent Income Public Sources (AU$)	Coef.	Robust Std. Err.	Z-value	P-value	95% Conf. Interval	
Funded Enrolments ACARA	$5,739	$120	47.97	0.00	$5,504	$5,973
Number of Funded Students in SEA Q1 in Government Schools	$4,319	$209	20.63	0.00	$3,908	$4,729
Number of Funded Students in SEA Q2 in Government Schools	$3,921	$543	7.22	0.00	$2,857	$4,985
Number of Funded Students in SEA Q1 in Catholic Schools	$2,740	$353	7.77	0.00	$2,049	$3,431
Number of Funded Students in SEA Q2 in Catholic Schools	$3,545	$502	7.05	0.00	$2,560	$4,529
Number of Funded Students in SEA Q1 in Independent Schools	$5,139	$736	6.98	0.00	$3,696	$6,582
Number of Funded Students in SEA Q2 in Independent Schools	$754	$782	0.96	0.34	-$779	$2,287
Number of Funded Indigenous Students	$8,531	$355	24.06	0.00	$7,836	$9,226
Number of Disadvantaged LBOTE	$2,586	$454	5.69	0.00	$1,696	$3,476
Number of Notional Funded SwD	$24,807	$909	27.28	0.00	$23,024	$26,589
School Location (1: Metro, 2: Provincial, 3: Remote and 4: Very Remote)	$161,426	$10,602	15.23	0.00	$140,646	$182,206
Intercept	-$170,052	$23,857	-7.13	0.00	-$216,810	-$123,294

The estimated coefficient of the interaction term between SEA Quartile 1 and government schools indicate if the number of students in SEA Q1 in a public school increases by 1, public funding increases by $4,319 on average holding all other variables constant.

The estimated coefficient of the interaction term between SEA Quartile 2 and government schools indicate if the number of students in SEA Q2 in a public school increases by 1, public funding increases by $3,921 on average holding all other variables constant.

The DfE model had an adjusted R2 of 94.97% which indicates that it objectively explains more variation in funding than the CGC model which has an adjusted R2 of

47.78%. The reason why the DfE model explains more variance is a combination of the removal of selection bias mentioned above but also the use of per-school rather than per-student funding as the dependent variable.

The per-school approach better matches the funding model of all governments in Australia who all provide funding based on the number of schools rather than students. The sum of the funding for all government schools in a jurisdiction can be divided by the number of students to determine the per-capita expenditure. The CGC model takes into account the variance in school size through an inverse school size factor; however it appears that this approach might not be as robust as examining school expenditure first and then converting this to per-capita as a second step.

Officers in the Commonwealth Grants Commission speculated that the reason why quartile 2 is not significant is because it is highly correlated with quartile 1. The DfE found this was not necessarily the case when it tested if SEA Quartiles 1 and 2 are correlated by running the variance inflation factor (VIF) test. A VIF of 10 and above indicates a multicollinearity problem.

The variance inflation factors (per the table below) for all the explanatory variables are less than 10 so there is no multicollinearity problem.

Variable	**VIF**	**1/VIF**
Funded Enrolments ACARA	7.91	0.126486
Number of Funded Students in SEA Q2 in Government Schools	7.66	0.130509
Number of Funded Students in SEA Q1 in Government Schools	6.31	0.158410
Number of Funded Students in SEA Q2 in Catholic Schools	5.50	0.181763
Number of Funded Students in SEA Q2 in Independent Schools	4.72	0.211998
Number of Funded Students in SEA Q1 in Catholic Schools	4.70	0.212675
Number of Funded Students in SEA Q1 in Independent Schools	3.57	0.279822
Number of Notional Funded SwD	2.21	0.451935
School Location (1: Metro, 2: Provincial, 3: Remote and 4: Very Remote)	1.66	0.602560
Number of Funded Indigenous Students	1.59	0.628546
Number of Disadvantaged LBOTE	1.44	0.694053
Mean VIF	4.30	