

Fiscal equalisation of Australian states and territories: policy options and welfare maximisation

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Abstract

The fiscal equalisation principle used by the Australian Commonwealth Grants Commission (CGC) is comprehensive by international standards in equalising the fiscal capacity of states. This system is most often justified on the grounds of equity. However, if labour is mobile then interstate migration achieves horizontal equity, while the redistribution policies of the Federal Government can achieve vertical equity. This means that the role of fiscal equalisation is to achieve an efficient distribution of different types of labour between states.

A theoretical model is presented that synthesises Boadway and Flatters (1982) and Albouy (2012) and is extended to give more attention to government expenditure and to include a consumption tax. It implies that full equalisation should be applied for the fixed costs of state government and for source-based taxes on natural resources, land and capital (e.g. mining royalties, land taxes, conveyancing duty). However, equalisation should be applied in a more limited way for the variable costs of state government, residence-based taxes on labour (e.g. payroll tax) and consumption taxes (e.g. GST). Limited equalisation covers differences in fiscal capacity arising from differences between states in their demographic mixes, but not from other differences such as in productivity or amenity. Some simplifying assumptions of the model are discussed including that there are fixed supplies of factors of production at the national level, labour is fully mobile between states, state governments take their equalisation grants as given and the services they provide are private.

Using the recent CGC assessment for 2015/16, the gain in consumer welfare from moving from the current Australian system to fully-efficient equalisation is estimated. Some recent proposals to move away from fiscal equalisation are also simulated and are found to involve welfare losses as they all involve moving away from full equalisation in areas where full equalisation is optimal.

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1 Introduction

Most federations use a system of fiscal equalisation to address concerns that states have different fiscal capacities. This is consistent with Buchanan (1950) who was concerned that economic forces had “tended to concentrate high income earners in specific geographic areas” leading to “inter-regional disparities in fiscal capacity”. He proposed the principle that fiscal equalisation be used to “allow state units originally unequal in fiscal capacity to provide equal services at equal rates of taxation”.

Australia has closely followed Buchanan’s principle in developing what Spahn (2007, p.93) has identified as the world’s most comprehensive system of fiscal equalisation.

Despite shortcomings such as a high degree of complexity, the Australia system has become *the* model for an ideal equalisation system. The basic approach is sound, complete, feasible, and reasonably transparent...the unique benchmark against which all equalisation mechanisms have to be compared in terms of their vulnerability to manipulation and perverse incentives.

Buchanan originally proposed his equalisation principle on the horizontal equity grounds of “equal treatment for equals” (Buchanan, 1950, p. 587). However, the free movement of labour between the states of a Federation offers a way of achieving horizontal equity in which individuals can account for a fuller range of factors than net fiscal benefits. But Buchanan (1952) also recognised that the principle of “equal treatment for equals” may also be important for achieving economic efficiency.

Indeed, Boadway and Flatters (1982), using a model with heterogeneous individuals, found that “the equalisation program that is called for on efficiency grounds is one that fully equalises per capita revenues from both source-based and residence-based taxes”. Full equalisation of the capacity to raise revenue was needed so that location decisions for each type of labour are driven by marginal productivity rather than net fiscal benefits.

Albouy (2012), using an extended version of the Boadway and Flatters (1982) model that allows for interstate differences in productivity and consumer amenity, calls this finding into question. “Unlike influential work by Buchanan (1950) and Boadway and Flatters (1982), I argue that, when properly interpreted, this same framework actually only supports the equalisation of source, and not residence-based revenues.” However, this paper will show that this apparent difference in findings is only partly explained by his model extensions. It is also due to his approach of combining equalisation transfers with other central government transfers that target vertical rather than horizontal equity.

The literature on fiscal equalisation has focussed more on state government revenues than their expenditures. The relative lack of attention to expenditures is a significant omission in analysing the Australian system because it is unusual in having comprehensive equalisation for state differences in expenditure needs.

The economic impacts of the Australian equalisation system have been estimated previously by Independent Economics (2012). Its report found that the existing Horizontal Fiscal Equalisation (HFE) system provided an annual consumer benefit of \$295 million, compared to a situation in which all equalisation adjustments, except on account of indigeneity, were abandoned. This study was subsequently extended and updated (Independent Economics, 2015).

Compared to Independent Economics (2015), this study develops the methodology in several ways. In particular, it allows for heterogeneous individuals, capital and different types of residence-based and source-based taxes. This allows more complete conclusions on optimal fiscal equalisation and closer comparisons with the existing literature.

Section 2 of this paper develops a model that synthesises Boadway and Flatters (1982) with Albouy (2012) and extends the modelling of expenditure to allow for fuller conclusions on expenditure equalisation. It also introduces a consumption tax to address the equalisation treatment of GST in the Australian setting. The resulting model is used to derive a welfare-maximising equalisation formula that is also practical to implement.

The key findings are that full equalisation should be applied for the fixed costs of state government and for source-based taxes on natural resources, land and capital. However, equalisation should be applied in a more limited way for the variable costs of state government, residence-based taxes on factor incomes and consumption taxes (e.g. GST). Limited equalisation covers differences in fiscal capacity arising from Buchanan's original concern – differences between states in their demographic mixes – but not from other differences such as in productivity or amenity.

Section 3 summarises the Australian system of fiscal equalisation that is managed by the Commonwealth Grants Commission (CGC). It identifies the similarities and differences between the Australian system and the welfare-maximising system.

Section 4 presents empirical analysis using the 2015/16 assessment by the CGC (2015) of state fiscal capacities. It estimates the impacts of alternative policy options for fiscal equalisation on the state distribution of the population and economic welfare. It finds a significant welfare gain in moving from the existing equalisation system to the welfare-maximising system but significant losses from other proposals to “reform” the system such as removing equalisation.

The main qualifications to the modelling are presented in section 5.

2 Equalisation model

The equalisation model presented here synthesises Boadway and Flatters (1982) and Albouy (2012). This proves to be useful in reconciling some apparent contradictions in their findings. It also extends their modelling to more fully consider equalisation of expenditures and consumption taxes to enhance the usefulness of the findings in the Australian setting. Table 1 compares the main assumptions made across the three models.

Boadway and Flatters (1982) present a range of alternative theoretical models that address different issues. This paper refers to the final model, which features heterogeneous individuals and capital, in line with the other models considered here.

An individual with labour of type e lives in state j and consumes a private consumption good c and state government services g , which are assumed to be publicly-provided private goods. Both of these goods are produced from an intermediate good, y , which serves as the numeraire. Productivity can differ between states so the price of c and g may also differ. The individual's full income can be written as follows.

$$y_e^j = PC^j c_e^j + PG^j g_e^j \quad [1]$$

The individual's utility also depends on the consumer amenity, Q , of the state in which they live. Hence the indirect utility function, V , takes the following form.

$$V_e = V_e(PC^j, PG^j, y_e^j, Q_e^j) \quad [2]$$

Under the long-run assumption of perfect mobility of labour, utility is the same in whichever state they live.

In each state, capital K , land L (which can also refer to natural resources) and each type of labour N are combined to produce the intermediate good. Part of this output is used to cover the fixed costs of the state government, GF , while the remainder is available for satisfying consumer wants. The national income constraint is as follows.

$$\sum_j \sum_e N_e^j y_e^j = \sum_j \{F^j(K^j, L^j, N^j) - GF^j\} \quad [3]$$

The supply of land in each state is taken as given. The supplies of capital and each type of labour are taken as given at the national level, but these factors are both perfectly mobile between states, leading to the following constraints.

$$K^{TOT} = \sum_j K^j \quad [4]$$

$$N^{TOT} = \sum_j N^j \quad [5]$$

Table 1: Comparison of Main Assumptions

| | <i>Boadway and Flatters (1982)</i> | <i>Albouy (2012)</i> | <i>this paper</i> |
|---|--|---|---|
| <i>No. of regions</i> | 2 | any | any |
| <i>State Residence-based taxes</i> | Labour, property | Labour, interest, rent | Labour, interest, rent, consumption |
| <i>State Source-based taxes</i> | Capital, fixed factor | Capital, fixed factor | Capital, fixed factor |
| <i>Central Govt taxes</i> | None | Residence-based taxes | None |
| <i>Central Govt transfers</i> | to state governments | to individuals (differentiated by type by state) | to state governments; to individuals (differentiated by type) |
| <i>Individuals</i> | heterogeneous | heterogeneous | heterogeneous |
| <i>asset holdings (regional/national)</i> | national | national | national |
| <i>key differences between states</i> | Skill-mix of individuals | Skill-mix of individuals; private & government productivity, consumer amenity | Skill-mix of individuals; private & government productivity, consumer amenity |
| <i>State government good</i> | Private; equal provision across individuals; no fixed production costs | Private/public; equal provision across individuals; no fixed production costs | Private; provision can vary across individuals; fixed production costs |
| <i>state government view of equalisation grants</i> | taken as given | taken as given | taken as given |
| <i>Labour and capital supplies</i> | Fixed nationally; fully mobile between states | Fixed nationally; fully mobile between states | Fixed nationally; fully mobile between states |

To achieve a Pareto optimum, a Lagrangian is formed in which the utility of one type of individual, that of type 1, is maximised while holding the utility of all other types fixed and taking into account the constraints of equations (2), (3), (4) and (5).

$$\mathcal{L}() = V_1 + \sum_j \sum_e \eta_e^j [V_e - V_e(PC^j, PG^j, y_e^j, Q_e^j)] + \pi[\sum_j \sum_e N_e^j y_e^j - \sum_j \{F^j(K^j, L^j, N^j) - GF^j\}] + \kappa[K^{TOT} - \sum_j K^j] + \sum_e v_e [N_e^{TOT} - \sum_j N_e^j] \quad [6]$$

Putting aside the constraints themselves, there are four sets of first order conditions.

$$\frac{\partial \mathcal{L}}{\partial V_1} = 0 \quad [7]$$

$$\frac{\partial \mathcal{L}}{\partial y_e^j} = 0 \quad [8]$$

$$\frac{\partial \mathcal{L}}{\partial N_e^j} = 0 \quad [9]$$

$$\frac{\partial \mathcal{L}}{\partial K^j} = 0 \quad [10]$$

Evaluating these derivatives and re-arranging gives the following conditions.

$$\sum_j \eta_1^j = -1 \quad [11]$$

$$\pi = \frac{\eta_e^j \frac{\partial V_e}{\partial y_e^j}}{N_e^j} \quad [12]$$

$$v_e = \pi(y_e^j - w_e^j) \quad [13]$$

$$\kappa = -\pi i^j \quad [14]$$

The above uses the results that factors are paid their marginal products. These factor payments are represented by the wage w , and the rental price of capital i . The two important first order conditions for present purposes are those associated with the optimal state distributions of capital and each type of labour.

Equation (14) implies that, for capital to be optimally allocated across states, its rental price must be the same in all states. Otherwise, returns to capital could be increased by re-allocating capital from states where its marginal product is lower to states where it is higher.

Later a source-based tax on capital will be introduced into the model. Investors arbitrage between states so that post-tax rates of return are uniform. In that case uniform rental prices can only be maintained if the tax wedge formed by the rate of source-based tax on capital is

also uniform. This means that if states can levy a source-based company tax, as they can in some countries, a Pareto optimum requires that they all tax at the same rate (Boadway and Flatters, 1982).

Turning to equation (13), it implies that for each type of labour to be optimally allocated across states, the non-labour income ($y-w$) offered by each state for a given type of individual must be the same. This is so location decisions for labour are driven by the marginal product of labour and are not distorted by signals from non-labour income.

Putting this another way, equation (13) can be manipulated to state that, for an individual of a given type, non-labour income in any state is equal to the same national average.

$$y_e^j - w_e^j = \frac{\sum_j N_e^j y_e^j}{N_e^{TOT}} - \frac{\sum_j N_e^j w_e^j}{N_e^{TOT}} \quad [15]$$

This condition for the optimal allocation of each type of labour across states is at the core of deriving the welfare-maximising formula for fiscal equalisation. The next step is to identify the components of non-labour income both for the individual in a particular state and for the national average for that type of individual. This involves considering the central government and state government budget constraints.

The treatment of the central government is rudimentary because the focus of the model is equalisation policy for state budgets. In the model, the central government budget is made up of two types of transfers. The first is transfers between different types of individuals aimed at achieving vertical equity. These transfers are according to the type of individual.

$$\sum_e N_e^{TOT} tr_e = 0 \quad [16]$$

The second is fiscal equalisation transfers. These transfers are according to state and are paid to state governments.

$$\sum_j hfe^j \sum_e N_e^j = 0 \quad [17]$$

Distinguishing between these two types of central government transfers will assist later in reconciling the equalisation findings of Boadway and Flatters (1982) and Albouy (2012).

The modelling of state government budgets is more involved.

$$PG^j \sum_e N_e^j g_e^j + GF^j = hfe^j \sum_e N_e^j + tc^j PC^j \sum_e N_e^j c_e^j + tL^j r^j L^j + tK^j i^j K^j + tW^j \sum_e w_e^j N_e^j + tI^j \sum_e \frac{N_e^j}{N_e^{TOT}} \theta_e \sum_j (1 - tK^j) i^j K^j + tR^j \sum_e \frac{N_e^j}{N_e^{TOT}} \theta_e \sum_j (1 - tL^j) r^j L^j \quad [18]$$

The left hand side shows state government expenditures. As was implicit above, a distinction is made between the variable and fixed expenditures of state governments. Fixed costs take

into account that any state government will incur some minimum level of costs in establishing and maintaining an administrative structure independent of the size of the state population.

The right hand side shows state government revenues. The first term is the fiscal equalisation transfer from the central government that was introduced above. The second term extends Albouy (2012) with the inclusion of a state consumption tax at the rate tc . The remaining terms follow Albouy (2012) by allowing for source-based taxes on land and capital at the rates tl and tK , and residence-based taxes on labour, capital and land incomes at the rates tw , tI and tR respectively.

Because individuals are assumed to own a share of national assets, the nature of the tax base for residence-based taxes on land and capital is the same for each state. Each class of individual is assumed to own a fixed share θ_e of the national stocks of capital and land, with these shares summing to unity.

Having established the national, central government and state government budget constraints, the budget constraint facing each individual can be inferred.

$$y_e^j = tr_e + w_e^j + \frac{\theta_e}{N_e^{TOT}} \sum_j (1 - tK^j) i^j K^j + \frac{\theta_e}{N_e^{TOT}} \sum_j (1 - tL^j) r^j L^j + res_e^j \quad [19]$$

On the left-hand side of equation (19) is the full income of the individual, y . Once it is determined, it is available to be spent on c and g according to equation [1]. The state government is assumed to choose the level of g leaving the individual to consume c from the remaining income. The level of g that is chosen by the state government is assumed to be that which leaves the individual with the utility maximising combination of c and g , given y .

On the right-hand side of equation (19) is the sources of the individual's full income. These include its transfer from the central government, its labour income, and its capital and land income, net of taxes that have been deducted at the source. It also includes a net fiscal benefit from the state government or fiscal residuum of res , which is defined in equation [20].

$$res_e^j = PG^j g_e^j - tc^j PC^j c_e^j - tw^j w_e^j - tI^j \frac{\theta_e}{N_e^{TOT}} \sum_j (1 - tK^j) i^j K^j - tR^j \frac{\theta_e}{N_e^{TOT}} \sum_j (1 - tL^j) r^j L^j \quad [20]$$

The net fiscal benefit from the state government consists of the value of government services net of payments of each of the state residence-based taxes.

We can now return to equation [15], the key condition for obtaining an optimal allocation of labour across states. The left hand-side refers to an individual's non-labour income. The components of this can now be identified by re-arranging equation [19].

$$y_e^j - w_e^j = tr_e + \frac{\theta_e}{N_e^{TOT}} \sum_j (1 - tK^j) i^j K^j + \frac{\theta_e}{N_e^{TOT}} \sum_j (1 - tL^j) r^j L^j + res_e^j \quad [21]$$

The right-hand side of equation [15] refers to the national average non-labour income for the same type of individual. This can be obtained by multiplying equation [21] by the number of individuals of that type in that state, aggregating over states and then dividing by the number of individuals of that type. This gives equation [22].

$$\frac{\sum_j N_e^j y_e^j}{N_e^{TOT}} - \frac{\sum_j N_e^j w_e^j}{N_e^{TOT}} = tr_e + \frac{\theta_e}{N_e^{TOT}} \sum_j (1 - tK^j) i^j K^j + \frac{\theta_e}{N_e^{TOT}} \sum_j (1 - tL^j) r^j L^j + \frac{1}{N_e^{TOT}} \sum_j N_e^j res_e^j \quad [22]$$

The optimal allocation of labour depends on equality between the components of the individual's non-labour income shown on the right-hand side of equation [21] with the corresponding components for the national average for that type of individual shown on the right hand side of equation [22]. There are three components of non-labour income in the model, any of which could potentially led to distortions in the allocation of labour between states.

The first component is central government transfers (positive and negative) designed to achieve vertical equity. These match in the two equations. Following Albouy (2012), the model makes the reasonable assumption that the amount of transfer depends only on the type of individual, not their location. Thus, the central government's transfer payments do not distort the location of any type of individual.

The second component is property income, including rental income from both capital and land. These components also match. Here the literature is divided between assuming that individuals own a share of assets in the state in which they live versus assuming that they own a share of national assets. If they own a share of the assets in the state in which they live, their location decision can be influenced by state differences in property income, as in one of the earlier models considered by Boadway and Flatters (1982). However, in reality private wealth does not change merely as a result of moving from one state to another, even though portfolio compositions may. So to remove this doubtful influence on location decisions, this paper follows Albouy (2012) and the final model in Boadway and Flatters (1982) in assuming that individuals own a share of national assets, rather than a share of state assets. This means that property income does not influence location decisions.

The third component is the net fiscal benefit. Comparing the two equations, the condition required for an optimal allocation of labour across states is as follows.

$$res_e^j = \frac{1}{N_e^{TOT}} \sum_j N_e^j res_e^j = res_e \quad [23]$$

In the absence of fiscal equalisation, only by chance can state governments afford to offer the same net fiscal benefit to an individual of a given type. In particular, states dominated by high income earners will have more fiscal capacity to offer net fiscal benefits to a given type of

individual than states that are dominated by low income earners. The resulting differences in net fiscal benefit are likely to distort the allocation of each type of labour across states. However, equalisation transfers can be used to remove such differences in fiscal capacity. We now solve for those equalisation transfers.

The first step is to re-express the state government budget constraint of equation [18] by substituting in for the net fiscal benefit given by equation [20]. In doing so, the net fiscal benefit is set to be the same in each state, in accordance with equation [23]. This implicitly assumes that each state optimises the spread of net fiscal benefits across different types in the same way, namely to be consistent with the vertical equity judgments made in setting utility levels of different types in the original Lagrangian.

$$\sum_e N_e^j res_e + GF^j = hfe^j \sum_e N_e^j + tL^j r^j L^j + tK^j i^j K^j \quad [24]$$

This form of the state budget constraint can also be aggregated over states to obtain the all states budget constraint in equation [25]. This aggregation uses the fact that the fiscal equalisation transfers sum to zero, as required by equation [17].

$$\sum_e N_e^{TOT} res_e + \sum_j GF^j = \sum_j tL^j r^j L^j + \sum_j tK^j i^j K^j \quad [25]$$

Expressing both the state and all states budget constraints in per capita form, subtracting the all states constraint from the states constraint, and re-arranging gives the solution for the optimal fiscal equalisation transfers expressed on a per capita basis.

$$hfe^j = [GF^j/N^j - \sum_j GF^j/N] - [tL^j r^j L^j/N^j - \sum_j tL^j r^j L^j/N] - [tK^j i^j K^j/N^j - \sum_j tK^j i^j K^j/N] + \sum_e (N_e^j/N^j - N_e^{TOT}/N) res_e \quad [26]$$

In the above, res_e is constructed as the national average for the net fiscal benefit of a type e individual.

$$res_e = \frac{1}{N_e^{TOT}} \sum_j PG^j N_e^j g_e^j - \frac{1}{N_e^{TOT}} \sum_j tc^j PC^j N_e^j c_e^j - \frac{1}{N_e^{TOT}} \sum_j tw^j N_e^j w_e^j - \frac{\theta_e}{N_e^{TOT}} \sum_j \frac{N_e^j tL^j}{N_e^{TOT}} \sum_k (1 - tK^k) i^k K^k - \frac{\theta_e}{N_e^{TOT}} \sum_j \frac{N_e^j tR^j}{N_e^{TOT}} \sum_k (1 - tL^k) r^k L^k \quad [27]$$

Equation [26] conveniently decomposes the components of the state budget into those that should be fully equalised and those that should be subject to more limited equalisation. The first three terms involve full equalisation and are now considered in turn.

The first term implies that the fixed costs of government should be fully equalised. A state government receives from the equalisation pool its state fixed costs and pays into the pool its per capita share of the fixed costs for all states. In that way, each state faces the same per capita fixed costs. This removes the fiscal advantage that larger states enjoy over smaller states from

spreading fixed costs over a larger population base. It is efficient to equalise for fixed costs because labour location decisions should be based on marginal costs, not fixed costs.

The second and third terms imply that source-based taxes on assets such as land (or natural resources) and capital should be fully equalised. In the model individuals own shares of national assets, so the ability to tax asset income at its source enables a state government to tax asset holders nationwide. For example, mining royalties allow a state government to tax shareholders in all states. Because of this national incidence, it is efficient to share the proceeds nationally. To do otherwise creates fiscal advantages for states with more ready access to source-based tax revenue, leading to inefficient fiscally-induced migration.

The final term involves limited equalisation of the net fiscal benefit. This limited equalisation removes state differences in fiscal capacities that arise from differences in state population compositions. This is consistent with Buchanan's original argument that it is important to equalise differences in fiscal capacities that arise from higher income earners congregating in particular states.

At the same time, other fiscal advantages and disadvantages affecting the net fiscal benefit are not equalised. In the model, such advantages and disadvantages can arise because states can differ in their productivity and in their consumer amenity. This in turn can drive state differences in wages as well as in prices for the private and government goods. It is inefficient to equalise for these differences.

The reason for this can be understood by considering the makeup of the net fiscal benefit. It is defined as the variable cost of providing government services net of the tax revenue raised within the state (from residence-based taxes) to fund those services. As Albouy (2012) notes, this can be interpreted as a user pays approach to providing government services with payment via the tax system. For this to work efficiently, price signals need to be transmitted from expenditures to revenue raising, not offset by equalisation. For example, if providing government services in a state is expensive because of remoteness or other factors, it is important this price signal is transmitted to residents of that state through higher taxes. Equalising for it would create a distortion leading to over settlement of that state relative to lower cost states.

This analysis is consistent with Boadway and Flatters (1982). As noted in the introduction, they call for full equalisation of both residence-based and source-based taxes. However, their finding for residence-based taxes stems from their assumption shown in Table 1 that states only differ in their population compositions. Had they also considered differences between states in productivity or consumer amenity, they would have found in favour of the limited equalisation proposed here that is based on population compositions only.

This analysis is also consistent with the model of Albouy (2012). This may appear surprising given Albouy's conclusion: "unlike influential work by Buchanan (1950) and Boadway and

Flatters (1982), I argue that, when properly interpreted, this same framework actually only supports the equalisation of source, and not residence-based revenues”.

The reason for this apparent inconsistency is that noted in the introduction: Albouy’s approach does not separate equalisation transfers from other central government transfers that target vertical rather than horizontal equity. Thus, his total transfers include both the horizontal equalisation transfers introduced in equation [17] as well as they vertical equity transfers introduced in equation [16].

$$F_e^j = hfe^j + tr_e \quad [28]$$

Albouy (2012) also uses a variable that covers both central and state government vertical redistribution between types of individuals.

$$F_e = tr_e + res_e - \overline{res} \quad [29]$$

Eliminating tr from these equations gives the following equation for Albouy’s total transfers.

$$F_e^j = hfe^j + \overline{res} - res_e + F_e \quad [30]$$

To see the implications of this, we begin by re-writing our optimal equalisation formula of equation [26] more simply as follows.

$$hfe^j = X^j + \overline{res}_j - \overline{res} \quad [31]$$

Here X covers the terms involving full equalisation. The remaining term shows that limited equalisation involves a per capita transfer equal to the difference between the average net fiscal benefit for a state and the corresponding national average. Because low income earners receive high net fiscal benefits and high income earners receive low net fiscal benefits, this involves transfers in the expected direction, from high income states to low income states. This represents the equalisation advocated by Buchanan (1950) for the differences in fiscal capacities arising from differences in population composition.

Substituting our solution for optimal fiscal equalisation transfers of equation [31] into equation [30] gives equation [32], which is in the form used by Albouy (2012).

$$F_e^j = X^j + \overline{res}_j - res_e + F_e \quad [32]$$

This equation includes an equalisation term for the difference between the average net fiscal benefit for a state and the net fiscal benefit for a type. Since high income earners receive low net fiscal benefits this appears to involve transfers in the opposite direction to before, from low income earners to high income earners. Albouy (2012) explains this as follows: “households paying more than the average (i.e. high income earners) should have excess taxes refunded to them by the federal government, insuring that local taxes operate as user fees”.

While Albouy (2012) is correct in terms of the definitions that he uses, it is important to note the following. His conclusions only apply when considering total transfers not specifically equalisation payments, and only after already accounting for the vertical redistribution factor defined in equation [29].

For the policy purpose of designing a fiscal equalisation formula, the relevant equation to use is equation [26] or, in its abbreviated form, equation [31]. As already discussed, it features a limited equalisation for residence-based taxes that captures Buchanan's concern of equalising for differences in fiscal capacities arising from differences in population compositions.

Our approach provides some insights into the equalisation of state government expenditure. Boadway and Flatters (1982) and Albouy (2012) do not model this as they assume that government services are demanded and provided at the same level to everyone. This means that no state enjoys a population composition-related fiscal advantage or disadvantage in meeting expenditure needs.

In practice, the Australian experience with equalisation shows important differences in the expenditure needs of different population groups. For example, the indigenous population has high government expenditure needs and is highly represented in the Northern Territory. This paper confirms that such differences in expenditure needs based on population compositions should be fully equalised, as Albouy (2012) surmises. As also noted above, this paper also finds that the fixed costs of government should be fully equalised. Australia practices both forms of equalisation. However, Australia goes further by equalising for differences in costs and prices affecting government expenditures. This step away from pricing state government services through the state tax system reduces efficiency. The Australian system is now considered in more detail.

3 The Australian fiscal equalisation system

In Australia, as in most other federations, a system of fiscal equalisation is used to address concerns that states have different fiscal capacities. Historically, the system has been motivated by a desire of governments to achieve horizontal equity. As a result, it differs in some respects from the approach developed in section 2, which is based on efficiency. Nevertheless, many of the aspects of the Australian system are consistent with the objective of efficiency.

The method of delivering equalisation varies between jurisdictions, and in Australia it involves adjustments to the general purpose grants that states receive from the pool of GST revenue. The initial division of the GST pool is based on each states' share of the national population. Each share is then adjusted up or down depending on whether a state's fiscal capacity is assessed to be below or above the average for all states. These grant adjustments leave each state with the same assessed capacity to provide government services.

In recent years the amount of equalisation recommended by the CGC has increased. This is because, with its high endowment of mineral resources, the fiscal capacity of Western Australia has strengthened with the lift in mining royalties from the mining boom. The resulting larger downward adjustments to WA's share of GST revenue has led to proposals from the WA Government to modify the HFE system.

This section analyses the general factors used by the CGC in formulating its equalisation recommendations, against the optimal equalisation approach developed in section 2. It then examines in greater detail the CGC's latest recommendations, which are for the state distribution of GST revenue in 2015/16.

3.1 General approach

The general equalisation principle used by the CGC (2015) is as follows.

State governments should receive funding from the pool of goods and services tax such that, after allowing for material factors affecting revenues and expenditures, each would have the fiscal capacity to provide services and the associated infrastructure at the same standard, if each made the same effort to raise revenue from its own sources and operated at the same level of efficiency.

This is similar to the original equity-based equalisation principle advocated by Buchanan (1950) to "allow state units originally unequal in fiscal capacity to provide equal services at equal rates of taxation".

This is consistent with the traditional view of governments in Australia that the role of fiscal equalisation is to achieve horizontal equity. The CGC does a professional job in following this equity-based policy approach required of it by government. One aim of this paper is to examine the benefits to the community of a change in government policy to an efficiency-based approach to equalisation.

The CGC (2015) lists the broad range of factors it uses in assessing fiscal capacity.

The fiscal positions of the States differ because of differences in their natural endowments, their economic, demographic and geographic circumstances and the policy choices they make. The Commission calculates what the fiscal capacities of the States would be if the policy differences were removed. We call these the assessed fiscal capacities of States and they are central to our recommended GST distribution. This distribution is designed to equalise the assessed fiscal capacities of the States.

Thus, the equalisation transfers between states recommended by the CGC are driven by four factors:

- natural endowments;
- demographic circumstances;
- geographic circumstances; and
- economic circumstances.

These four factors are now considered in turn against the efficiency-based approach to equalisation developed in section 2.

Natural endowments

Higher natural endowments of mining resources and prime land provide a state with a fiscal advantage in collecting mining royalties, land tax and conveyancing duties. These can be regarded as source-based taxes. Thus, in terms of the analysis set out in section 2, they should be fully equalised and they are. This promotes efficiency by eliminating fiscally induced migration caused by differences in state capacities to raise source-based taxes from the national population.

Mining royalties are currently the largest driver of equalisation transfers in Australia. In fully equalising for the capacity to raise mining royalties, there are two design considerations. First, to the extent practical, equalisation should be based on mining capacity rather than mining effort. Second, to the extent that state government revenue raising from mining royalties involves expenditure costs such as costs incurred in project approval processes, these should be offset against the revenue gains.

Demographic circumstances

As originally argued by Buchanan (1950), demographic circumstances can significantly affect a state's fiscal capacity. If a high proportion of a state's population is in a low socio-economic group or elderly, revenue-raising capacity will be lower and expenditure needs higher. The Australian practice of fully equalising for this fiscal disadvantage can be expected to promote efficiency, as established in section 2. It promotes efficiency by eliminating fiscally-induced migration caused by demographic differences.

Geographic circumstances

Geographic circumstances can also affect a state's fiscal capacity. The CGC equalises for geographic factors, including the higher costs associated with remoteness and large urban centres. Notwithstanding its statement above, in practice the CGC partially rather than fully equalises for geographic factors. Boadway (2007) explains the partial equalisation process as follows.

Rural and urban areas have different levels of health care and roads because it costs more to provide such services in rural areas. Equalisation systems typically do not try to fully equalise differences in costs. One way of dealing with the problem is to take as given differences in levels of public services in different geographic locations and to equalise the costs of providing those services for like areas across regions. This is the approach taken in Australia.

However, as established in section 2, from an efficiency perspective, these higher cost areas should not be subsidised. Rather, the additional costs should be funded on a user pays basis through taxes levied on state residents, not funded nationally through equalisation payments. Thus, the efficiency of the Australian equalisation system would be improved by moving from partial to no equalisation for geographic circumstances.

Economic circumstances

The CGC also equalises for the effects of economic circumstances on several areas of a state's budget. However, under the efficiency analysis of section 2, these are all areas in which only limited equalisation (i.e. for demographic circumstances) should apply. Thus, for maximum efficiency, the existing equalisation for economic circumstances should be replaced with narrower equalisation for demographic circumstances. The two main areas of equalisation for economic circumstances are the CGC assessments for payroll tax revenue and the wage costs of expenditures. These two areas are now considered in turn.

The CGC assesses a state's relative capacity to raise payroll tax revenue from two state labour market outcomes: the average wage and the employment to population ratio. However, these outcomes are affected by both demographic and economic circumstances.

It is efficient to equalise for the contribution of demographic circumstances (i.e. mix of labour market skills) to payroll tax revenue. However, it is not efficient to equalise payroll tax revenue for differences between states in labour market outcomes for the same skill groups. In the model of section 2, such differences arise from differences between states in productivity and consumer amenity. These differences act as a market signal for economic migration in an efficiently operating national labour market.

In this report, we simulate the replacement of equalisation for economic circumstances with the more appropriate and narrower equalisation for demographic circumstances. In doing so,

we make the simplifying assumption that differences between states in wages reflect economic circumstances while differences in employment to population ratios reflect demographic circumstances. In practice, if equalisation for economic circumstances is replaced by equalisation for demographic circumstances, it would be necessary for the CGC to undertake a more sophisticated, detailed decomposition of labour market outcomes into demographic and economic circumstances.

Turning to the equalisation of expenditures for wage costs, the CGC appropriately seeks to obtain a pure measure of wage costs by controlling for a wide range of demographic and other factors that lead to differences in average wage rates between states. However, if the aim is to promote efficiency, any equalisation for differences in wage costs would be removed, as shown in section 2.

The above analysis is summarised in Table 2. It shows, for each of the four factors, whether the CGC applies equalisation. It compares this with the optimal approach to equalisation developed in section 2.

Table 2: Equalisation Factors

| Factor | CGC | fully-efficient |
|---------------------------|---------|--------------------------|
| natural endowments | yes | yes |
| demographic circumstances | yes | yes |
| geographic circumstances | partial | no |
| economic circumstances | yes | replace with demographic |

In addition, under a fully efficient approach the equalisation process would be widened to cover more taxes as explained below.

3.2 2015/16 assessment

In practice, the equalisation process used by the CGC is more complex than it may appear from the four factors listed in Table 2. This is seen in the latest CGC assessment, which relates to the distribution of GST revenue in 2015/16. Table 3 is drawn directly from the CGC (2015) report and shows 18 separate components or drivers that are aggregated to reach the final recommended transfers. Those recommended equalisation transfers appear in the final row of the table. By design, they sum to zero when added across states.

For modelling purposes, these drivers are aggregated to the four broader categories shown in Table 2. A final column has been added to the table showing, for each driver, the broader category (or categories) into which it has been classified.

On the revenue side, there are five categories. Three of these are classified to the “source-based” revenue category: mining royalties, conveyancing duty and land tax. Such source-based revenue should continue to be fully equalised, as established in section 2.

Table 3: CGC Drivers of fiscal equalisation

| Table S4-6 Drivers of illustrative difference from EPC distribution of GST, 2015-16 (\$ million) | | | | | | | | | | |
|--|--------|--------|-------|--------|-------|-------|------|-------|--------|----------------|
| | NSW | Vic | Qld | WA | SA | Tas | ACT | NT | Redist | category |
| | \$m | \$m | \$m | \$m | \$m | \$m | \$m | \$m | \$m | |
| Effects of revenue raising capacity | 2 253 | 2 981 | - 273 | -5 888 | 527 | 208 | 204 | - 12 | 6 173 | |
| Mining production | 2 262 | 2 993 | -274 | -5 911 | 529 | 209 | 205 | -12 | 6 197 | source-based |
| Payrolls paid | -145 | 460 | 205 | -1 114 | 387 | 208 | -18 | 16 | 1 276 | economic/demog |
| Property sales (a) | -762 | -25 | 247 | -174 | 483 | 177 | 10 | 44 | 961 | source-based |
| Land values | 36 | -122 | -31 | -269 | 229 | 81 | 53 | 23 | 422 | source-based |
| Other revenue effects | 247 | 60 | -104 | -246 | -31 | 19 | 40 | 15 | 382 | economic/demog |
| Total revenue raising capacity | 1 638 | 3 366 | 43 | -7 714 | 1 598 | 694 | 291 | 85 | 7 714 | |
| Effects of expenditure requirements | | | | | | | | | | |
| Demographic features | | | | | | | | | | |
| Remoteness and regional costs (b) | -1 336 | -1 113 | 696 | 508 | 130 | 377 | -153 | 890 | 2 601 | geographic |
| Indigenous status (c) | -118 | -1 298 | 594 | 190 | -120 | 84 | -55 | 722 | 1 591 | demographic |
| Socio-economic status (d) | 376 | -79 | -64 | -293 | 310 | 36 | -210 | -76 | 722 | demographic |
| Other SDC (e) | -43 | -368 | 326 | -111 | 96 | 27 | -35 | 108 | 557 | demographic |
| Wage costs (f) | 348 | -629 | -464 | 842 | -164 | -111 | 84 | 93 | 1 368 | economic |
| Population growth (g) | -737 | -151 | 157 | 1011 | -268 | -156 | -37 | 181 | 1 349 | demographic |
| Urban centre size (h) | 323 | 744 | -563 | 25 | -152 | -211 | -54 | -112 | 1 092 | geographic |
| Administrative scale | -443 | -280 | -173 | 42 | 118 | 225 | 237 | 273 | 896 | fixed costs |
| Natural disaster relief | -216 | -236 | 661 | -75 | -89 | -25 | -17 | -3 | 661 | geographic |
| Small communities (i) | -311 | -274 | 95 | 187 | 63 | 22 | -19 | 238 | 605 | geographic |
| Non-State sector (j) | -332 | -229 | 25 | 428 | -35 | 62 | 59 | 21 | 595 | demographic |
| Other expense effects | -476 | -990 | 262 | 491 | 119 | 24 | -43 | 613 | 1 510 | demographic |
| Total expense and capital effects | -2 965 | -4 904 | 1 552 | 3 247 | 9 | 356 | -243 | 2 948 | 8 112 | |
| Effects of Commonwealth payments | 438 | 59 | -74 | -22 | -132 | -38 | 51 | -282 | 547 | |
| Total | -889 | -1 479 | 1 521 | -4 490 | 1 475 | 1 012 | 98 | 2 752 | 6 858 | |

Note: The redistribution is the total difference from the EPC distribution. It is the sum of positive (or negative) items in each row.

(a) Stamp duty on conveyances only. Excludes stamp duty on motor vehicles.

(b) The effects of remoteness on the use and cost of services.

(c) The effects of Indigenous status on the use and cost of services. It does not include the effects Indigenous SES status.

(d) The effects of socio-economic status on the use and cost of services. In most categories, we have used area based measures.

(e) Includes the effects of interstate differences in age structure (including number of students in the Schools assessment), NE

(f) The effect of differences between States in wage costs on the cost of providing services across States.

(g) The effects of population growth on State investment in infrastructure including urban public transport, net borrowing and

(h) The effects of urban centre size on urban transport subsidies and investment in urban transport infrastructure. Excludes th

(i) The effects of concentrations of people living in small, remote and very remote communities on utility subsidies.

(j) The effect of the provision of services by the non-State sector on the demand for State education and health services.

The remaining two categories of revenue are classified to both the “economic” and demographic categories. These revenue sources are payroll tax, which has been discussed earlier, and “other revenue effects”, which refer to insurance taxes and motor vehicle taxes. These other revenue effects are driven by state incomes, which are influenced by demographic circumstances such as the proportion of the population of prime working age, and economic circumstances such as the wages and productivity of different groups of workers. Under the analysis of section 2, the equalisation process for these two revenue items should be narrowed so that it is limited to demographic circumstances.

There is also a final category of revenue, “other revenue” (not to be confused with “other revenue effects”) which is not shown in Table 3 because the CGC does not assess it. The CGC therefore implicitly assumes that “other revenue” is driven by population size so no equalisation is needed. Accounting for 38 per cent of state government revenues, this category includes gambling taxes, user charges and interest and dividends. It seems likely that the bulk of revenue in this category is also driven by state incomes and therefore will be affected by both demographic and economic circumstances. Under the analysis of section 2, equalisation for “other revenue” should be introduced but limited to demographic circumstances only.

Finally the GST itself is not included in the CGC table. The CGC implicitly treats the GST as a central government tax and therefore outside of its framework for equalising state government fiscal capacities.

The arguments for this approach would be that legally the GST is a Federal tax and that rates of GST cannot vary from state to state. However, GST revenue is raised from state residents and fully spent by state governments, making it an integral component of state budgets. This places it within usual economic analysis of state fiscal equalisation such as that presented in section 2.

Indeed, Albouy (2012) goes further and includes all state and central government taxes in his assessment of fiscal equalisation. This is understandable in that, as Albouy (2012) shows, central government taxes can distort labour location decisions across states. On the other hand, perhaps locational distortions caused by pure central government taxes are something for the central government to address in designing those taxes, rather than something to be addressed through fiscal equalisation between states. Perhaps for that reason, the literature is generally focussed on state budgets.

Turning to the expenditure side, many of the drivers, such as indigenous status, are demographic-related. If a state has a high concentration of people from a demographic group that requires a high level of government services, it is important to equalise for this, in line with the analysis of optimal equalisation in section 2. Otherwise, the resulting high state tax burden will lead to inefficient, fiscally induced outward migration.

Four of the drivers are geographic, the most important being remoteness and regional costs. As noted above, the CGC does not fully equalise for geographic circumstances but rather partially equalises by funding like services in like areas. As discussed earlier, cost factors such as geographic circumstances ought not to be equalised from an efficiency perspective.

The next expenditure driver is administrative scale. This refers to the fixed costs of providing state government services. The division of Australia into eight states and territories with eight sets of fixed costs is a given or “natural” feature of the political environment in which equalisation is designed to operate. The analysis in section 2 found that such fixed costs should be fully equalised, so that location decisions can be based efficiently on marginal costs and benefits.

The final expenditure driver of wage costs is clearly part of the “economic circumstances” of each state. As discussed above, it ought not to be equalised for from an efficiency perspective.

3.3 Previous Australian estimates of gains from HFE

Before describing our estimates of the welfare impacts of fiscal equalisation, this section considers previous estimates for Australia of the efficiency effects of the existing equalisation system.

Dixon et al. (2002) use a “general equilibrium model that was tailor-made for examining the welfare effects of variations in the Commonwealth/State funding arrangements”. They simulate repealing the current equalisation system and distributing the GST on a purely equal per capita (EPC) basis (apart from retaining equalisation for indigeneity). They estimate this would result in a welfare *gain* of \$169 million in 2000/01 terms. They suggest that “the major source of gain from reducing subsidisation in the allocation of Commonwealth grants is that it will take money away from State governments that do not spend it in accordance with household preferences” (Dixon et al. 2002, p19).

Independent Economics (2012) approximately reproduce the Dixon et al. general equilibrium modelling. They find that the unexpected direction of the Dixon et al. result is due to the inconsistent way that they estimate welfare. In modelling interstate migration decisions, Dixon et al. include an amenity effect under which consumer welfare is reduced by an increase in a state’s population. However, when calculating the change in consumer welfare resulting from that interstate migration, they include no such amenity effect. This leads them to report a welfare gain from abolishing HFE. If instead they had consistently applied the same measure of consumer welfare throughout, the approximate replication of their modelling shows that they would have found a significant welfare loss, not a welfare gain, from repealing fiscal equalisation.

Independent Economics (2012) also use their general equilibrium modelling to provide their own estimate of the welfare effect from repealing fiscal equalisation. Their estimate was a welfare loss of \$295 million in 2009/10 terms. This is broadly comparable with Dixon et al. (2012) after their modelling is corrected to use the same measure of welfare throughout.

Updated estimates using more refined modelling are presented Independent Economics (2015). That report estimated a welfare loss of \$521 million. The increase from the earlier estimate was mainly due to two factors. First, the estimate in the 2012 report was on a 2009/10 basis while the estimate in the 2015 report was on a 2015/15 basis. Second, equalisation has become more significant because the mining boom has added to equalisation transfers.

4 Empirical analysis

Similar to the previous studies, this section begins by estimating the welfare loss from repealing the existing system of fiscal equalisation. It then estimates the welfare effects of two proposals that have been put forward to modify how fiscal equalisation operates. Finally, it estimates the welfare gain from moving to the fully-efficient system of equalisation developed in section 2.

The baseline scenario is based on the existing equalisation system. The transfers under that system are taken from the CGC’s (2015) HFE assessment for 2015/16, as presented earlier in Table 3. That reflects CGC assessments of state fiscal capacities in each of the three years of 2011/12, 2012/13 and 2013/14, projected forward to 2015/16 using forecasts for population and GST revenue. These baseline transfers are shown in the “baseline” column of Table 4, which matches the final row of Table 3.

The remaining columns of Table 1 show the transfers under alternative scenarios for fiscal equalisation, which are discussed presently.

Table 4: Equalisation scenarios (\$ million)

| | baseline | grants | modified epc | 75c floor | optimal |
|-----|----------|--------|--------------|-----------|---------|
| NSW | - 889 | -2 182 | - 118 | -1 892 | 2 031 |
| Vic | -1 479 | -1 706 | -1 298 | -2 263 | - 619 |
| Qld | 1 521 | 139 | 594 | 886 | 547 |
| WA | -4 489 | - 770 | 190 | -1 693 | -5 614 |
| SA | 1 475 | 989 | - 120 | 1 252 | 1 276 |
| Tas | 1 012 | 865 | 84 | 944 | 820 |
| ACT | 98 | - 14 | - 55 | 47 | 31 |
| NT | 2 752 | 2 680 | 722 | 2 719 | 1 529 |

By varying the pattern of interstate transfers from the optimal pattern, the first four scenarios involve net fiscal benefits that distort location decisions for labour. The resulting welfare losses have been modelled in two ways. The first way is a simple deadweight loss analysis.

$$DWL = -\frac{1}{2} \epsilon t^2 Y$$

The deadweight loss (DWL) from departing from the optimal system of equalisation depends on the differences between the optimal transfer for a state and the transfer that it receives, expressed as a share of state income. This tax or subsidy rate is represented above as t .

The DWL also depends on the long-run elasticity of a state’s population with respect to changes in state income per capita resulting from changes in its net fiscal benefit. Albouy (2012) cites an estimate from Wilson (2003) for Canada of 3.23. This paper rounds this to 3. However, as the DWL is proportional to this parameter, the sensitivity of the DWL estimates to alternative values for this parameter can be readily assessed by simple proportionally re-scaling the DWL

estimates. These long-run population effects could take a decade or more to fully develop through a gradual process of interstate migration.

Finally, the DWL estimate depends on state income Y . The income for each state in 2015/16 has been forecast by applying Treasury economic forecasts for general economic growth to historical data for each state's income. A by-product of these DWL calculations is estimates of percentage impacts on state populations, which are also presented.

The second approach used to estimate the economic impacts is the custom-designed CGE model described and used in *Independent Economics* (2015). That model has been calibrated to use the same estimate for the long-run elasticity of a state's population with respect to changes in state income per capita resulting from changes in its net fiscal benefit of 3.

Not surprisingly, both approaches produced similar estimates of the population and welfare effects of each policy scenario. This is consistent with Albouy's observation that: "employment and deadweight loss predictions are robust to many assumptions of the model, since they are simulated from a reduced-form parameter, which may include many un-modelled effects" (Albouy, 2012). Hence, it makes little difference that the economic structure of the model used in *Independent Economics* (2015) is significantly different from the economic structure of the model presented in section 2.

For simplicity, this paper presents estimates from the CGE model only, as the DWL formula-based estimates are broadly similar. We now turn to the results for the various policy scenarios.

4.1 Modified EPC

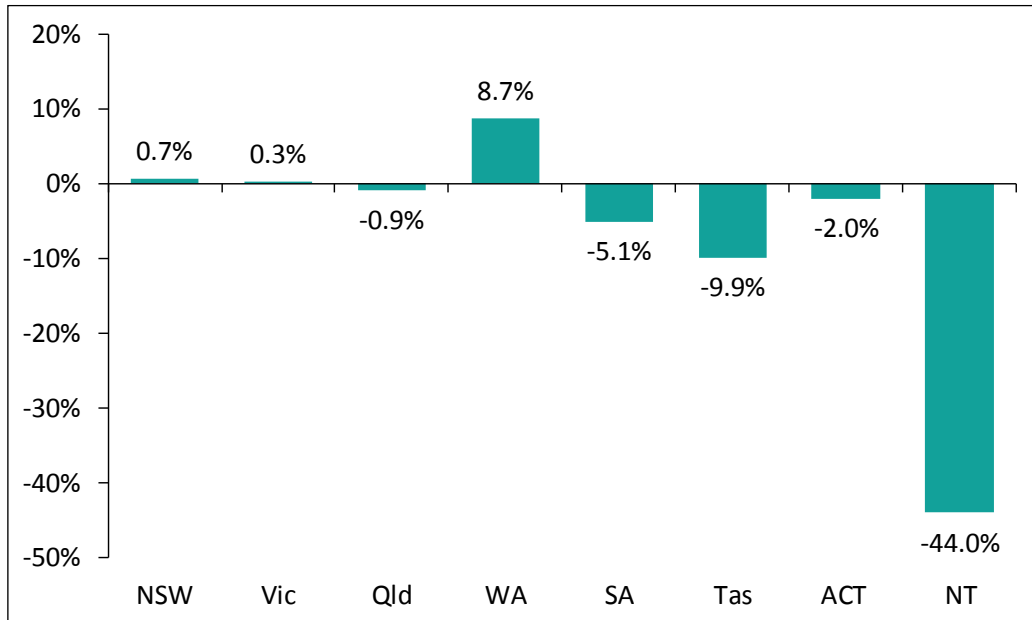
In this scenario fiscal equalisation is largely removed. GST revenues are distributed between states on an equal per capita (EPC) basis with one exception. The exception is that equalisation is retained for indigenous status, as in the previous studies discussed in section 3.3.

This alternative policy is referred to as a modified EPC system of distributing GST revenues. This specification of a modified EPC system can be interpreted in various ways. The literal interpretation is that the HFE system is removed, except for indigenous status. An alternative interpretation is that HFE is fully removed, but that the Commonwealth Government takes over funding of indigenous needs. Either way, the modified EPC scenario recognises that it would be unrealistic to simulate a situation in which government funding arrangements no longer recognise indigenous needs.

Table 4 shows the changes to equalisation transfers in moving from the baseline of existing policy to the modified EPC. The biggest winner is WA and the biggest loser is the NT. WA wins mainly from removing the economically efficient equalisation of mining royalties. NT loses both from removing the economically efficient equalisation for demographic factors and from removing the economically-inefficient equalisation for geographic circumstances.

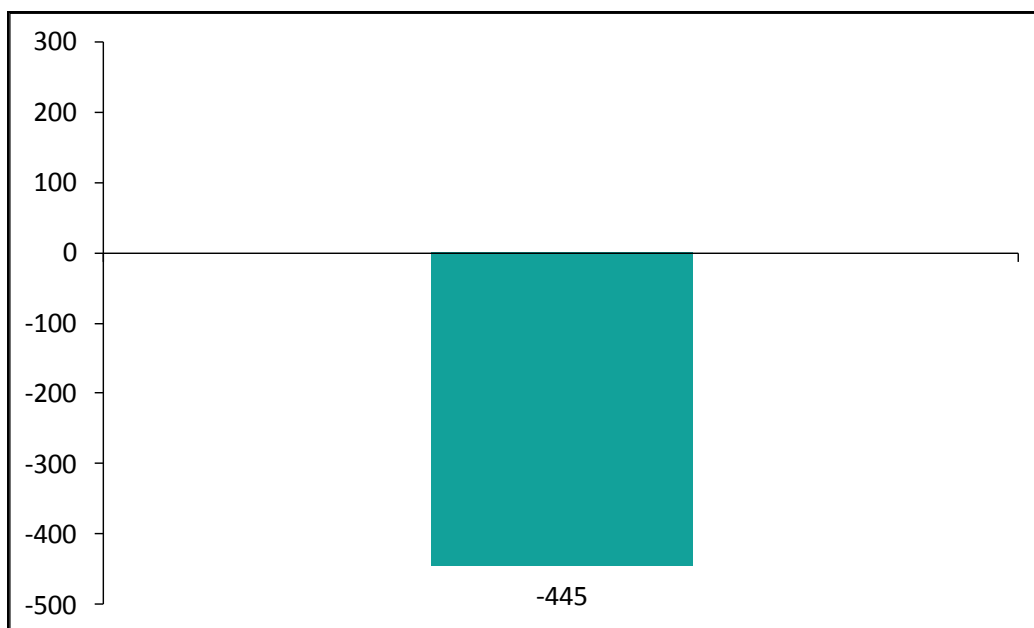
Chart 4.1 shows that this pattern of gain and loss leads to population movements in the expected direction. WA experiences a significant and inefficient population gain while NT experiences a very large percentage population loss, which is partly efficient and partly inefficient.

Chart 4.1. Population impact of modified EPC system compared to current HFE system, per cent



Because these population movements mainly represent inefficient fiscally-induced migration, there is a significant loss in economic welfare. This annual loss is estimated at \$445 million as seen in Chart 4.2.

Chart 4.2 Welfare impact of modified EPC compared to current HFE system, \$m, 2015/16 terms



This estimate is substantial but a little lower than the estimate of \$521 million in Independent Economics (2015). This is because this paper recognises that equalisation for geographic circumstances is inefficient so there is a benefit from its removal. This benefit partly offsets that larger costs from removing other equalisation factors, notably equalisation for source-based revenues such as mining royalties and demographic factors.

4.2 The grants scenario

In the grants scenario, payments to the recipient states are made by the Federal Government from its taxation revenue instead of by the donor states. Such a scenario may be designed to make it appear that the donor states would be better off, because they no longer make equalisation payments, while the recipient states would be no worse off, because there would still receive their equalisation payments.

Such a view of the “grants” scenario is superficial because it ignores the fact that the Federal Government would need to raise additional tax revenue to fund the new grants. A reasonable assumption is that the additional Commonwealth taxation revenue is raised on an EPC basis from residents of each state. The same net effect would also be achieved by funding the grants from the GST pool on an EPC basis. We have used the later approach in the modelling as a simple way of taking into account that, ultimately, the new Federal grant would need to be funded by taxpayers in each state.

Table 4 shows that in the grants scenario all five recipient states (Qld, SA, Tas, ACT and NT) lose income compared to the existing HFE system. While they retain the same equalisation payment, they lose income because their citizens all need to contribute to the funding of the new Federal grant (either through the GST pool or through higher Federal taxes).

Turning to the donor states, only WA receives more income as a result of being relieved of making equalisation transfers. It no longer makes an equalisation payment of about \$4.5 billion and this easily outweighs WA’s per capita share of funding the new grants of about \$0.8 billion. NSW and Victoria, while being donor states, both lose income. They no longer make equalisation transfers, but this is outweighed by their per capita contributions to the funding of the new grants to recipient states.

As shown in Chart 4.3, this gain in transfers to WA at the expense of all other states leads to fiscally-induced migration away from all other states towards WA. The main effect of the grants scenario is to greatly water down the efficient equalisation of WA’s mining royalties. This is a substantial step away from optimal fiscal equalisation, leading to an annual welfare loss of \$284 million, as shown in Chart 4.4.

Chart 4.3. Population impact of grants scenario compared to current HFE system, per cent

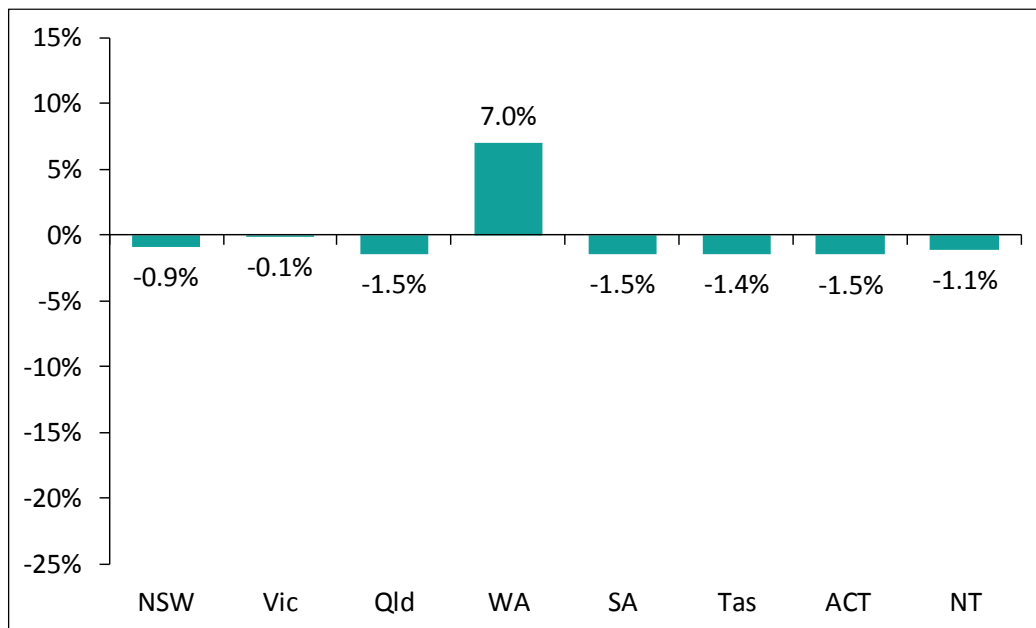
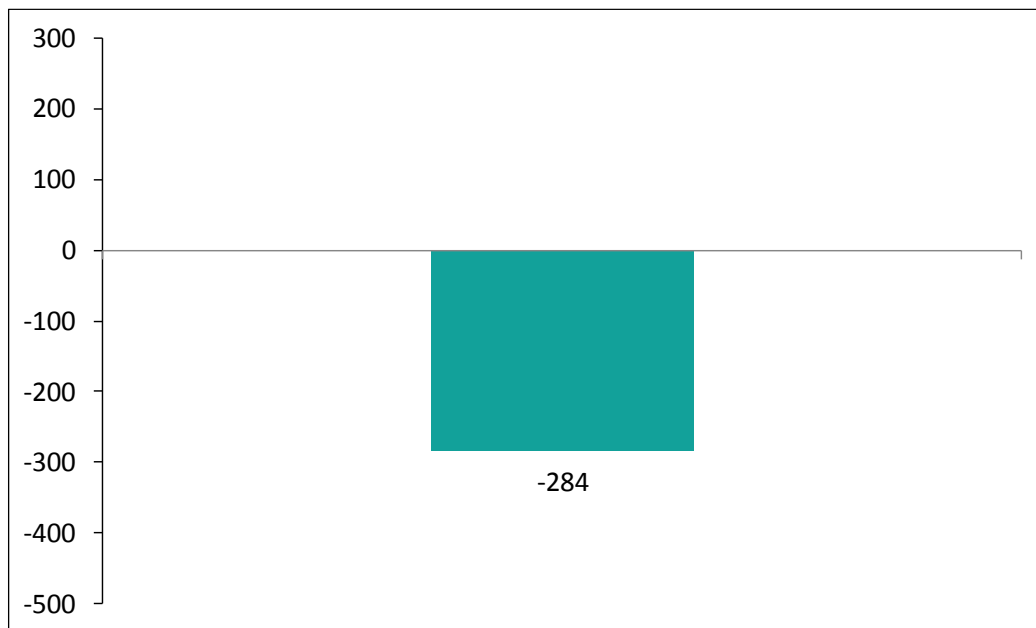


Chart 4.4 Welfare impact of grants scenario compared to current HFE system, \$m, 2015/16 terms



4.3 The 75c floor scenario

In the “75c floor” scenario, a floor of 75 cents is placed on each state’s GST grants pool relativity. Table 4 shows that WA is the only state that was under this floor in the 2015/16 CGC assessment. With a fixed pool of GST revenue, raising the GST grants pool relativity of WA from the assessed value of 0.30 to 0.75 would require reducing the GST grants pool relativities of other states. This scenario assumes this is achieved by the other seven states

contributing on an equal per capita basis to the additional funding for WA. This raises each of their GST grants pool relativities.

The resulting equalisation transfers are shown in Table 4. Comparing this with the baseline and grants scenarios presented earlier, it can be seen that the 75c floor scenario involves a smaller departure from the existing HFE system than does the grants scenario. The only state for which this is not the case is Victoria.

Given the smaller departure from the existing system, the population and welfare effects are also smaller but follow a similar pattern. The annual welfare loss is estimated at \$199 million.

This policy's focus on the GST grants pool relativities also reflects a misunderstanding of the nature of the fiscal equalisation system. The heart of that system is a set of equalisation transfers that add to zero, such as those shown in Table 4. The GST only serves as the current method of delivering those transfers. As noted earlier, the GST distributions are initially formulated on a per capita basis, and then the equalisation transfers are superimposed.

The equalisation transfers could alternatively be completely separated from the GST system. Donor states would then contribute to a special pool and recipient states would draw from the same pool. GST distributions would be made on an EPC basis. This separated system would lead to exactly the same outcome for each state as the existing system. Thus, focussing on GST grants pool relativities confuses the fiscal equalisation policy with its current delivery mechanism. This highlights the arbitrary nature of setting a floor on grants pool relativities.

Chart 4.5 Population impact of 75c floor scenario compared to current HFE system, per cent

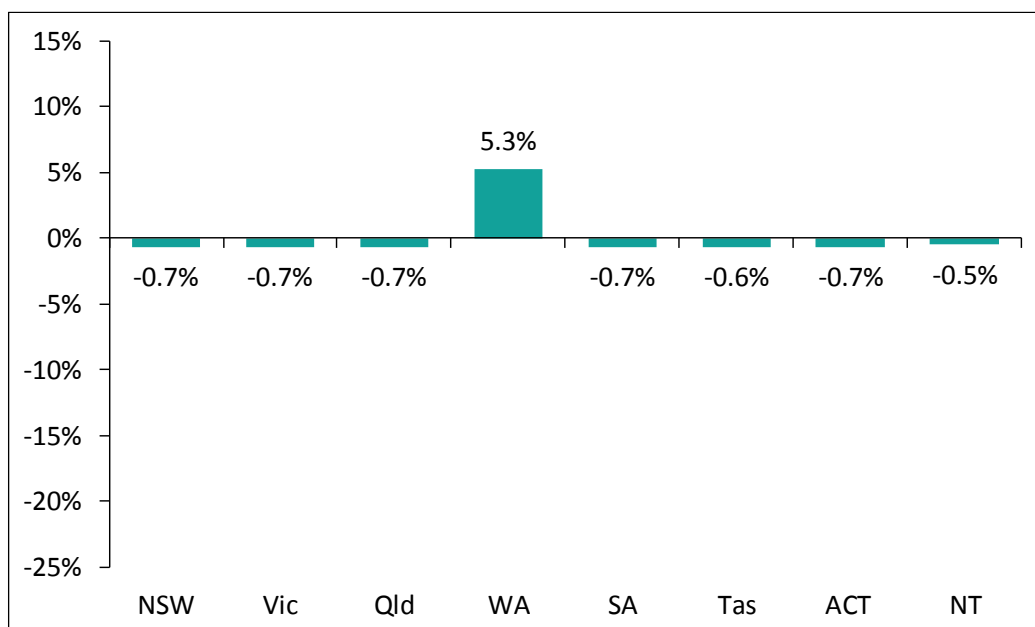
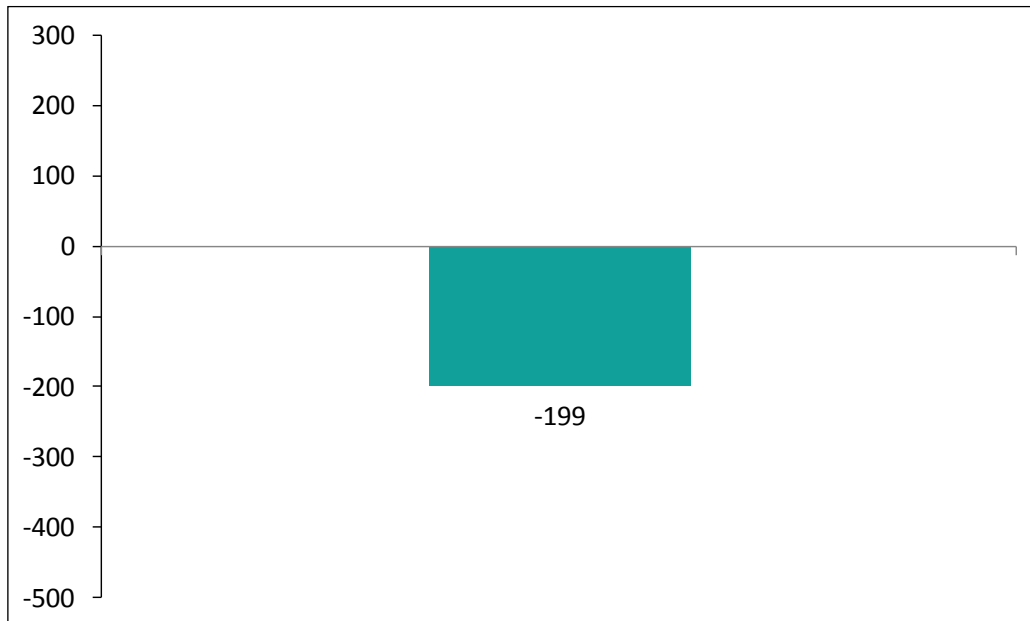


Chart 4.6 Welfare impact of 75c floor scenario compared to current HFE system, \$m, 2015/16 terms



4.4 The fully-efficient scenario

The previous scenarios are based on the existing HFE system and various alternative policies that have been proposed. This final scenario uses the optimal equalisation formula developed in section 2.

From a welfare perspective, the main change in moving from the existing system to the optimal system is the removal of equalisation for geographic circumstances. Table 4 shows that this leads to a significant reduction in payments to the NT. This leads to economically efficient migration out of the NT as the high costs of its geographic circumstances are transferred from national taxpayers to NT taxpayers.

Chart 4.7 shows the large percentage population loss in the NT. This is the main driver of the welfare gain shown in Chart 4.8 of \$260 million.

Chart 4.7 Population impact of the optimal scenario compared to current HFE system, per cent

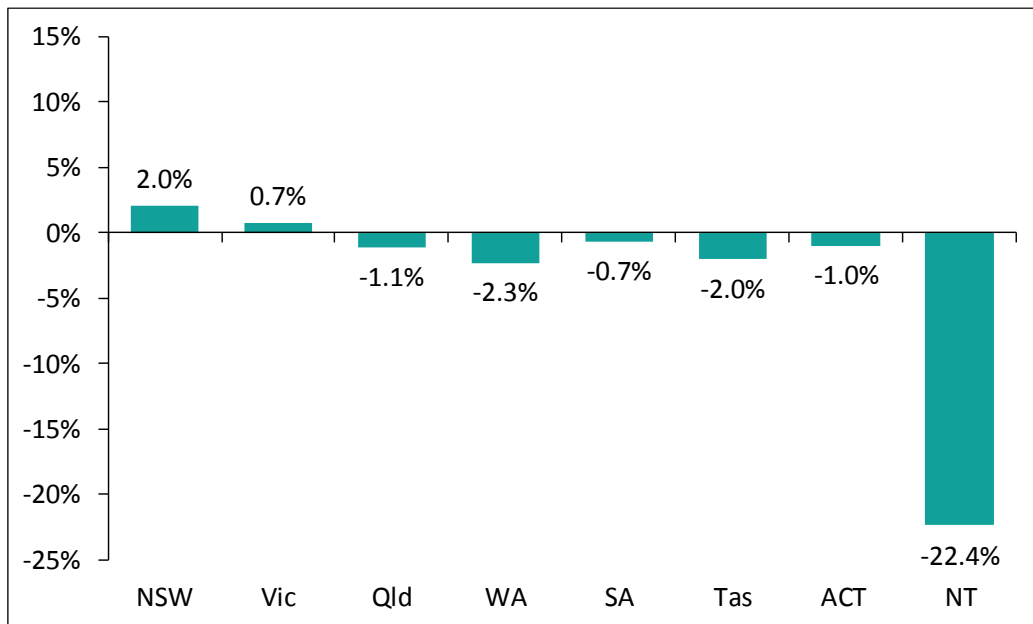
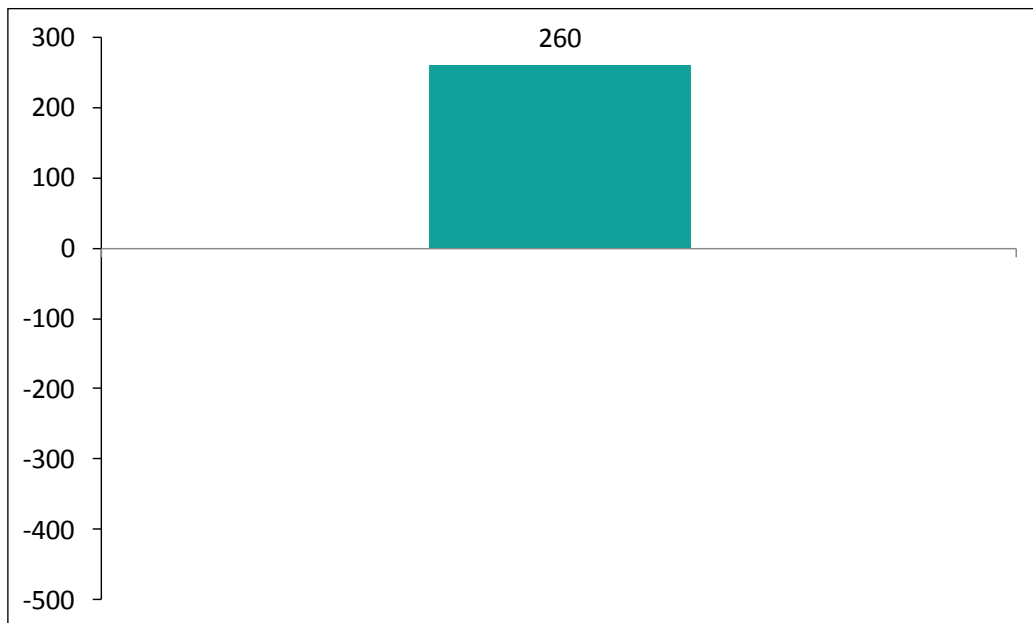


Chart 4.8 Welfare impact of the optimal scenario compared to current HFE system, \$m, 2015/16 terms



5 Qualifications

Four qualifications to the theoretical model in section 2 and hence the empirical analysis of section 4 are as follows.

First, following Boadway and Flatters (1982) and Albouy (2012), the modelling treats the national supplies of each type of labour and capital as fixed. This would not be reasonable in an analysis of the efficiency of taxes applied to these factors of production. However, this paper focusses on the specific issue of fiscal equalisation, where the key issue is achieving locational neutrality for labour decisions rather than neutrality in the total supply.

Second, we also assume that labour is perfectly mobile between states. Albouy (2012) points out that “mobility makes the most sense in a long run setting: when mobility costs are amortised over longer periods, they become small relative to the potential gains of moving”. He adds: “the conclusions below may hold even when some households are immobile, so long as there is a sufficiently large number of mobile households of each type”.

Third, again following Boadway and Flatters (1982) and Albouy (2012), the modelling implicitly assumes that state governments take their equalisation grants as given. However, the spending and tax behaviour of a state government does have some impact on the equalisation grant that it receives in Australia, as emphasised by Petchey (2011). For example, when a state government unilaterally raises a tax, for each additional dollar of revenue that it receives directly, its equalisation grant is adjusted by a fraction of a dollar. That fraction, which may be positive or negative, is equal to the difference between the state’s share of the population and its share of the tax base. Generally, although not always, this fraction is rather small. Further, there is a lack of empirical evidence that its existence influences state government behaviour.

Fourth, this paper assumes that state government services are private in nature, meaning that there is no fiscal externality from the provision of public goods. This is consistent with the literature assessments of both Boadway and Flatters (1982) and Albouy (2012) that state government services are private to a close approximation. This reflects the private nature of the major state government services such as schools and hospitals as distinct from the public nature of central government services such as defence.

6 References

Albouy, David (2012), 'Evaluating the efficiency and equity of federal fiscal equalisation', *Journal of Public Economics*, Vol. 96, pp 824-839.

Boadway, Robin; Flatters, Frank (1982), 'Efficiency and equalisation payments in a federal system of government: a synthesis and extension of recent results', *Canadian Journal of Economics*, Vol. 15, No. 4 (Nov 1982), pp. 613-633.

Boadway, Robin (2003), 'The Theory and Practice of Equalisation', Queens Economic Department Working Paper No. 1016, Department of Economics, Queens University, Ontario.

Boadway, Robin (2007), 'Grants in a Federal Economy: A Conceptual Perspective', Chapter 2 in *Intergovernmental Fiscal Transfers: Principles and Practice*, Boadway, Robin and Shah Anwar (eds.), The World Bank.

Buchanan, James M. (1950), 'Federalism and Fiscal Equity', *The American Economic Review*, Vol. 40, No. 4 (Sep 1950), pp. 583-599.

Buchanan, James M. (1952), 'Federal Grants and Resource Allocation', *Journal of Political Economy*, Vol. 60, No. 3, (June 1952), pp. 208-217.

Commonwealth Grants Commission (2015), 'Report on GST Revenue Sharing Relativities – 2015 Review', Commonwealth of Australia.

Dixon, Peter B., Picton, Mark R., Rimmer, Maureen T. (2002) 'Effects of changes in Commonwealth grants to the States: an applied general equilibrium analysis', Centre of Policy Studies, Monash University, March 2002.

GST Distribution Review (2012), 'Final Report', Commonwealth of Australia, October 2012.

Independent Economics (2012), 'Horizontal Fiscal Equalisation: Modelling the welfare and efficiency effects', for the South Australian Department of Treasury and Finance.

Independent Economics (2015), 'Horizontal Fiscal Equalisation: Modelling update and scenarios', for the South Australian Department of Treasury and Finance.

Petchey, Jeffrey (2011), 'Fiscal capacity equalisation of the Australian states', *The Australian Economic Review*, vol. 44, no. 2, pp. 207–14.

Spahn, Paul Bernd (2007), 'Equity and Efficiency Aspects of Interagency Transfers in a Multigovernment Framework', Chapter 3 in *Intergovernmental Fiscal Transfers: Principles and Practice*, Boadway, Robin and Shah, Anwar (eds.), The World Bank.

Wilson, L. S. (2003), 'Equalisation, Efficiency and Migration: Watson Revisited', *Canadian Public Policy*, Vol. 29, No. 4 (Dec, 2003), pp. 385-396.