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INSTITUTE FOR REGIONAL FUTURES

Federation Council

Efficiency Report

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The University of Newcastle acknowledges the traditional custodians of the lands within our footprint areas: Awabakal, Darkinjung, Biripai, Worimi, Wonnarua, Gomeroi and Eora Nations.

We also pay respect to the wisdom of our Elders past, present and emerging.

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Executive Summary

This report provides a comprehensive review of the relative technical efficiency of Federation Council. Sophisticated modelling demonstrates, beyond reasonable doubt, that Federation Council already achieves close to optimal efficiency when compared against the total rural cohort for the state and adjusting for disadvantageous scale. As we have empirically demonstrated in earlier work, the amalgamation was ill-conceived and resulted in a structurally inefficient local government area. Despite this, council staff have achieved objectively impressive results and continue to make improvements relative to previous years. We anticipate that future planned improvements will see Federation Council performing at the efficient frontier, which is all that can be reasonably expected of a local government.

1 Introduction

It seems that both the Office of Local Government (OLG) and the Independent Pricing and Regulatory Tribunal (IPART) are concerned about the efficiency of local governments seeking to increase their rates above the prescribed cap. Unfortunately, it also seems that there is a good deal of confusion about what precisely efficiency is, how to measure efficiency competently, as well as the potential for efficiency improvements to put material downward pressure on taxation.

Efficiency is often ill-defined in a public policy sense despite the fact that economists have quite precise definitions and ways of measuring same. Typically, scholars make reference to three distinct kinds of efficiency which local governments exert varying levels of control over.

Allocative efficiency refers to how scarce resources are harnessed to maximise the well-being of citizens (Fergusson, 1972). To achieve allocative efficiency, it is necessary for decision-makers to direct inputs to the quality and quantity of goods and services desired by the community. In a local government sense the principal mechanism for allocative efficiency is the democratic process over time.

Technical efficiency (also referred to by scholars as x-efficiency or productive efficiency) refers to the optimal conversion of inputs into a large range of local government outputs (Drew, 2021). The inputs to the production process are staff and money and the outputs are too numerous to list (hence economists typically use proxies for the main types of goods and services produced by local governments). The state government, regulators and some citizens have put considerable emphasis on the concept of efficiency presumably believing that: (i) efficiency is a legitimate goal of government, and (ii) that efficiency might ineluctably lead to improved sustainability and/or lower taxes.

There is no good reason to think that efficiency is either a legitimate goal of government, or indeed that high levels of efficiency are even possible (Drew, Razin and Andrews, 2018). Scholarly work on public values has identified that citizens care most strongly about notions such as access to services, privacy, equity, civil rights, as well as safety and security (see, for example Bozeman, 2019). Efficiency rarely rates a mention unless citizens are confronted with the need to pay the full price for the services that they consume (Drew, 2021). Indeed, many of the things that citizens expect their governments to do are completely contrary to efficiency – for instance holding regular elections (considerable resources are expended for no additional goods or services output), or disaster response (where governments often have to pay penalty rates and the like to ensure quick relief for those suffering). We doubt very much that citizens would ordinarily argue that government functions such as these ought to be sacrificed in the name of efficiency. Moreover, it has long been held by scholars that efficient delivery of goods and services is inconsistent with democratic government in any case (see, Fenwick, 1920; Friedman, 1993). Indeed, we have only to briefly consider the disaster wrought at the hands of new public management proponents to understand the folly of myopically pursuing efficiency in a democracy (see, for example, O'Flynn, 2007; Drew, 2021).

Nevertheless, regulators have continued to place strong focus on efficiency. The assumption seems to be that improvements to efficiency will result in higher sustainability or lower taxes. However, the scholarly evidence on this matter does not support the assumption (see Drew, Kortt and Dollery, 2015a). The main reason for this lack of support is that efficiency is a short-run concept, whereas sustainability (and tax rates in the context of a rate cap regime) are long-run matters. Any marginal changes to efficiency in the present are thus likely to pale into insignificance when set against decisions taken over many years regarding the construction of infrastructure, addition of services, drawing down of debt, or the neglect to charge an average tax price for a local government area (this last factor is certainly a large contributor to Federation's

predicament as demonstrated in our *Capacity to Pay* report). Indeed, one only has to consider the personal budget metaphor to understand the fallacious nature of pervasive assumptions in this area.[1]

In a local government sense, the way to improve technical efficiency is to combine the optimal mix of production factors to produce a given quantity of outputs (what is referred to as an input orientation). This is the role of local government managers. Presumably this is the focus of regulators, although as we shall see, their crude ratios are entirely incapable of measuring technical efficiency.

Dynamic efficiency is the third category of the economic concept, and it refers to changes to allocative or productive efficiency over time (Drew, 2021). Dynamic efficiency is principally driven by improvements to learning or technology. Dynamic efficiency might also alter due to changes in legislation or regulatory practice, albeit generally in a deleterious manner. Dynamic efficiency largely arises due to the actions of others (advancement to industry or education offerings) and lies beyond the direct control of Councillors or local government management.

In the past regulators have sought to measure technical efficiency through a crude ratio defined as operational expenditure divided by population. In 2015 it was asserted that to be efficient a linear trend would need to be downwards sloping over a five-year period.[2] This approach entirely neglected to consider how different factors of production might be best combined and eschewed the time value of money altogether. Furthermore, the aforementioned attempt at measuring efficiency also used the incorrect functional unit – it has been shown countless of times that in Australian local government, that number of properties is a superior denominator in the absence of more sophisticated weighted methods (Drew and Dollery, 2014). A number of other serious problems exist that we shall enumerate later. In sum, the crude metric still used in NSW is fatally flawed and only likely to lead to erroneous conclusions. Clearly something more sophisticated is required to allow valid statistical reasoning to take place.

In this report the centrepiece of our work are data envelopment analysis (DEA) and free disposability hull analysis (FDH). This is world's best practice and sophisticated empirical work conducted by one of the leading scholars on the face of the earth. It is the only way to competently appraise the efficiency of Federation over time and we conduct these analyses over an eleven year panel for the entire cohort of rural NSW local governments.[3] Notably, the work which we present in this report, should also be considered in the context of the extensive constant return to scale modelling that was conducted as part of the report on *The Advantages and Disadvantages of Amalgamation and Federation Council's Financial Sustainability Journey* (2023).

The remainder of this report is set out as follows. In the next section we review a number of ratio metrics that will provide an overview of relative performance compared to councils that the OLG deem to be similar to Federation. Following this we present world's best practice sophisticated DEA and FDH analysis. Thereafter, we conduct a DEA of tax efficiency. We also search for the determinants of efficiency and briefly outline the Council's efficiency journey. The report concludes with some observations regarding the potential for efficiency improvements to materially alter the required special rate variation which needs to be passed on to taxpayers.

[1] If a person went on an efficiency drive, they might hope to shave off a few percent on discretionary expenditures (savings on non-discretionary items such as food and water are usually not possible). Marginal savings of this kind would take many years to have a material impact on debts taken out to purchase property or the like, and pale into insignificance when set against the pecuniary implications of past decisions relating to things such as how many children one brought into the world.

[2] A linear trend was not appropriate for data which was not linear, and five years is generally not considered sufficiently lengthy to establish a trend of the kind envisaged.

[3] The tax efficiency work is only conducted over a six-year panel of data.

2 Ratio Analysis of Efficiency

Typically, councils compare a few so-called efficiency ratios to try to make an argument about their relative technical efficiency in support of a special rate variation. As we have already foreshadowed, this approach is flawed and likely to lead to completely erroneous conclusions. Nevertheless, it seems somewhat de rigueur, and the exercise will at least highlight the importance of the sophisticated work that forms the centrepiece of this report.

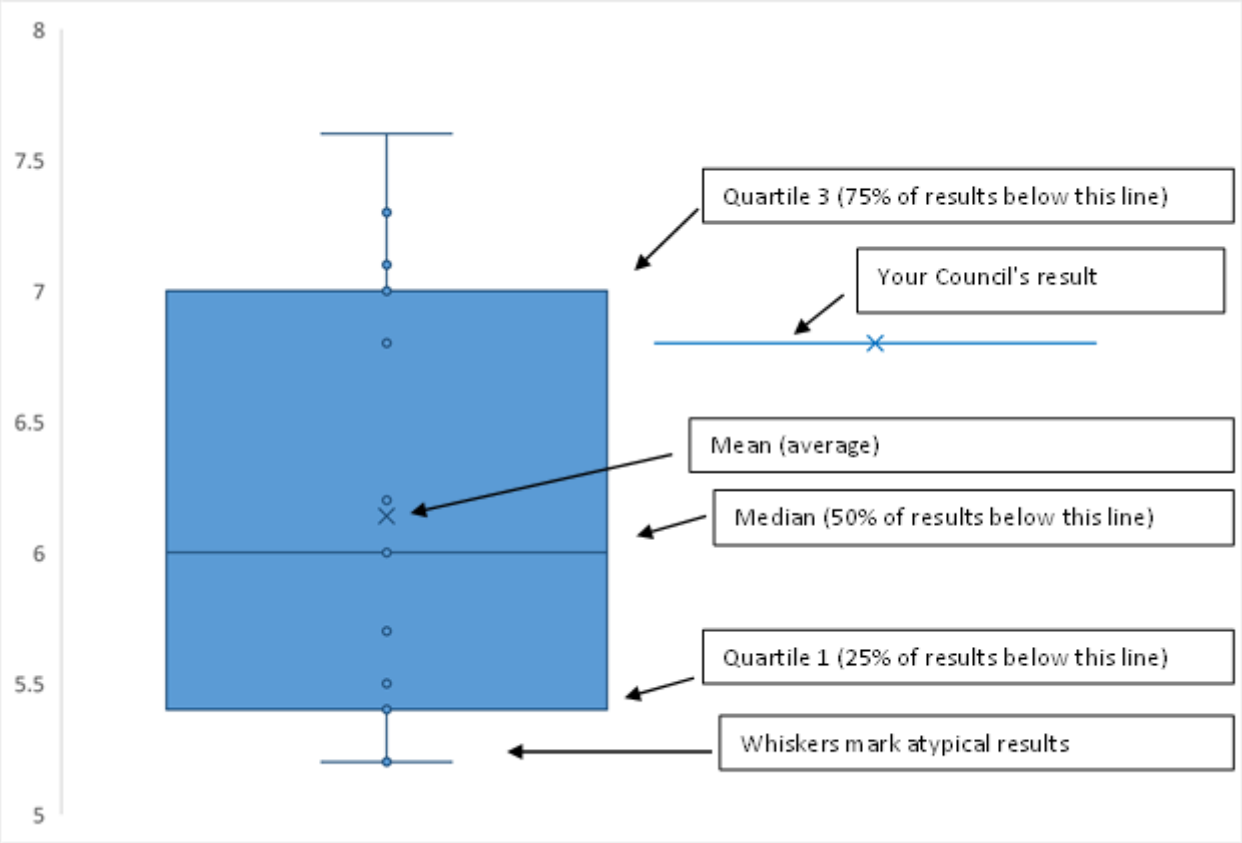
For the ratio comparisons that follow reference is made to the peer group that draws on the OLG preferred categorisation.

Table 1: Peers Used in Comparisons

Bellingen	Cabonne	Cootamundra-Gundagai
Cowra	Greater Hume	Gunnedah
Inverell	Leeton	Moree Plains
Murray River	Nambucca Valley	Parkes
Snowy Valley		

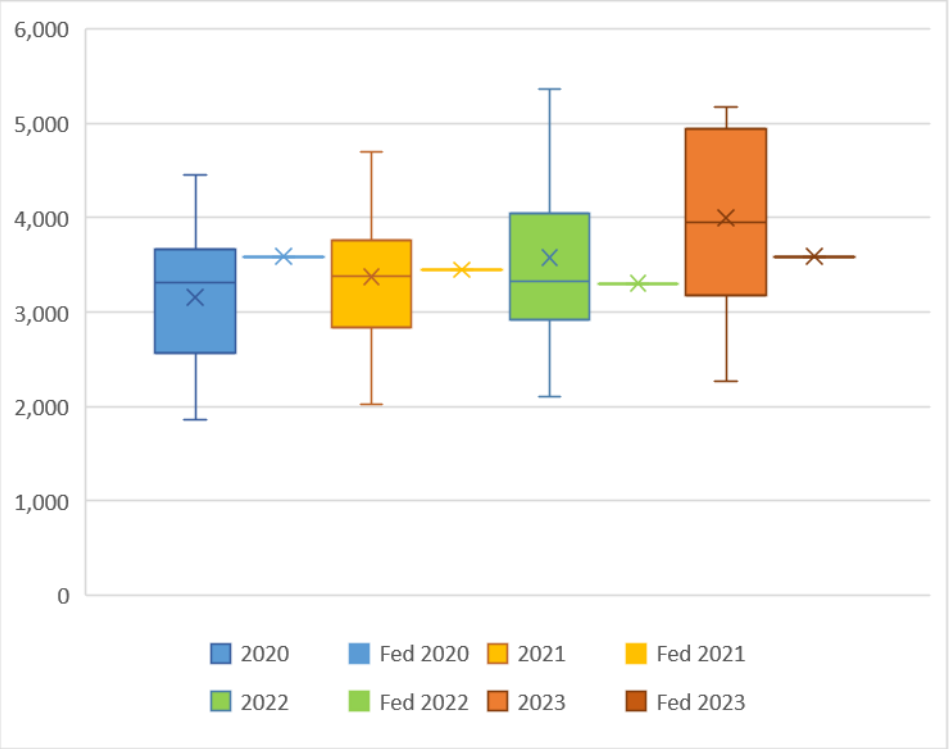
The most efficient way of comparing Council to the peer group is to chart a box and whisker plot. Figure 1 provides a reminder about how to read these types of graphs.

Figure 1: Interpreting Box and Whisker Plots



In Figure 2 we present the OLG preferred metric of operational expenditure per capita as used during the Fit for the Future debates. As we have already suggested, this metric is completely flawed, and distinguished scholars have previously pointed out that it 'simply does not measure efficiency' (Drew and Dollery, 2015, p. 86).

Figure 2: Operational Expenditure per Capita ($)

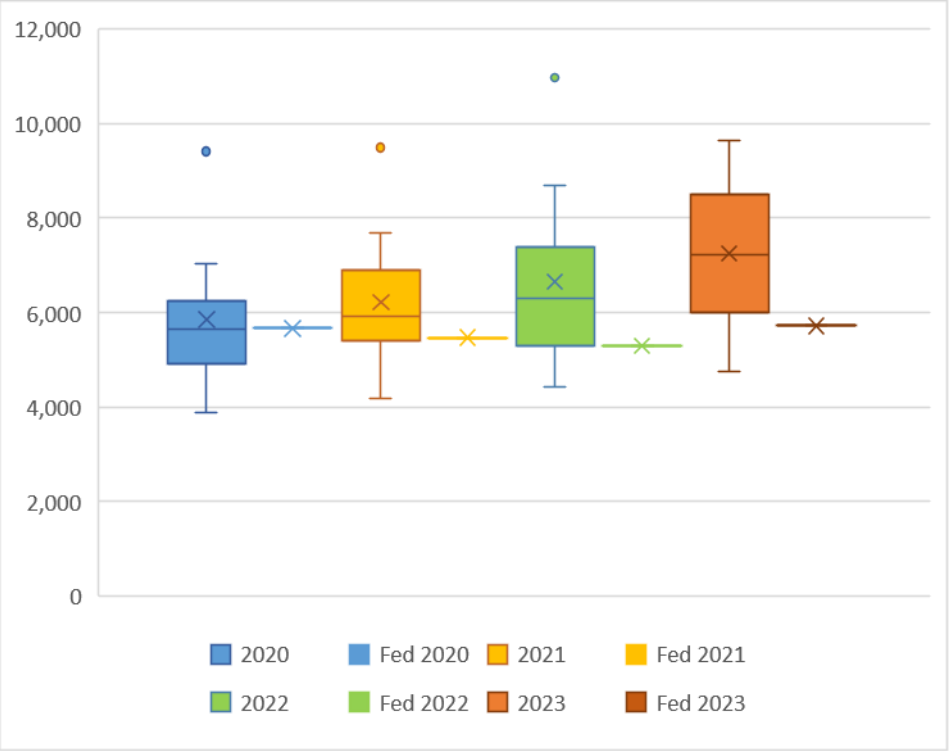


According to Figure 2 Federation Council has below typical efficiency relative to the cohort detailed in Table 1. However, it would be extremely unwise to place any reliance on a metric with such dubious pedigree for a number of reasons. First, the ratio depends on known unreliable data – population figures in intercensal years are merely estimates which the Australian Bureau of Statistics (2022) themselves have declared to typically impute errors of up to 8.9 percent at the SA2 level (typically several SA2 units need to be combined to produce local government level data). Using data that is known to have quite large errors is not a good way to accurately measure efficiency. Second, the preponderance of services in the Australian local government milieu are still delivered to properties (Drew, 2021). Using population as the denominator implicitly asserts that the cost of providing services to a household of, say, five people is somehow five times larger than the cost of providing services to a single person household. When one considers the largest single item of expenditure – the roads connecting houses and businesses – the proposition seems quite untenable. Third, the metric also implies that the cost of providing services to people living on farms is somehow comparable to the cost of providing services to people living in town. This is simply not true, nor do the people receive anything like the same basket of local goods and services. Fourth, operational expenditure per capita ignores the single largest item of costs for local government in NSW – roads. Indeed, roads are negatively correlated to population size ($r = -0.2531$) – this fact also further confirms that the output from this 'efficiency' ratio is likely to be complete non-sense.

In Victoria operation expenditure per property assessment is used instead. In Figure 3 we present the metric for Federation council relative to the peer group. Whilst, better than the NSW metric it remains fatally flawed. It still neglects the fact that different categories of ratepayers tend to receive entirely different services. For instance, most people living on farm properties only have a graded dirt road to drive on, no street lighting, no footpaths – all of which stands in stark contrast to the services provided in the

Corowa township for example. The metric employed in Victoria also continues to ignore the single largest item of expenditure – roads. For these reasons, it would be unwise to place any reliance on the results presented in Figure 3 either.

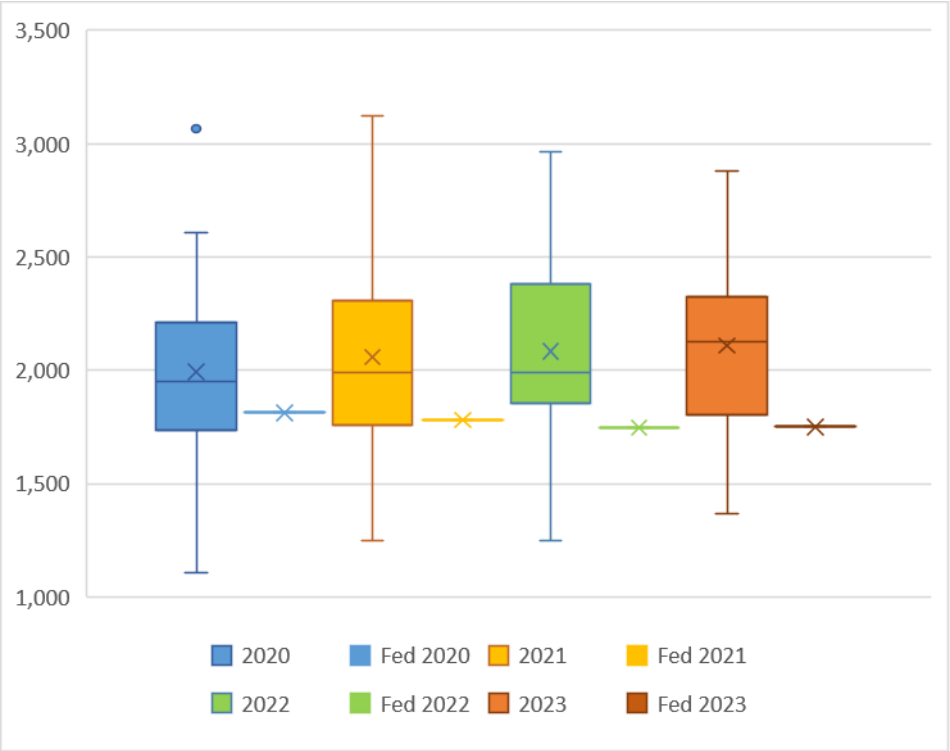
Figure 3: Operational Expenditure per Property Assessment ($)



As we have already stated, the only way to competently measure efficiency is to use a sophisticated empirical technique that is capable of measuring the conversion of the various production inputs into multiple and appropriate proxies for outputs. Before doing so, in the next section, we will examine two further metrics that will provide some important context for the earlier discussions, and also expose misconceptions held by some in the community.

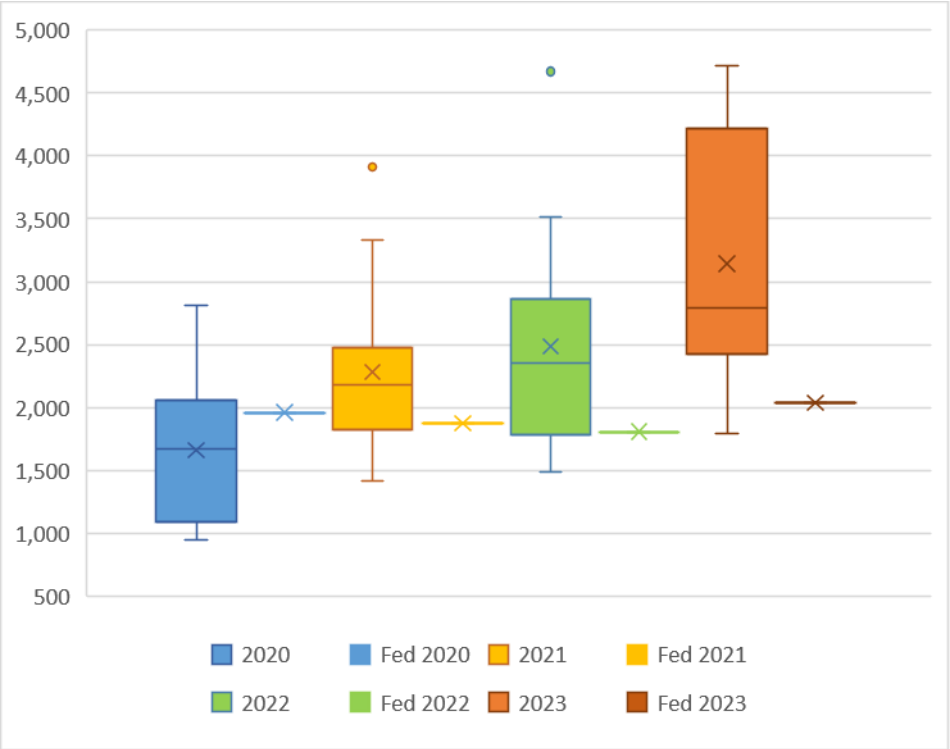
In Figure 4 we provide details of staff expenses per property assessment. Some people in Federation continue to claim that senior staff are remunerated too generously, and that staff costs are too high more generally. In our previous work we demonstrated that comments about senior staff remuneration simply were not correct according to comparative data in Note F1-1 of the audited financial statements. In Figure 4 below we show that staff unit costs for the Council are in the bottom quartile with respect to the peer group and have been declining in relative terms over recent years. The claims being made by some simply do not accord with the facts as presented in audited financial statements.

Figure 4: Staff Expenses per Property Assessment ($)



In Figure 5 we also provide data for unit material and contract expenses. Once again, Federation is at or near the bottom quartile and it would therefore be quite unreasonable to pretend that the council has been profligate. Indeed, both Figures 4 and 5 point to exceptionally good cost control in a very difficult operating environment (to see just how difficult the operating environment has been, readers are referred to the YouTube videos outlining year on year growth in unit expenditure at: https://www.youtube.com/watch?v=CL989GPoW98).

Figure 5: Material and Contract Expenses per Property Assessment ($)



3 Standard Relative Technical Efficiency

Data envelopment analysis (DEA) is a linear programming[4] technique that allows for the analysis of the efficiency with which multiple inputs are converted into multiple outputs. As such, DEA is far more consistent with the economic definition of technical efficiency than are the more common single input output ratios. For example, both staff and operational expenditure can be considered as separate inputs in a DEA exercise, and this allows us to better reflect the various outcomes that are possible through different combinations of production factors. In similar vein, DEA allows scholars to separate out various proxies for output that better reflect the diversity of goods and services that a local government produces. The specification for the work that we produced makes the advantages of the empirical technique plain:

Staff ($) + operating expenditure ($) → residential (no.) + farm (no.) + business (no.) + sealed roads (km) + unsealed roads (km)

Here we consider staff in pecuniary terms to reflect the different skills and productivity that ought to be reflected in remuneration, consistent with Drew, Kortt and Dollery, 2015. The output proxies we employ recognise that the respective categories of taxpayers usually have access to vastly different baskets of goods and services. Moreover, we also include as outputs sealed and unsealed roads respectively which properly reflects that these represent the largest items of expenditure, with quite different maintenance schedules (depending on surface). The proxies are thus the best suite to recognise what councils actually do within the limitations of Nunamaker's rule[5] – and far more realistic that the single outputs used for the earlier ratio analyses. Notably, in the DEA and free disposability hull (FDH) work that we present, pecuniary data was adjusted to properly reflect the time value of money.

For the work that follows we used an input-orientation consistent with the relevant scholarly literature (Drew, Kortt and Dollery, 2015). An input orientation recognises that local government decision-makers have relatively little control over the output proxies, but much more discretion about the resources that they invest into producing same. Otherwise stated, the length of roads is more-or-less given, but how we assign money and staff to maintain them, is certainly something that might change.

We also used variable return to scale specifications of the linear programming. This means that we adjusted for the effects of scale, that we have shown in other work have been deleterious for Federation.

Data envelopment results are both relative and unconditional. Relative means that interpretation of the results can only validly be made with reference to the particular decision-making units and years analysed. Unconditional means that we haven't adjusted for any operating environment effects (other than size, captured by VRS). We address the unconditional nature of the analyses in our second-stage regression work later in this report.

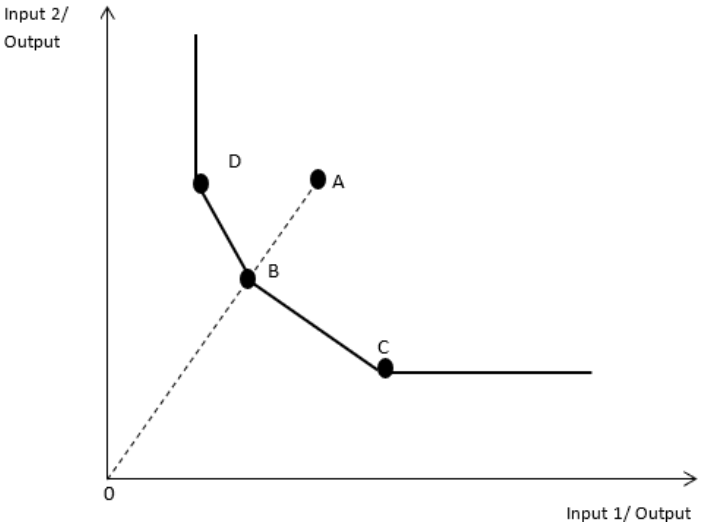
The best way to understand DEA is generally through a graphical illustration. In Figure 6 we present a simplified input-orientated example. Here the curve drawn between Councils D, B and C represents the theoretically possible efficient frontier. These are the councils that have the best conversion of inputs into a given set of outputs. Councils of this kind are considered perfectly efficient in a relative sense and

[4] Linear programming is a mathematical technique that can be employed when multiple feasible solutions exist in a mapped function responsive to introduced mathematic constraints. It is iterative in nature and therefore requires significant levels of computing power.

[5] Nunamaker's rule is a decision-making tool which prescribes that the sum of inputs and outputs ought not exceed a third of the number of decision-making units (DMU; that is, local governments). For our fifty-eight-member cohort the upper limit for the sum of inputs and outputs would be nineteen – our specification is well within this range.

assigned a score censored at one. Councils in the interior of the curve (such as 'A') represent relatively less efficient decision-making entities. The ratio of the radial distances marked provides a score between zero (perfectly inefficient) and one (perfectly efficient). This number represents the relative technical efficiency of A with respect to the rest of the cohort under analysis (sometimes people multiply this number by one-hundred and then talk about the percent relative technical efficiency).

Figure 6: Input-Orientated DEA



Readers interested in obtaining further information on data envelopment analysis are referred to the seminal works of Cooper et al. (2007) and Coelli et al. (2005).

It might also be noted that there is some potential for clustering of results, especially if councils face the same harsh decision-making constraints.

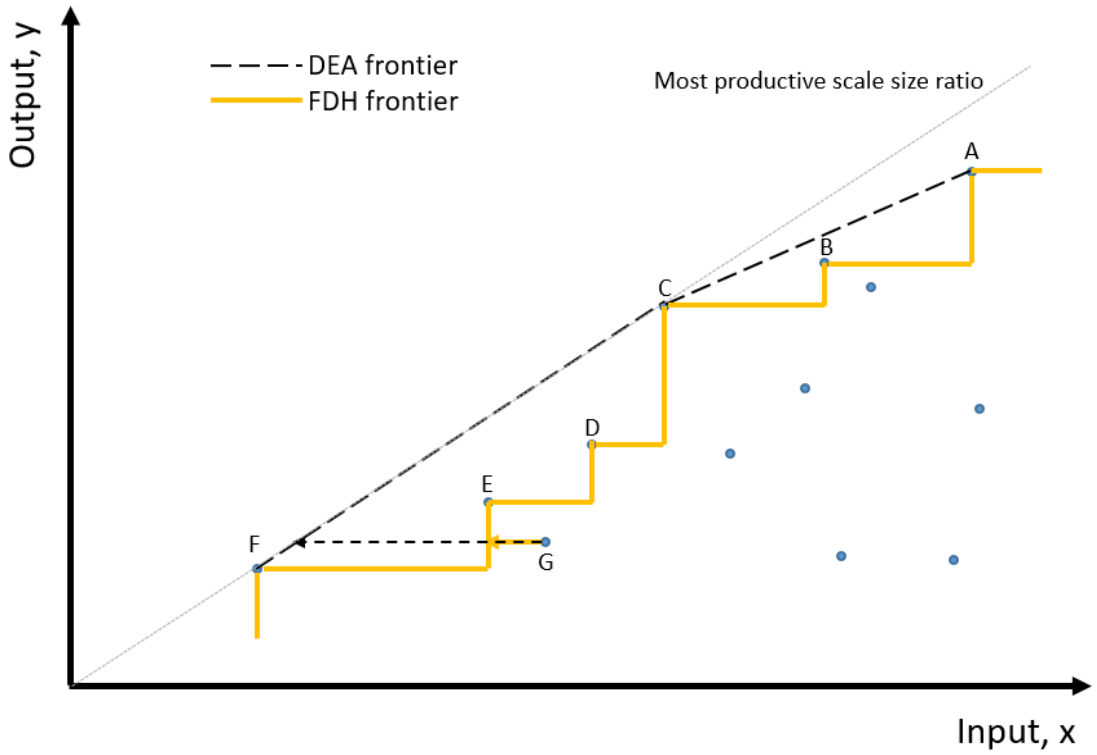
In the analysis that follows we use a long (eleven year) panel for all of the rural councils in NSW. Because of the long timeframe involved we were obliged to use local intertemporal analysis (also sometimes called windows analysis). Local intertemporal DEA is a special kind of moving average which allows us to compare results over time because of overlapping periods.

To further assure our results we also bootstrapped[6] calculations using 10,000 iterations.

Another, slightly different sophisticated approach to measuring efficiency is called free disposability hull analysis. To ensure that the community received the most comprehensive picture of relative technical efficiency we also conducted this analysis using the earlier specifications. The main difference between DEA and FDH is that the latter uses a step-wise frontier comprised of the actual results attained by decision making units rather than the curvilinear theoretical efficient frontier. Otherwise stated, DEA tends to be more pessimistic because it compares a given council to an ideal that might not even have been achieved by any of the peer group whereas FDH only compares to what others have actually achieved. Figure 7 provides a graphical comparison of the two approaches.

[6] Bootstrapping is a probabilistic random re-sampling protocol that is used to reduce potential statistical bias when dealing with a sample.

Figure 7: DEA and FDH Frontier Comparisons



The mathematic specification for our DEA is:

$$\min \theta$$
$$s.t.$$
$$\sum_{j=1}^{n} \lambda_j x_{ij} \leq \theta x_{i0}, i = 1, \dots, m$$
$$\sum_{j=1}^{n} \lambda_j y_{rj} \geq y_{r0}, r = 1, \dots, s$$
$$\sum_{j=1}^{n} \lambda_j = 1 \ (VRS)$$
$$\lambda_j \geq 0$$

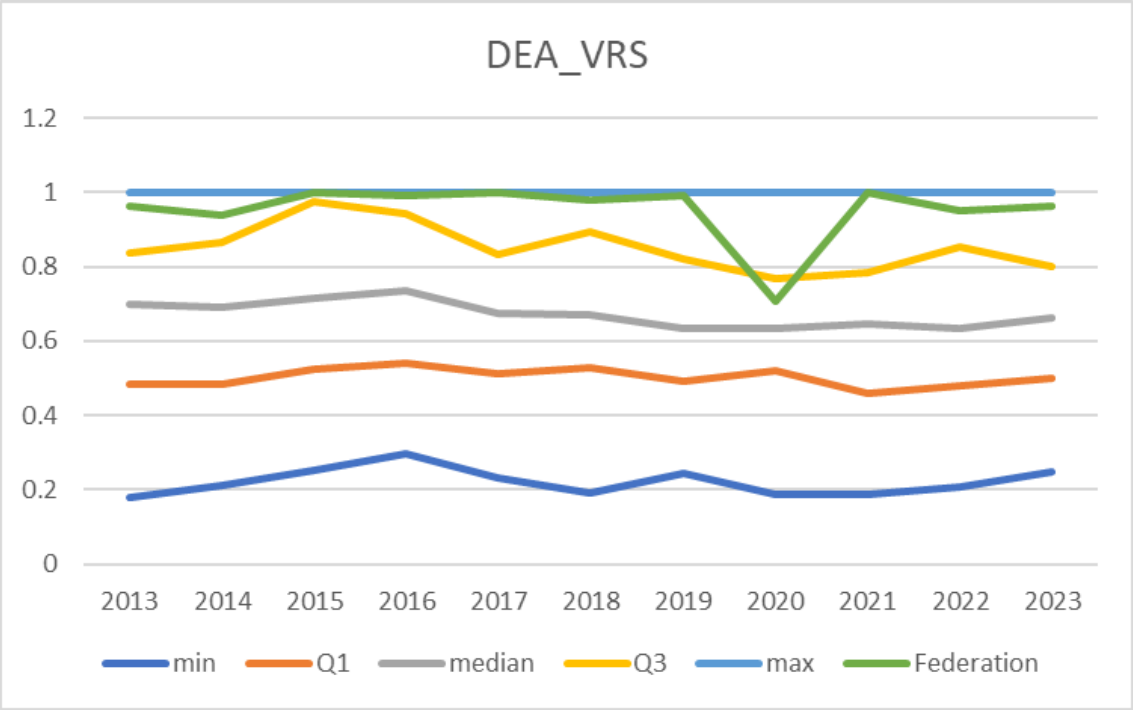
The FDH specification was:

$$\min \theta$$
$$s.t.$$
$$\sum_{j=1}^{n} \lambda_j x_{ij} \leq \theta x_{i0}, i = 1, \dots, m$$
$$\sum_{j=1}^{n} \lambda_j y_{rj} \geq y_{r0}, r = 1, \dots, s$$
$$\sum_{j=1}^{n} \lambda_j = 1$$
$$\lambda_j \in \{0,1\}$$

Figure 8 presents the local intertemporal data envelopment analysis results for Federation Council relative to various measures of central tendency and spread, for the remainder of the NSW rural local government cohort. For the period prior to amalgamation, we simply combined the individual inputs and outputs for Corowa and Urana respectively, as per scholarly precedent (see, for example, Drew et al., 2015).

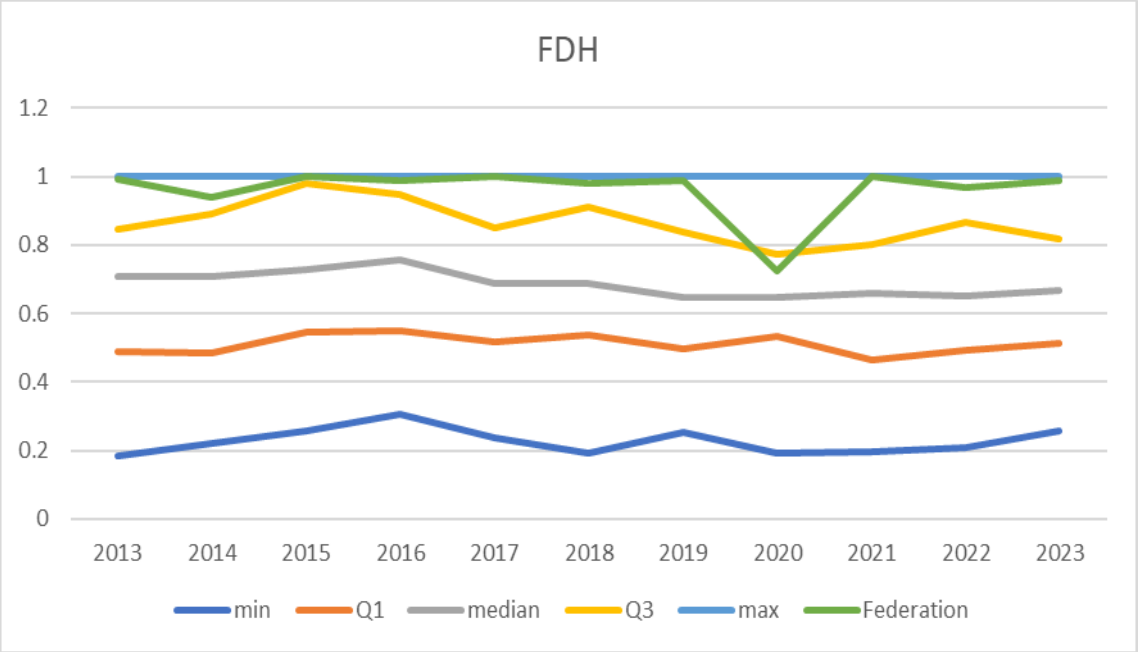
The VRS local intertemporal DEA makes it clear that Federation Council has been operating with commendable levels of efficiency, when adjusting for the deleterious effects of over-scale due to amalgamation, relative to the peer group against an idealised theoretical potential. Indeed, for much of the time Federation has been operating with perfect relative technical efficiency. Moreover, it is notable that relative technical efficiency has improved marginally since last these results were presented to the community.

Figure 8: Local Intertemporal Data Envelopment Analysis of Efficiency Employing Variable Returns to Scale



In Figure 9 we assess relative technical efficiency according to actual outcomes achieved by other NSW rural councils, rather than an idealised theoretical potential. This suggests that Federation Council is performing at an even higher level relative to the peer group. Indeed, for the most recent financial year (FY2023) relative technical efficiency improved from 0.9668 to an impressive 0.9880 (recall the highest possible score in this model was 1.0). Otherwise stated Federation had some of the best conversion rates of inputs into outputs in the entire state, and it would probably be unreasonable to demand significantly more.

Figure 9: Free Disposability Hull Analysis of Efficiency



Nevertheless, the 2023 report by Professors Drew, Miyazaki and Ferreira did indeed find some areas for potential marginal improvement, which Council has on-the-whole agreed to pursue. We understand that it takes time to carefully consider the recommendations in the previous reports and make the necessary consultations. We look forward to Federation improving to a position directly on the efficient frontier in the years to come.

We note that these results stand at odds to the inferences which might have been made according to the earlier flawed metrics presented in the previous section of this report (some of which also employed known incorrect data). The said differences underscore the importance of sophisticated robust analysis for important questions of fact.

4 Tax Efficiency 2018-2021

Underlying much of the regulatory and community dialogue regarding special rate variations is a desire to get maximum 'bang for the buck' (value for the tax dollar). This is an entirely reasonable concern.

We can precisely measure the 'bang for the buck' by conducting either DEA or FDH and replacing the factors of production with the single input of tax (rates) revenue. Thus, the specification would be:

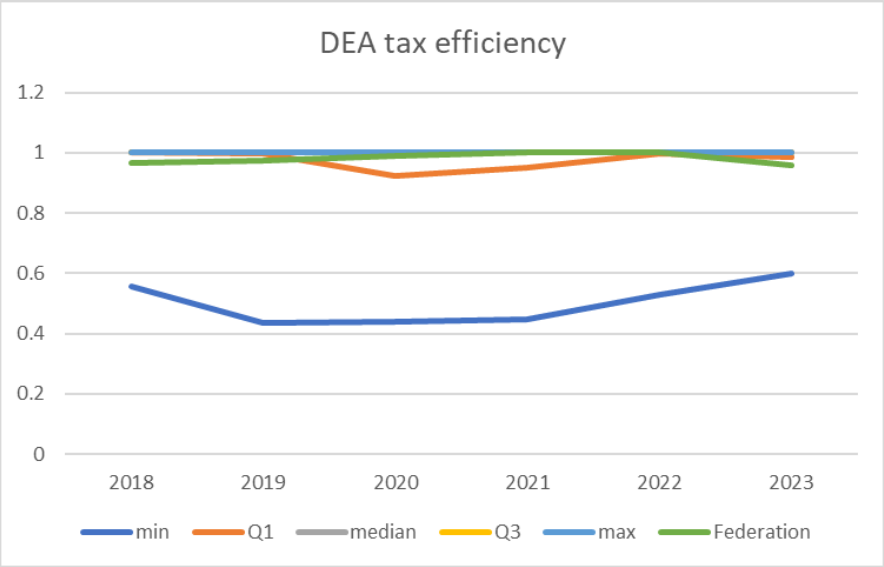
Total taxation take ($'000) → residential (no.) + farm (no.) + business (no.) + sealed roads (km) + unsealed roads (km)

For a tax efficiency analysis, it is also important to again conduct variable returns to scale, and bootstrap for maximum assurance (we used 10,000 repetitions).

In Figure 10 we present the DEA, which our readers will recall is the most pessimistic account of matters. In this case our analysis is only conducted over six years due to data limitations.

As can be seen, for most years Federation Council had optimal, or near-to-optimal, conversion of tax money into the various output proxies relative to all other rural NSW local governments. This is a commendable achievement and is proof beyond any reasonable doubt that the ratepayers of Federation are getting good value in relative terms.

Figure 10: Taxation Efficiency, Local Intertemporal, Data Envelopment Results, 2018-2023



It is probably not surprising that council is so tax (technically) efficient in a relative sense given that we have already demonstrated both good conversion of the factors of production (Figures 8 and 9) as well as far lower than expected revenue effort (see our *Capacity to Pay* report). It is notable that there has been a slight attenuation in the most recent year correlating somewhat with the large temporary SRV that is in place. For this reason, it will be important for Council to follow through on the recommendations made in our earlier work, in order that they might stay at the very face of the efficient frontier. There is always room for improvement – and we are convinced that Councillors, management and the dedicated staff do indeed wish to improve further – but given the results of world's best sophisticated analysis people ought not hope for huge leaps forward from future efficiency dividends (there just isn't much scope for savings when one is already close to optimally efficient). Instead, improvements will tend to be marginal – although certainly important and necessary.

5 The Determinants of Efficiency

In this section of the report, we will attempt to identify the effect of operating environment on relative technical efficiency. To do so we conducted second-stage regression analysis – a sophisticated mathematical technique capable of identifying the mean response of a dependent variable (the regressand), to a number of independent variables (the regressors).

The regressand for this particular exercise was the constant returns to scale efficiency scores derived from data envelopment analysis according to the following specification:

Staff ($) + operating expenditure ($) → residential (no.) + farm (no.) + business (no.) + sealed roads (km) + unsealed roads (km)

The CRS scores were logged to correct for skewed data and ensure normal residuals which are critical for accurate statistical inference. Readers may recall that VRS already controls for size effects, and it is clear that using scores of this kind would not have allowed us to test size-related regressors. Against the regressand we tested standard potential determinants as derived from the scholarly literature (see for example, Drew et al, 2015a).

OLS regression was used, with the addition of year dummies to control for the periods under analysis. A fixed effects regression was not suitable given time-invariant regressors, and a random effects estimate was ruled out by an unfavourable Hausman test. We also included a dummy variable in response to the substantial evidence that amalgamation increased unit costs, *ceteris paribus* (see, for example, McQuestin et al., 2020; Drew et al., 2021; Drew et al., 2023).

The econometric analysis that follows can be specified as:

$$\mathbf{T} = \alpha + \beta 1\mathbf{P} + \beta 2\mathbf{X} + \boldsymbol{\mu}.$$

In this specification **T** (the dependent variable) is the constant returns to scale technical efficiency score for each council in each year, **P** is a vector of relevant population data and **X** is a vector of socio-demographic and local government characteristics. Mu (**μ**) is an independent identically distributed random error term. It should be noted that natural log transformations were executed where required to correct for skewed distributions, as detailed in Table 2. All standard econometric tests were conducted, and the residuals were confirmed to be near-normal in distribution (a critical assumption for valid statistical reasoning).

Table 2: Definitions and Means of Variables, FY2019 - FY2023 Inclusive

Variable	Definition	Similar Councils
CRS (ln)	Constant returns to scale efficiency scores, logged.	-0.709
Number of assessments (ln)	Total number of assessable properties, logged.	8.336
Density (ln)	Population divided by the local government area, logged	0.063
IPPE (ln)	The value of infrastructure, property, plant and equipment, logged	12.848
Mean employee income (ln)	Mean employee income (lagged), logged	10.807
Mean unincorporated business income	Mean unincorporated business income (lagged)	15507.13
Aged	Proportion of people on an aged pension	13.614
DSP (ln)	Proportion of people on a disability support pension, logged	1.456
Newstart (ln)	Proportion of people on a Newstart allowance, logged	1.436
Carer (ln)	Proportion of people on a carers' pension, logged	0.416
Single (ln)	Proportion of people on a single parent pension, logged	0.400

Table 3: Multiple Regression Results, 2019-2023 inclusive

	Extended Cohort
Number of Assessments (ln)	2.406* (1.161)
Number of Assessments Squared (ln)	-0.110 (0.070)
IPPE (ln)	-0.139+ (0.089)
Welfare receipts	Yes**
Amalgamation	-0.032
n	241
Coefficient of Determination	0.5762

+p < 0.10, *p < 0.05, **p < 0.01. Standard errors in parentheses

In Table 3, we reproduce key results arising from our five-year regression. The results unfortunately are only suggestive rather than definitive, and don't really add much to the picture that we already have of relative technical efficiency.

Only one size variable was statistically significant (the polynomial term), and we therefore cannot confidently assert any size effect (contra the amalgamation debate). Notably the turning point revealed by calculus was well-beyond the size of any rural local government area (the second derivative revealed a turning point at around 56,182 assessments).

The value of infrastructure assets does seem to have a deleterious effect on efficiency, albeit only at the ten percent level of statistical certainty. The interpretation of this result is that a one percent increase in the value of infrastructure, is statistically associated with a 0.139 percent decrease to efficiency, *ceteris paribus*. The lesson here is that decision-makers should think very carefully before constructing new infrastructure because doing so is likely to reduce the efficiency with which inputs are converted into outputs for the future.

Several welfare receipts were statistically associated with reduced efficiency. In particular, welfare associated with disadvantage (Newstart allowance, single parent pensions and the like) reduced relative technical efficiency in a statistically significant manner. This is not terribly helpful for decision-makers, because disadvantage is largely beyond their control.

Amalgamation was associated with material reductions to efficiency, but this result was not statistically significant in this particular specification. It is quite likely that there is some conflation between this dummy variable and the size regressors, which has obscured inference in this instance.

The model did have high explanatory power as indicated by the coefficient of determination. However, aside from the infrastructure result, the determinants suggest few salient lessons for local government decision-makers in this case.

6 Efficiency Outcomes

Council has implemented a number of efficiency measures in response to both their undertakings as part of the temporary SRV previously granted, as well as the 2023 report on financial sustainability authored by Professors Drew, Miyazaki and Ferreira.

These measures are detailed in the Annual Report and other Council documents that should be consulted by the end-users of this present report.

7 Recommendations

As noted earlier, sophisticated evidence demonstrates beyond reasonable doubt that Council is operating at or very near to the efficient frontier according to most specifications and time periods. It is therefore reasonable to expect only marginal improvements to efficiency arising from the various recent interventions. Nevertheless, we certainly encourage Council to implement as many of the recommendations as possible, subject to legislation and consultation.

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