Chapter 9
Government Structure Classifications and Transformations

Chapter 9 builds on a previous effort to classify government structures and transformations between them (Drummond 2002: 43-46) and seeks to address Primary Objective 4 of this study, which calls for *a classification system, or taxonomy, for government structure alternatives in terms of sub-national governments and the distribution of functions between national and sub-national governments.*

This chapter has six sections. The first reviews previous efforts to classify government structures and transformations. The second and third then describe two comprehensive classification systems in which models are distinguished by their sub-national governmental units and the distributions of government functions among the levels of government present within each given overall structure: the *complete government structure* (CGS) and *basic government structure* (BGS) classification systems. Sub-national government units are described in terms of their number and also the actual sets of such sub-national units in the CGS classification system, but are only described in terms their number in the BGS classification system. The fourth section describes government structure models of particular interest which are assessed in terms of their relative financial benefits in Part III of this thesis. The fifth describes a *complete government structure transformation* (CGST) classification system in terms of an embryonic transformation algebra which can be considered analogous to the algebraic systems employed in matrix algebra and linear transformations. The sixth then presents selected examples of government structure transformations.

By establishing comprehensive classification systems describing government structure alternatives and transformational pathways between such structures, Chapter 9 seeks to construct a conceptual framework which can be used to analyse and compare alternative government structures and hence generally reduce to a manageable level the "lateral thinking" (Wiltshire 1991: 13) required to progress the "Herculean task" (Jaensch 1997: 93) of conceptualising, designing and advocating alternative visions for Australia's government structure.

Previous Classifications and Transformations

Australian government structures can be defined, as previously (Drummond 2002: 43-46), in terms of six models: the *National-Local, Dual National, New States*, *Regional States*, *Simplified New States* and *Simplified Regional States* models.[1] The following five transformations between these six models can also be defined (Drummond 2002: 44-46):

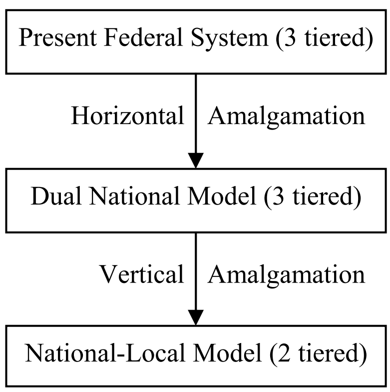
- *horizontal amalgamations* – which reduce the number of State-Territory type governments;
- *vertical amalgamations* – in which the single State government in the Dual National model amalgamates with the Commonwealth government of the present system to form a single new national government in the National-Local model;
- *New State formations* – in which New States are formed though divisions of existing States;
- *State-Local integrations* – in which local governments are absorbed into parent State-Territory type governments; and
- *functional transfers* – in which functions are transferred from the State-Territory level to the Commonwealth level.

These six models and associated transformations are now described in turn.

National-Local and Dual National Models

The *National-Local* model would result if present Commonwealth, State and Territory governments coalesced, through a combination of horizontal and vertical amalgamation processes, into a single national government, leaving local governments in more or less their present form. Noting the Australian Capital Territory's unique combination of State and municipal government functions, this coalescence would in effect require the establishment of an ACT local municipal government, and the transfer of the ACT's present State government roles to the newly formed national government. Conceptually, it is advantageous to consider the process leading to the National-Local model as a two stage amalgamation process, involving an initial process of *horizontal amalgamation*, and a subsequent process of *vertical amalgamation*, as follows:

Figure 9-1: Horizontal and Vertical Amalgamation Processes Leading to the National-Local Model



In the *horizontal amalgamation* process, the eight State and Territory governments are assumed to integrate into a single Australia-wide State-Territory type government, the *new single State government*, which would operate parallel to the present Commonwealth government in what is hence called the *Dual National* model. The *vertical amalgamation* stage then sees the coalescence of the Commonwealth government and the new single State government into the one new national government. The Dual National model would never be seriously considered for actual implementation, but was assessed along with the other five alternative models as it assumes a pivotal role in the process of estimating the costs or benefits of government structures (Drummond 2002: 46-51). The Dual National model also has at least some degree of substantive legitimacy in terms of several prominent examples of parallel bureaucracy and "dual nationalism" generally within the Australian public and private sectors, including:

- the 25 or so Australian Technical Colleges which the Commonwealth Government is currently (in 2007) establishing, which will operate parallel to State and Territory secondary school and TAFE systems;
- the Catholic Church administered education and health systems, which operate parallel to Commonwealth, State, Territory and other non-government education and health providers; and
- the Aboriginal and Torres Strait Islander Commission (ATSIC) over the period of its existence from 1990 to 2005.

The National-Local and Dual National models and other similar models defined later in this chapter will be referred to collectively as *Unification models*. The National-Local model clearly describes a unitary system of government, and the Dual National model has been designed to provide insights into a unitary model and can also be considered unitary. The horizontal amalgamation process described in Figure 9-1 can be considered a partial unification process, and the horizontal and vertical amalgamation processes together constitute complete Unification.

New States, Regional States, Simplified New States and Simplified Regional States Models

The *New States* model would result if New States were formed in accordance with Chapter VI of Australia's federal Constitution, and so would generally be assumed to comprise State governments in their present form, but smaller in size and greater in number, leaving local governments in essentially their present form. The *Regional States* model would arise if, through a process of vertical amalgamation, or *State-local integration*, local governments were absorbed into the States of the New States model. So the Regional States model would emerge if regional governments, based on the ACT combined State-local model, were formed throughout Australia. The *Simplified Regional States* model would result if a further process of functional transfer shifted some State-Territory level functions, powers and responsibilities from

Regional States to an expanded Commonwealth government. The *Simplified New States* model would arise if New States were subject to a similar functional transfer process. Two functional transfer options were considered for illustrative purposes in the earlier analysis (Drummond 2002: 45): the *3 Function Transfer* and *6 Function Transfer* schemes, described in Table 9-1 as follows:

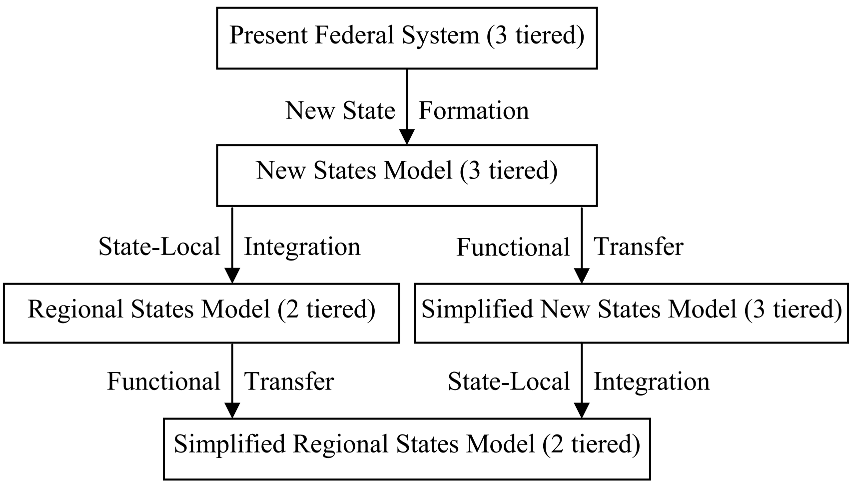
Table 9-1. Functional Transfers to Commonwealth Government in Simplified New States and Simplified Regional States Models

Functions and Transfer Schemes	Expenditure by all State, Territory and Local Governments in 2000-2001 ($b and % of total expenditure)[a]
1. Public Order & Safety	9.34 (8.4%)
2. Education	24.90 (22.3%)
3. Health	22.36 (20.1%)
Total 3 Function Transfer (1+2+3)	56.59 (50.8%)
4. General Public Services	9.47 (8.5%)
5. Social Security & Welfare	6.39 (5.7%)
6. Transport & Communications	14.40 (12.9%)
Total 6 Function Transfer (1+2+3+4+5+6)	86.86 (77.9%)

a. Functions and expenditures are from ABS Cat. 5512.0: 2000-01, Table 31.

Figure 9-2 below illustrates the common lineage extending from Australia's current federal system to the New States model, and eventually the Simplified Regional States model, via either the Regional States or Simplified New States models.

Figure 9-2: Processes Leading to the New States, Regional States, Simplified New States and Simplified Regional States Models



The six models described above represent a continuum of possible systems comprising two or three principal levels of democratic government. If only a small number of New States were to form, and little or no functional transfer eventuated, the resultant New States or Simplified New States models would depart little from Australia's present system. At the other extreme, if a very large number of regional governments formed in a Simplified Regional States system, and there were significant functional transfers (as with the 6 function transfer described in Table 9-1), regional governments hence formed would resemble strengthened local governments as generally conceived, so the Simplified Regional States model would approach the National-Local model.

Whereas it is generally always assumed that New States formation would preserve a federal system (see, for example, Ellis 1933; Page 1923; 1924; 1931; 1950; Drummond 1946; 1949), the Regional States model as defined would also clearly remain a federation. In the absence of functional transfers, the New States and Regional States models would remain federal systems just as much as Australia's current federal system. The Simplified New States and Simplified Regional States models, however, would tend to move along the federal-unitary continuum increasingly towards a unitary form as more and more functions are transferred to the national government.

New States and Simplified New States models and other similar models defined later in this chapter are referred to collectively as New States models in accordance with historical descriptions (see also Chapter 2 and Appendix 2A). Regional States and Simplified Regional States models, similarly, are collectively referred to as Regional Government models (see also Chapter 2 and Appendix 2B).

Complete Government Structure Classification System

The six models described in the preceding section have been useful in describing a range of government structure possibilities, at least superficially and in qualitative senses, but more complete and specific classification systems, or taxonomies, are possible, and two such classification systems are introduced and defined in full in this and the next section:

- the *complete government structure* (CGS) *classification system* (CGSCS), in which models are expressed symbolically in what will be referred to as *complete government structure notation* (CGSN); and
- the *basic government structure* (BGS) *classification system* (BGSCS): a simplified version of the CGS system as above in which models are expressed symbolically in *basic government structure notation* (BGSN).

The complete government structure (CGS) classification system describes hypothetical Australian government structure models in terms of three dimensions as follows:

- *S-dimension*: the number of State-Territory type governments (N_S) and the actual set of such State-Territory type governments (**S**);
- *L-dimension*: the number of local governments (N_L) and the actual set of such local governments (**L**); and
- *F-dimension*: the set of government functions (**F**) which are transferred from State-Territory governments in the present system to the Commonwealth or national government in the resultant system. So **F** is the set of functions that would be added to Section 51 of the current Commonwealth Constitution in order to constitutionally recognise such functional transfers.

Government system reforms extending beyond those described by these S-, L- and F-dimensions can be envisaged, such as the transfer of one or more government functions from the Commonwealth to the State-Territory level, but the present thesis will confine its attention to these three dimensions.

A hierarchy of models and "families" of models can be defined and classified using these CGS and BGS systems, and can be symbolically expressed in CGS and BGS notations, where MOD represents government structure models. A total of 26 families of models shall now be defined in terms of these CGS and BGS systems, as distinguished by a two or three letter identifier, including:

- State-Local Functional Transfer (SLF) models, with MOD = SLF;
- Regional States Functional Transfer (RSF) models, with MOD = RSF;
- National-Local (NL) models, with MOD = NL;
- Functional Transfer (FT) models, with MOD = FT; and
- Australia's Current (CU) model, with MOD = CU.

The State-Local Functional Transfer (SLF) models make up the complete set of all government structure models that are possible, in theory at least, when the S-, L- and F-dimensions assume all possible values. The 25 model classifications introduced here in addition to the SLF models are all subsets of SLF models that arise when one or more of the S-, L- and F-dimensions are subject to restriction.

All 26 model classifications employed herein are now formally defined in turn, beginning with the SLF models.

State-Local Functional Transfer (SLF) Models

State-Local Functional Transfer models of Australian government, or SLF models for short, are models in which sub-national government units comprise up to two levels – State-Territory and local, like the present States and the Northern Territory. As introduced above, N_S denotes the number of State-Territory type units (STTUs) in the resultant system, **S** is the set of such STTUs, N_L denotes the number of local government units, **L** is the set of local government units, and **F** denotes the set of functions which are transferred from State-Territory governments in the present system to the Commonwealth or national government in the resultant system. So **F** is the set of functions that would be added to Section 51 of the current Commonwealth Constitution in order to constitutionally recognise functional transfers.

Whilst the ACT has just the single level of combined State-local government, if an SLF model retains the ACT as a distinct political unit with its present political boundaries, then the ACT unit *shall be* included in the N_S count and the set **S** of all State-Territory type units.

So SLF models can be expressed briefly as:

$$\text{MOD} = \text{SLF} = \text{SLF}(N_S\text{: } \mathbf{S}\text{; } N_L\text{: } \mathbf{L}\text{; } \mathbf{F}) \qquad ...[9.1]$$

Where, as above: N_S is the number of State type units in the resultant model, including the two existing territories if they remain;

S is the actual set of State-Territory type units;

N_L is the number of local government units in the resultant model;

L is the actual set of local government units;

and

F is the set of functions transferred from the State-Territory level to the Commonwealth or national government in the resultant model.

The notation used in result [9.1] above and similar expressions that follow shall be referred to as *CGS notation*, as introduced earlier, or *complete notation* for short.

The numbers N_S and N_L are counting numbers which can theoretically span from 0 through 1, 2, 3 and so on upwards without an upper bound, but in practice it is clear that these numbers must be finite rather than infinite. So N_S and N_L are assumed to be finite numbers, though in theory at least there is an infinite number of ways in which the sets **S** and **L** can form. For example, if $N_S = 2$, there are theoretically an infinite number of ways in which Australia can be divided up (geographically in terms of land borders, or otherwise) into 2 political units, so the set **S** of such units could be constituted in an infinite number of different ways. In practice, however, if the location of land borders were only assumed accurate to the nearest metre or some equivalent in terms of longitude or latitude, for example, there would then be a finite number of ways in which sets **S** and **L** could form, though a still extremely large number. Furthermore, sets **F** of functions transferred from the State-Territory level to the Commonwealth or national level could theoretically be an extremely large set of minutely specific functions, though in practice will be finite sets involving a relatively small number of broad, clearly defined functions such as education, health and so on, as in Table 9-1 above and Tables 7-1 through 7-4 in Chapter 7.

It can be seen in [9.1] that as the sets **S** (for State-Territory government units), **L** (for local government units) and **F** (for functional transfers from State-Territory level to the Commonwealth level) assume all possible arrangements, an infinite continuum of government structures can be defined and classified. So the classification framework here is complete and comprehensive in this sense. As stated above, however, only a finite range of options will be explored herein. The *functional transfer sets* (**F**) associated with the F-dimension as defined above, as in expression [9.1], will now be further described.

Functional Transfer Sets (F)

As defined above, functional transfer sets, denoted by **F**, are sets of government functions transferred from State-Territory governments in the present system to the Commonwealth or national government in a reformed government structure. Functional transfers can involve just one functional area, such as education or health, or a "bundle" of several functions such as education and health. The term "functions" is used herein to represent constitutionally assigned government powers, responsibilities, functions and purpose areas generally.

As indicated in Table 9-1 above and in Tables 7-1 through 7-4 in Chapter 7, specific functional areas such as education and health, individually or in multi-function combinations, are defined herein as expenditure categories CAT and associated functional sets **CAT** or $\mathbf{F}_{\mathbf{CAT}}$.[2] The eight single function sets listed in Table 7-2 and the seven multi-function sets listed in Table 7-3 have been defined specifically for employment herein as functional transfer sets, as defined above, in subsequent analyses. The *Three Function Set* comprising Education (EDU), Health (HEA) and Public Order and Safety (POS), for example, can be employed here as a functional transfer set for a reformed government structure in which the EDU, HEA and POS functions are transferred from State-Territory governments to the Commonwealth government, as follows:

$\mathbf{F_{3FC}} = \mathbf{3FC} = \{EDU, HEA, POS\}$ ...[9.2]

Functional transfer sets include, but are not limited to, the function sets and expenditure category subsets aligning with all 18 of the public sector expenditure categories defined in Chapter 7. For example, if all public sector corporations were transferred from State-Territory government control to the Commonwealth government, the applicable functional transfer set could be described as follows:

$\mathbf{F_{PSC}} = \{PSC\}$ ...[9.3]

Chapter 10 following will describe how government structure models are financially assessed for each given expenditure category. For such assessments, function sets **F** can only include functions or sub-functions which are defined *within* the given expenditure category considered. For the education expenditure category (CAT = EDU), for example, **F** can only be a subset of sub-functions within the education function. So **F** has to be either the empty set (∅), $\mathbf{F_{EDU}}$ in full, or some other subset of $\mathbf{F_{EDU}}$. In other words, **F** must comprise the empty set or one or more sub-functions within the education function – such as "primary and secondary" education or "technical and further education" as listed in Table 7-4 in Chapter 7. Similar restrictions on **F** apply to all of the public sector expenditure categories listed in Table 7-4. Whilst functions could in theory be broken down into a very large number of very specific sub-functions, subsequent analyses herein will only employ functional transfer sets from among the single function and multi-function sets as listed in Tables 7-2 and 7-3 in Chapter 7.

Subsets of State-Local Functional Transfer (SLF) Models

If just one of N_S and N_L in expression [9.1] were zero, but the other not zero, then the SLF model would comprise just two levels of government: national and local if $N_S = 0$, or national and State-Territory if $N_L = 0$. And if N_S and N_L are *both* zero, then the SLF model here would comprise just the single level of government at the national level. Models in which one or both of N_S and N_L are zero form subsets of SLF models. Several important subsets of the infinite totality of these SLF models are now introduced and described in turn. All of these model subsets can be described in terms of expression [9.1] above.

Three Level Functional Transfer (3LF) Models

Three Level Functional Transfer models of Australian government, or 3LF models for short, are the subset of SLF models in which there is at least one State-Territory level government and there is also at least one local government. So with $N_L \geq 1$ and $N_S \geq 1$ in [9.1], the 3LF model can be expressed as:

$$\text{MOD} = \text{3LF} = \text{3LF}(N_S \geq 1: \mathbf{S}; N_L \geq 1: \mathbf{L}; \mathbf{F}) = \text{SLF}(N_S \geq 1: \mathbf{S}; N_L \geq 1: \mathbf{L}; \mathbf{F}) \quad ...[9.4]$$

It can be seen that the 3LF government structure models include all SLF models except for those in which either or both of N_S and N_L are zero. The next three models described are subsets of the SLF models in which N_S or N_L or both are zero.

Single Level National (NAT) Model

The *Single Level National* model, or NAT model for short, is the special case SLF model in which N_S and N_L are *both* zero, so that all government functions are carried out by the single national government. So in the NAT model, $N_S = 0$, $N_L = 0$, **S** and **L** are both empty sets (denoted by Ø), and $\mathbf{F} = \mathbf{F_{ALL}}$, where $\mathbf{F_{ALL}}$ is the full set of government functions held at the State-Territory level – all of which go to the national government in the NAT model. So with $N_S = 0$, $N_L = 0$, $\mathbf{S} = \varnothing$, $\mathbf{L} = \varnothing$ and $\mathbf{F} = \mathbf{F_{ALL}}$ in [9.1], the NAT model can be expressed as:

$$\text{MOD} = \text{NAT} = \text{NAT}(N_S = 0: \mathbf{S} = \varnothing; N_L = 0: \mathbf{L} = \varnothing; \mathbf{F} = \mathbf{F_{ALL}})$$
$$= \text{SLF}(0: \varnothing; 0: \varnothing; \mathbf{F_{ALL}}) \quad ...[9.5]$$

Regional States Functional Transfer (RSF) Models

Regional States Functional Transfer models of Australian government, or RSF models for short, are the subset of SLF models in which there are no local governments (so $N_L = 0$), but there is at least one State-Territory level government (so $N_S \geq 1$). So with $N_L = 0$, $N_S \geq 1$ and $\mathbf{L} = \varnothing$ in [9.1], the RSF model can be expressed as:

$$\text{MOD} = \text{RSF} = \text{RSF}(N_S \geq 1: \mathbf{S}; \mathbf{F}) = \text{SLF}(N_S \geq 1: \mathbf{S}; N_L = 0: \mathbf{L} = \varnothing; \mathbf{F})$$
$$= \text{SLF}(N_S \geq 1: \mathbf{S}; 0: \varnothing; \mathbf{F}) \quad ...[9.6]$$

In the absence of local governments, the sub-national governments in RSF models occur at just the single level and will resemble the ACT combined State-local model within Australia's current system of government.

National-Local (NL) Models and the National Current Local (NCL) Model

National-Local models, or NL models for short, are the subset of SLF models in which there are no State-Territory level governments (so $N_S = 0$), but there is at least one local level government (so $N_L \geq 1$). In NL models, as with the NAT model described by expression [9.5], all State-Territory level functions are transferred to the national government, so $\mathbf{F} = \mathbf{F_{ALL}}$. So with $N_S = 0$, $\mathbf{S} = \varnothing$, $N_L \geq 1$ and $\mathbf{F} = \mathbf{F_{ALL}}$ in [9.1], the NL model can be expressed as:

$$\text{MOD} = \text{NL} = \text{NL}(N_L \geq 1\text{: } \mathbf{L}) = \text{SLF}(N_S = 0\text{: } \mathbf{S} = \varnothing;\ N_L \geq 1\text{: } \mathbf{L};\ \mathbf{F} = \mathbf{F_{ALL}})$$
$$= \text{SLF}(0\text{: } \varnothing;\ N_L \geq 1\text{: } \mathbf{L};\ \mathbf{F_{ALL}}) \qquad \text{...[9.7]}$$

The National-Local models defined by [9.7] include the National-Local model considered in previous analyses (Drummond 2002: 44-45). Originally, the National-Local model was assumed to consist of local governments in their current number and form. This previously used National-Local model classification shall be referred to henceforth as the *National Current Local* (NCL) model, where "Current" refers to local governments in their current form and number. So the NCL model can be described as follows in terms of expression [9.7]:

$$\text{MOD} = \text{NCL} = \text{NL}(N_L = N_{LCU}\text{: } \mathbf{L} = \mathbf{L_{CU}})$$
$$= \text{SLF}(N_S = 0\text{: } \mathbf{S} = \varnothing;\ N_L = N_{LCU}\text{: } \mathbf{L} = \mathbf{L_{CU}};\ \mathbf{F} = \mathbf{F_{ALL}})$$
$$= \text{SLF}(0\text{: } \varnothing;\ N_{LCU}\text{: } \mathbf{L_{CU}};\ \mathbf{F_{ALL}}) \qquad \text{...[9.8]}$$

Where: N_{LCU} is the number of local government units in Australia's current model of government;

and

$\mathbf{L_{CU}}$ is the set of local government units in the current model.

State-Local (SL), Three Level (3L) and Regional States (RS) Models

Three relatively simple subsets, or simplifications, of the SLF, 3LF and RSF models described above are *State-Local* (SL) models, *Three Level* (3L) models and *Regional States* (RS) models respectively. In the SL, 3L and RS models there are no functional transfers from the State-Territory level to the Commonwealth or national level. So $\mathbf{F} = \varnothing$ for all of these models.

State-Local models, or SL models for short, are SLF models in which there is no functional transfer. So variation is only permitted within the S and L dimensions in SL models. With $\mathbf{F} = \varnothing$ in [9.1], the SL model can be expressed as:

$$\text{MOD} = \text{SL} = \text{SL}(N_S\text{: } \mathbf{S};\ N_L\text{: } \mathbf{L})$$
$$= \text{SLF}(N_S\text{: } \mathbf{S};\ N_L\text{: } \mathbf{L};\ \mathbf{F} = \varnothing) = \text{SLF}(N_S\text{: } \mathbf{S};\ N_L\text{: } \mathbf{L};\ \varnothing) \qquad \text{...[9.9]}$$

Three Level models, or 3L models for short, are 3LF models in which there is no functional transfer. So with $\mathbf{F} = \varnothing$ in [9.4], the 3L model can be expressed as:

$$MOD = 3L = 3L(N_S \geq 1: \mathbf{S}; N_L \geq 1: \mathbf{L})$$
$$= 3LF(N_S \geq 1: \mathbf{S}; N_L \geq 1: \mathbf{L}; \mathbf{F} = \varnothing) = SLF(N_S \geq 1: \mathbf{S}; N_L \geq 1: \mathbf{L}; \varnothing) \qquad ...[9.10]$$

Regional States models, or RS models for short, are RSF models in which there is no functional transfer. So with $\mathbf{F} = \varnothing$ in [9.6], ***RS*** models can be expressed as:

$$MOD = RS = RS(N_S \geq 1: \mathbf{S})$$
$$= RSF(N_S \geq 1: \mathbf{S}; \mathbf{F} = \varnothing) = SLF(N_S \geq 1: \mathbf{S}; 0: \varnothing; \varnothing) \qquad ...[9.11]$$

Functional Transfer (FT) and Functional Transfer Current Local (FTC) Models

Another subset of SLF and 3LF models are *Functional Transfer* models, or FT models for short, in which the current eight States and Territories are retained (so $N_S = 8$), but one or more functions are transferred from the State-Territory level of the present system to the Commonwealth level in the resultant system. It is also assumed that FT models, like SLF and 3LF models, will have at least one local level government (so $N_L \geq 1$). So FT models can be described as follows in terms of expression [9.4]:

$$MOD = FT = FT(N_L \geq 1: \mathbf{L}; \mathbf{F}) = 3LF(N_S = 8: \mathbf{S} = \mathbf{S_{CU}}; N_L \geq 1: \mathbf{L}; \mathbf{F})$$
$$= 3LF(8: \mathbf{S_{CU}}; N_L \geq 1: \mathbf{L}; \mathbf{F}) = SLF(8: \mathbf{S_{CU}}; N_L \geq 1: \mathbf{L}; \mathbf{F}) \qquad ...[9.12]$$

Where: $\mathbf{S_{CU}}$ is the set of eight State and Territory governments in the current model; and

$\mathbf{F}$, again, is the set of functions transferred from the present State-Territory level to the Commonwealth or national government in the resultant model.

Functional Transfer Current Local models, or FTC models for short, are the FT models that arise when local governments remain in their present form and number. So with $N_L = N_{LCU}$ and $\mathbf{L} = \mathbf{L_{CU}}$ (as defined following [9.8] above) in [9.12], FTC models are given by:

$$MOD = FTC = FTC(\mathbf{F}) = 3LF(N_S = 8: \mathbf{S} = \mathbf{S_{CU}}; N_L = N_{LCU}: \mathbf{L} = \mathbf{L_{CU}}; \mathbf{F})$$
$$= 3LF(8: \mathbf{S_{CU}}; N_{LCU}: \mathbf{L_{CU}}; \mathbf{F}) = SLF(8: \mathbf{S_{CU}}; N_{CU}: \mathbf{L_{CU}}; \mathbf{F}) \qquad ...[9.13]$$

In FTC models, the only changes from the current system are functional transfers.

Australia's Current (CU) Model and Local Government Reform (LGR) Model

Australia's current model of government, or CU model for short, can be considered a special case of FTC model in which there are no functional transfers, so that $\mathbf{F} = \varnothing$, and [9.1], [9.4] and [9.13] hence reduce to:

$$\begin{aligned} \text{MOD} &= \text{CU} = \text{FTC}(\mathbf{F} = \varnothing) \\ &= \text{3LF}(N_S = 8: \mathbf{S} = \mathbf{S_{CU}};\ N_L = N_{LCU}: \mathbf{L} = \mathbf{L_{CU}};\ \mathbf{F} = \varnothing) \\ &= \text{SLF}(8: \mathbf{S_{CU}};\ N_{LCU}: \mathbf{L_{CU}};\ \varnothing) \qquad \text{...[9.14]} \end{aligned}$$

Local Government Reform models, or LGR models for short, are the same as the CU model above except that local governments are allowed to vary from their present number and form. Again it is assumed, however, that there is at least one local level government (so $N_L \geq 1$). So for LGR models, with $N_L \geq 1$ replacing $N_L = N_{LCU}$ and **L** replacing $\mathbf{L_{CU}}$, [9.14] becomes:

$$\begin{aligned} \text{MOD} = \text{LGR} = \text{LGR}(N_L \geq 1: \mathbf{L}) &= \text{3LF}(N_S = 8: \mathbf{S} = \mathbf{S_{CU}};\ N_L \geq 1: \mathbf{L};\ \mathbf{F} = \varnothing) \\ &= \text{SLF}(8: \mathbf{S_{CU}};\ N_L \geq 1: \mathbf{L};\ \varnothing) \qquad \text{...[9.15]} \end{aligned}$$

It is seen that in LGR models, the only changes from the current system are changes in the number and form of local governments.

Dual National State-Local (DSL), Dual National Three Level (DN3), Dual National Two Level (DN2) and Dual National Current Local (DNC) Models

Dual National State-Local models, or DSL models for short, are the subset of SL models in which there is just a single Australia-wide State-Territory level government denoted by S_{AUS}. So with $N_S = 1$ in and $\mathbf{S} = \{S_{AUS}\}$ in [9.9], DSL models are given by:

$$\begin{aligned} \text{MOD} &= \text{DSL} = \text{DSL}(N_L: \mathbf{L}) \\ &= \text{SL}(N_S = 1: \mathbf{S} = \{S_{AUS}\};\ N_L: \mathbf{L}) = \text{SLF}(1: \{S_{AUS}\};\ N_L: \mathbf{L};\ \varnothing) \qquad \text{...[9.16]} \end{aligned}$$

Dual National Three Level models, or DN3 models for short, are the subset of 3L models in which there is just a single Australia-wide State-Territory level government (S_{AUS}). So with $N_S = 1$ in and $\mathbf{S} = \{S_{AUS}\}$ in [9.10], DN3 models are given by:

$$\begin{aligned} \text{MOD} = \text{DN3} = \text{DN3}(N_L \geq 1: \mathbf{L}) &= \text{3L}(N_S = 1: \mathbf{S} = \{S_{AUS}\};\ N_L \geq 1: \mathbf{L}) \\ &= \text{SLF}(1: \{S_{AUS}\};\ N_L \geq 1: \mathbf{L};\ \varnothing) \qquad \text{...[9.17]} \end{aligned}$$

The DN3 models include all DSL models except for the *Dual National Two Level* model, or DN2 model for short, which is the unique single model among DSL models in which there are no local governments. Expression [9.11] shows that the DN2 model is also the special case of RS models in which $N_S = 1$ and $\mathbf{S} = \{S_{AUS}\}$. So with $N_L = 0$ and $\mathbf{L} = \varnothing$ in [9.16], and with $N_S = 1$ and $\mathbf{S} = \{S_{AUS}\}$ in [9.11], DN2 models are given by:

$$MOD = DN2 = DSL(N_L = 0: \mathbf{L} = \varnothing) = SL(N_S = 1: \mathbf{S} = \{S_{AUS}\}; N_L = 0: \mathbf{L} = \varnothing)$$
$$= SLF(1: \{S_{AUS}\}; 0: \varnothing; \varnothing) = RS(N_S = 1: \mathbf{S} = \{S_{AUS}\}) \qquad ...[9.18]$$

The *Dual National Current Local* model, or DNC model for short, is the unique DN3 model that arises when local governments remain in their current form and number. So with $N_L = N_{LCU}$ and $\mathbf{L} = \mathbf{L_{CU}}$ in [9.17], DNC models are given by:

$$MOD = DNC = DN3(N_L = N_{LCU}: \mathbf{L} = \mathbf{L_{CU}})$$
$$= 3L(N_S = 1: \mathbf{S} = \{S_{AUS}\}; N_L = N_{LCU}: \mathbf{L} = \mathbf{L_{CU}})$$
$$= SLF(1: \{S_{AUS}\}; N_{LCU}: \mathbf{L_{CU}} ; \varnothing) \qquad ...[9.19]$$

New States (NS) and Fewer States (FS) Models

New States models, or NS models for short, are the subset of 3L models in which New States are added to the eight States and Territories of the current system. So in NS models N_S will always exceed eight (the number of State-Territory type governments in Australia's current system). With $N_S > 8$, or $N \geq 9$, in [9.10], NS models can be expressed as:

$$MOD = NS = NS(N_S \geq 9: \mathbf{S}; N_L \geq 1: \mathbf{L}) = 3L(N_S \geq 9: \mathbf{S}; N_L \geq 1: \mathbf{L})$$
$$= 3LF(N_S \geq 9: \mathbf{S}; N_L \geq 1: \mathbf{L}; \mathbf{F} = \varnothing) = SLF(N_S \geq 9: \mathbf{S}; N_L \geq 1: \mathbf{L}; \varnothing) \qquad ...[9.20]$$

Whereas New States models are just 3L models for cases where $N_S > 8$, or $N_S \geq 9$, *Fewer States* models, or FS models for short, are again just 3L models, but this time for cases where N_S is between 2 and 7 inclusive. This range of N_S values is assumed here in order to avoid overlap with the NL and DN3 models defined in expressions [9.7] and [9.17] respectively for $N_S = 0$ (in NL models) and $N_S = 1$ (in DN3 models). This $2 \leq N_S \leq 7$ range also avoids overlap with the LGR models defined in [9.15], in which $N_S = 8$. So with $2 \leq N_S \leq 7$ in [9.1] and [9.4], FS models are given by:

$$MOD = FS = FS(2 \leq N_S \leq 7: \mathbf{S}; N_L \geq 1: \mathbf{L}) = 3L(2 \leq N_S \leq 7: \mathbf{S}; N_L \geq 1: \mathbf{L})$$
$$= 3LF(2 \leq N_S \leq 7: \mathbf{S}; N_L \geq 1: \mathbf{L}; \mathbf{F} = \varnothing)$$
$$= SLF(2 \leq N_S \leq 7: \mathbf{S}; N_L \geq 1: \mathbf{L}; \varnothing) \qquad ...[9.21]$$

New States Current Local (NSC) and Fewer States Current Local (FSC) Models

New States Current Local (NSC) models are simply NS models with local governments remaining in their current number and form. So with $N_L = N_{LCU}$ and $\mathbf{L} = \mathbf{L_{CU}}$ in [9.20], NSC models are given by:

$$\begin{aligned}\text{MOD} &= \text{NSC} = \text{NSC}(N_S \geq 9\text{: }\mathbf{S}) = \text{NS}(N_S \geq 9\text{: }\mathbf{S};\ N_L = N_{LCU}\text{: }\mathbf{L} = \mathbf{L_{CU}}) \\ &= \text{3L}(N_S \geq 9\text{: }\mathbf{S};\ N_L = N_{LCU}\text{: }\mathbf{L} = \mathbf{L_{CU}}) \\ &= \text{3LF}(N_S \geq 9\text{: }\mathbf{S};\ N_L = N_{LCU}\text{: }\mathbf{L} = \mathbf{L_{CU}};\ \mathbf{F} = \varnothing) \\ &= \text{SLF}(N_S \geq 9\text{: }\mathbf{S};\ N_{LCU}\text{: }\mathbf{L_{CU}};\ \varnothing) \qquad \text{...[9.22]}\end{aligned}$$

Fewer States Current Local (FSC) models are simply FS models with local governments remaining in their current number and form. So with $N_L = N_{LCU}$ and $\mathbf{L} = \mathbf{L_{CU}}$ in [9.21], FSC models are given by:

$$\begin{aligned}\text{MOD} &= \text{FSC} = \text{FSC}(2 \leq N_S \leq 7\text{: }\mathbf{S}) = \text{FS}(2 \leq N_S \leq 7\text{: }\mathbf{S};\ N_L = N_{LCU}\text{: }\mathbf{L} = \mathbf{L_{CU}}) \\ &= \text{3L}(2 \leq N_S \leq 7\text{: }\mathbf{S};\ N_L = N_{LCU}\text{: }\mathbf{L} = \mathbf{L_{CU}}) \\ &= \text{3LF}(2 \leq N_S \leq 7\text{: }\mathbf{S};\ N_L = N_{LCU}\text{: }\mathbf{L} = \mathbf{L_{CU}};\ \mathbf{F} = \varnothing) \\ &= \text{SLF}(2 \leq N_S \leq 7\text{: }\mathbf{S};\ N_{LCU}\text{: }\mathbf{L_{CU}};\ \varnothing) \qquad \text{...[9.23]}\end{aligned}$$

Simplified New States (SNS) and Simplified Fewer States (SFS) Models

Simplified New States models, or SNS models for short, are the subset of 3L models in which New States are added to the eight States and Territories of the current system, and in which at least one function is transferred from State-Territory level to the Commonwealth or national level. So for SNS models **F** is *not* the empty set Ø. So SNS models are the same as NS models except that $\mathbf{F} \neq \varnothing$ for SNS models whereas $\mathbf{F} = \varnothing$ for NS models. So with $\mathbf{F} \neq \varnothing$ replacing $\mathbf{F} = \varnothing$ in [9.20], SNS models are given by:

$$\begin{aligned}\text{MOD} &= \text{SNS} = \text{SNS}(N_S \geq 9\text{: }\mathbf{S};\ N_L \geq 1\text{: }\mathbf{L};\ \mathbf{F} \neq \varnothing) \\ &= \text{3L}(N_S \geq 9\text{: }\mathbf{S};\ N_L \geq 1\text{: }\mathbf{L};\ \mathbf{F} \neq \varnothing) \\ &= \text{3LF}(N_S \geq 9\text{: }\mathbf{S};\ N_L \geq 1\text{: }\mathbf{L};\ \mathbf{F} \neq \varnothing) \\ &= \text{SLF}(N_S \geq 9\text{: }\mathbf{S};\ N_L \geq 1\text{: }\mathbf{L};\ \mathbf{F} \neq \varnothing) \qquad \text{...[9.24]}\end{aligned}$$

Simplified Fewer States models, or SFS models for short, are the same as SNS models except that in SFS models N_S is between 2 and 7 inclusive. So with $2 \leq N_S \leq 7$ replacing $N_S \geq 9$ in [9.24], SFS models are given by:

$$\begin{aligned}\text{MOD} &= \text{SFS} = \text{SFS}(2 \leq N_S \leq 7\text{: }\mathbf{S};\ N_L \geq 1\text{: }\mathbf{L};\ \mathbf{F} \neq \varnothing) \\ &= \text{3L}(2 \leq N_S \leq 7\text{: }\mathbf{S};\ N_L \geq 1\text{: }\mathbf{L};\ \mathbf{F} \neq \varnothing) \\ &= \text{3LF}(2 \leq N_S \leq 7\text{: }\mathbf{S};\ N_L \geq 1\text{: }\mathbf{L};\ \mathbf{F} \neq \varnothing) \\ &= \text{SLF}(2 \leq N_S \leq 7\text{: }\mathbf{S};\ N_L \geq 1\text{: }\mathbf{L};\ \mathbf{F} \neq \varnothing) \qquad \text{...[9.25]}\end{aligned}$$

Simplified Regional States (SRS) Models

Simplified Regional States models, or SRS models for short, are just RSF models (given by expression [9.6]) in which at least one function is transferred from State-Territory level to the Commonwealth or national level. So SRS models are the same as RS models (defined by expression [9.11]) except that $\mathbf{F} \neq \varnothing$ for SRS models whereas $\mathbf{F} = \varnothing$ for RS models. So with $\mathbf{F} \neq \varnothing$ replacing $\mathbf{F} = \varnothing$ in [9.11], SRS models are given by:

$$\text{MOD} = \text{SRS} = \text{SRS}(N_S \geq 1: \mathbf{S}; \mathbf{F} \neq \varnothing) = \text{RSF}(N_S \geq 1: \mathbf{S}; \mathbf{F} \neq \varnothing)$$
$$= \text{SLF}(N_S \geq 1: \mathbf{S}; 0: \varnothing; \mathbf{F} \neq \varnothing) \qquad \text{...[9.26]}$$

Simplified New States Current Local (SNC) Models and Simplified Fewer States Current Local (SFC) Models

Simplified New States Current Local (SNC) models are simply SNS models with local governments remaining in their current number and form. So with $N_L = N_{LCU}$ and $\mathbf{L} = \mathbf{L_{CU}}$ in [9.24], SNC models are given by:

$$\text{MOD} = \text{SNC} = \text{SNC}(N_S \geq 9: \mathbf{S}; \mathbf{F} \neq \varnothing)$$
$$= \text{SNS}(N_S \geq 9: \mathbf{S}; N_L = N_{LCU}: \mathbf{L} = \mathbf{L_{CU}}; \mathbf{F} \neq \varnothing)$$
$$= \text{3L}(N_S \geq 9: \mathbf{S}; N_L = N_{LCU}: \mathbf{L} = \mathbf{L_{CU}}; \mathbf{F} \neq \varnothing)$$
$$= \text{3LF}(N_S \geq 9: \mathbf{S}; N_L = N_{LCU}: \mathbf{L} = \mathbf{L_{CU}}; \mathbf{F} \neq \varnothing)$$
$$= \text{SLF}(N_S \geq 9: \mathbf{S}; N_{LCU}: \mathbf{L_{CU}}; \mathbf{F} \neq \varnothing) \qquad \text{...[9.27]}$$

Simplified Fewer States Current Local (SFC) models are simply SFS models with local governments remaining in their current number and form. So with $N_L = N_{LCU}$ and $\mathbf{L} = \mathbf{L_{CU}}$ in [9.25], SFC models are given by:

$$\text{MOD} = \text{SFC} = \text{SFC}(2 \leq N_S \leq 7: \mathbf{S}; \mathbf{F} \neq \varnothing)$$
$$= \text{SFS}(2 \leq N_S \leq 7: \mathbf{S}; N_L = N_{LCU}: \mathbf{L} = \mathbf{L_{CU}}; \mathbf{F} \neq \varnothing)$$
$$= \text{3L}(2 \leq N_S \leq 7: \mathbf{S}; N_L = N_{LCU}: \mathbf{L} = \mathbf{L_{CU}}; \mathbf{F} \neq \varnothing)$$
$$= \text{3LF}(2 \leq N_S \leq 7: \mathbf{S}; N_L = N_{LCU}: \mathbf{L} = \mathbf{L_{CU}}; \mathbf{F} \neq \varnothing)$$
$$= \text{SLF}(2 \leq N_S \leq 7: \mathbf{S}; N_{LCU}: \mathbf{L_{CU}}; \mathbf{F} \neq \varnothing) \qquad \text{...[9.28]}$$

The following section now describes the basic government structure (BGS) classification systems and notations as simplifications of the CGS system as above.

Basic Government Structure Classification System

In the *complete government structure (CGS) classification system*, using CGS notation, SLF models are expressed as in equation [9.1], which is repeated as follows:

$$\text{MOD} = \text{SLF} = \text{SLF}(N_S\text{: }\mathbf{S}\text{; } N_L\text{: }\mathbf{L}\text{; }\mathbf{F}) \qquad \text{...[9.1]}$$

In the *basic government structure (BGS) classification system*, in which the simplified BGS *notation* is used, State and local governments are described only in terms of their numbers – that is, N_S and N_L. Sets **S** and **L**, of actual State-Territory and local government units respectively, are not specified in simplified model notation. So in BGS notation, SLF models are described by the expression:

$$\underline{\text{MOD}} = \underline{\text{SLF}} = \underline{\text{SLF}}(N_S\text{; } N_L\text{; }\mathbf{F}) \qquad \text{…[9.29]}$$

The model identifier is underlined in *basic (BGS) notation* in order to distinguish from *complete (CGS) notation*.

For any given N_S, N_L and **F**, expression [9.29] represents all possible sets of N_S State-Territory type governments and N_L local type governments.

Similarly, whereas RSF models, for example, are described by expression [9.4] in complete notation, they are expressed as follows in basic notation:

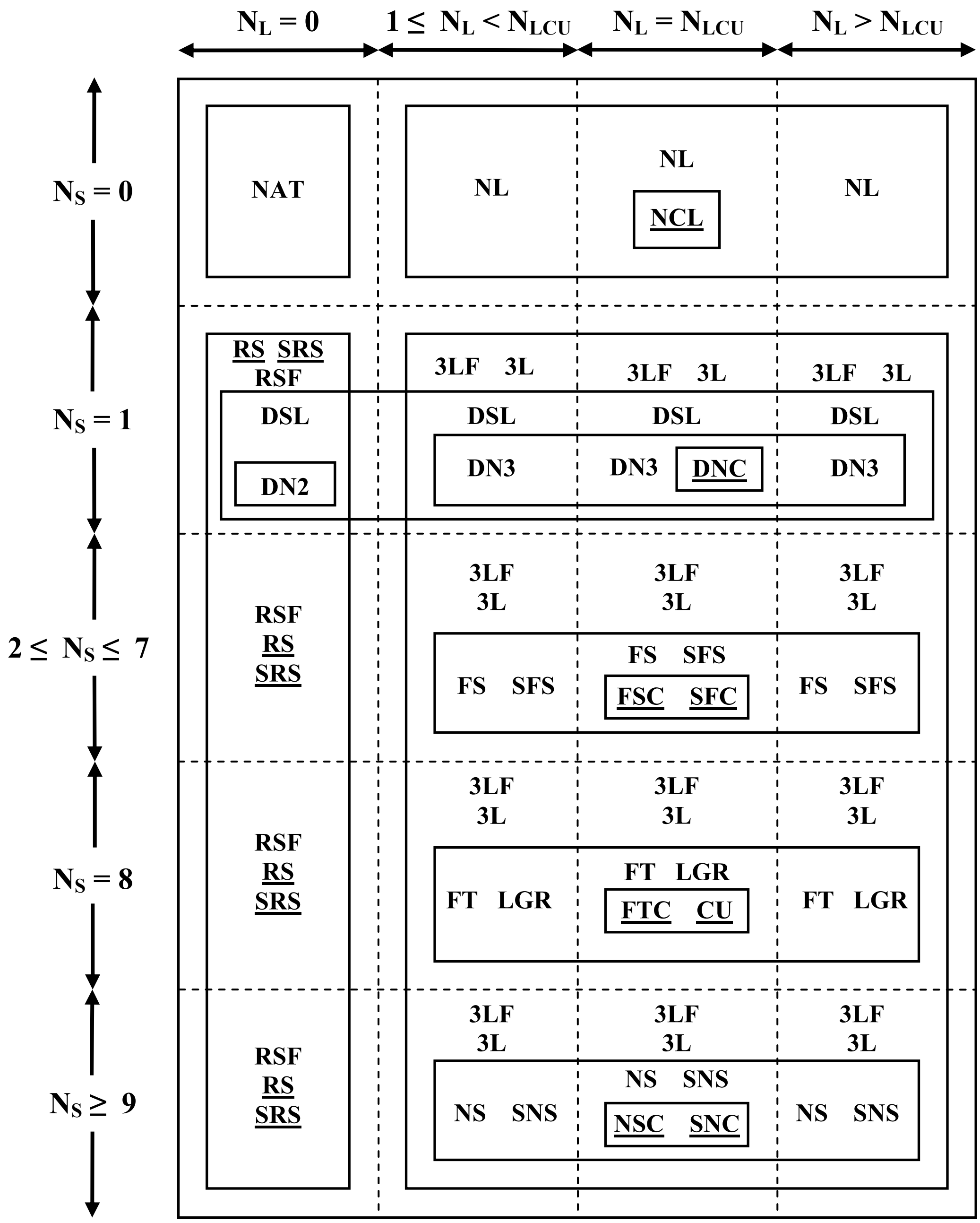
$$\underline{\text{RSF}} = \underline{\text{RSF}}(N_S \geq 1\text{; }\mathbf{F}) \qquad \text{…[9.30]}$$

The models classified and expressed in the preceding passages are summarised in Table 9-2 and Figures 9-3 and 9-4, on the following three pages. Figures 9-3 and 9-4 show how the models in Table 9-2 can be distinguished by their numbers of State-Territory type governments (N_S) and local type governments (N_L).

Table 9-2: Government Structure Models in Complete and Basic Model Notation

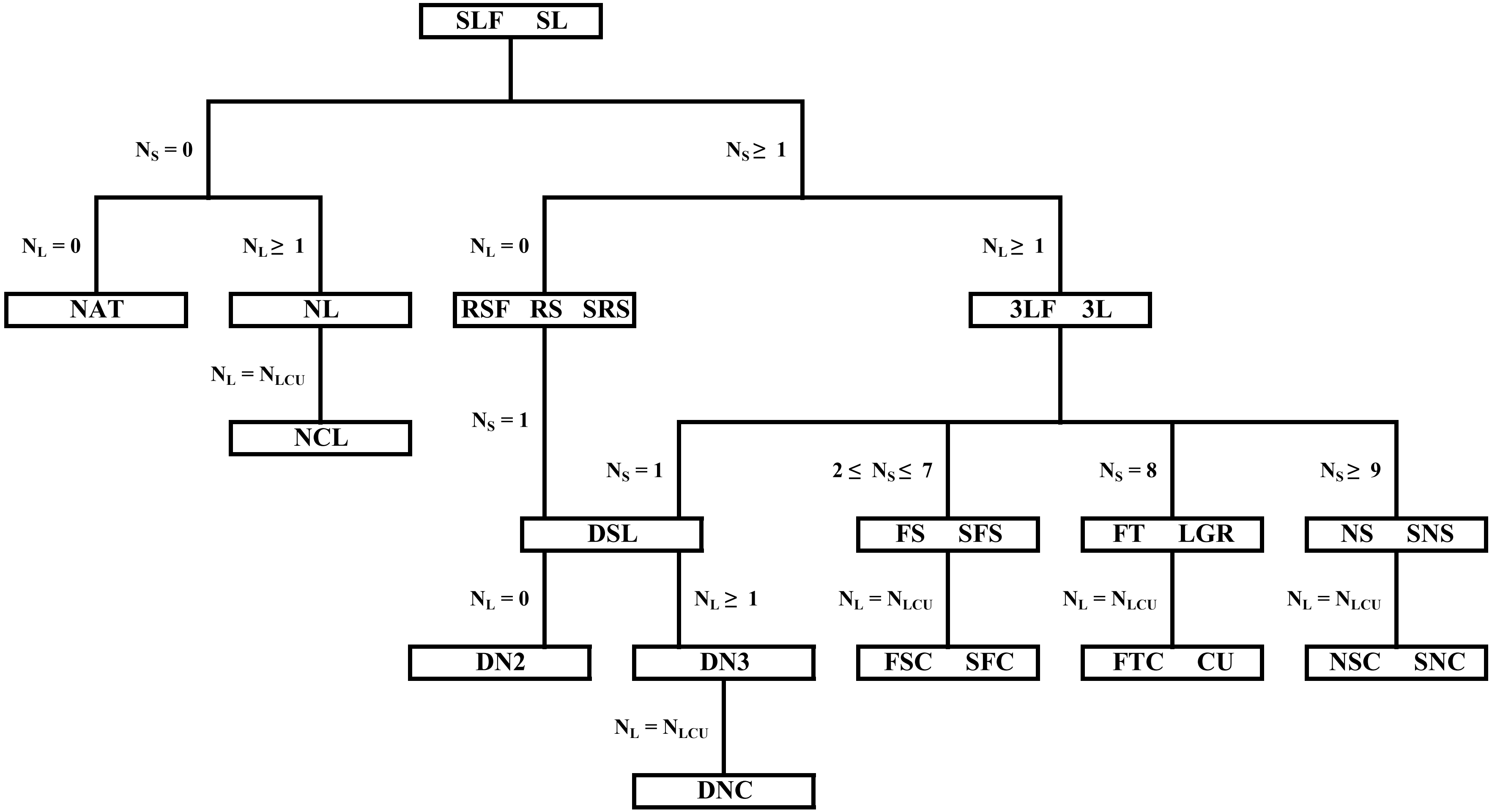
Government Structure Model (MOD) Categories			Variable Restrictions ("var" means dimension is *not* fixed or otherwise restricted, and so remains variable)				
Model	**Complete Government Structure (CGS) Notation**	**Basic Government Structure (BGS) Notation**	N_S	**S**	N_L	**L**	**F**
SLF	$SLF(N_S\text{: }\mathbf{S}; N_L\text{: }\mathbf{L}; \mathbf{F})$	$SLF(N_S; N_L; \mathbf{F})$	var	var	var	var	var
3LF	$3LF(N_S \geq 1\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}; \mathbf{F}) =$ $SLF(N_S \geq 1\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}; \mathbf{F})$	$3LF(N_S \geq 1; N_L \geq 1; \mathbf{F}) =$ $SLF(N_S \geq 1; N_L \geq 1; \mathbf{F})$	var $N_S \geq 1$	var	var $N_L \geq 1$	var	var
NAT	$NAT =$ $SLF(0\text{: }\varnothing; 0\text{: }\varnothing; \mathbf{F_{ALL}})$	$NAT =$ $SLF(0; 0; \mathbf{F_{ALL}})$	$N_S = 0$	$\mathbf{S} = \varnothing$	$N_L = 0$	$\mathbf{L} = \varnothing$	$\mathbf{F} = \mathbf{F_{ALL}}$
RSF	$RSF(N_S \geq 1\text{: }\mathbf{S}; \mathbf{F}) =$ $SLF(N_S \geq 1\text{: }\mathbf{S}; 0\text{: }\varnothing; \mathbf{F})$	$RSF(N_S \geq 1; \mathbf{F}) =$ $SLF(N_S \geq 1; 0; \mathbf{F})$	var $N_S \geq 1$	var	$N_L = 0$	$\mathbf{L} = \varnothing$	var
NL	$NL(N_L \geq 1\text{: }\mathbf{L}) =$ $SLF(0\text{: }\varnothing; N_L \geq 1\text{: }\mathbf{L}; \mathbf{F_{ALL}})$	$NL(N_L \geq 1) =$ $SLF(0; N_L \geq 1; \mathbf{F_{ALL}})$	$N_S = 0$	$\mathbf{S} = \varnothing$	var $N_L \geq 1$	var	$\mathbf{F} = \mathbf{F_{ALL}}$
NCL	$NCL =$ $SLF(0\text{: }\varnothing; N_{LCU}\text{: }\mathbf{L_{CU}}; \mathbf{F_{ALL}})$	$NCL =$ $SLF(0; N_{LCU}; \mathbf{F_{ALL}})$	$N_S = 0$	$\mathbf{S} = \varnothing$	$N_L = N_{LCU}$	$\mathbf{L} = \mathbf{L_{CU}}$	$\mathbf{F} = \mathbf{F_{ALL}}$
SL	$SL(N_S\text{: }\mathbf{S}; N_L\text{: }\mathbf{L}) =$ $SLF(N_S\text{: }\mathbf{S}; N_L\text{: }\mathbf{L}; \varnothing)$	$SL(N_S; N_L) =$ $SLF(N_S; N_L; \varnothing)$	var	var	var	var	$\mathbf{F} = \varnothing$
3L	$3L(N_S \geq 1\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}) =$ $SLF(N_S \geq 1\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}; \varnothing)$	$3L(N_S \geq 1; N_L \geq 1) =$ $SLF(N_S \geq 1; N_L \geq 1; \varnothing)$	var $N_S \geq 1$	var	var $N_L \geq 1$	var	$\mathbf{F} = \varnothing$
RS	$RS(N_S \geq 1\text{: }\mathbf{S}) =$ $SLF(N_S \geq 1\text{: }\mathbf{S}; 0\text{: }\varnothing; \varnothing)$	$RS(N_S \geq 1) =$ $SLF(N_S \geq 1; 0; \varnothing)$	var $N_S \geq 1$	var	$N_L = 0$	$\mathbf{L} = \varnothing$	$\mathbf{F} = \varnothing$
FT	$LFT(N_L \geq 1\text{: }\mathbf{L}; \mathbf{F}) =$ $SLF(8\text{: }\mathbf{S_{CU}}; N_L \geq 1\text{: }\mathbf{L}; \mathbf{F})$	$LFT(N_L \geq 1; \mathbf{F}) =$ $SLF(8; N_L \geq 1; \mathbf{F})$	$N_S = 8$	$\mathbf{S} = \mathbf{S_{CU}}$	var $N_L \geq 1$	var	var
FTC	$FT(\mathbf{F}) =$ $SLF(8\text{: }\mathbf{S_{CU}}; N_{LCU}\text{: }\mathbf{L_{CU}}; \mathbf{F})$	$FT(\mathbf{F}) =$ $SLF(8; N_{LCU}; \mathbf{F})$	$N_S = 8$	$\mathbf{S} = \mathbf{S_{CU}}$	$N_L = N_{LCU}$	$\mathbf{L} = \mathbf{L_{CU}}$	var
CU	$CU =$ $SLF(8\text{: }\mathbf{S_{CU}}; N_{LCU}\text{: }\mathbf{L_{CU}}; \varnothing)$	$CU =$ $SLF(8; N_{LCU}; \varnothing)$	$N_S = 8$	$\mathbf{S} = \mathbf{S_{CU}}$	$N_L = N_{LCU}$	$\mathbf{L} = \mathbf{L_{CU}}$	$\mathbf{F} = \varnothing$
LGR	$LGR(N_L \geq 1\text{: }\mathbf{L}) =$ $SLF(8\text{: }\mathbf{S_{CU}}; N_L \geq 1\text{: }\mathbf{L}; \varnothing)$	$LGR(N_L \geq 1) =$ $SLF(8; N_L \geq 1; \varnothing)$	$N_S = 8$	$\mathbf{S} = \mathbf{S_{CU}}$	var $N_L \geq 1$	var	$\mathbf{F} = \varnothing$
DSL	$DSL(N_L\text{: }\mathbf{L}) =$ $SLF(1\text{: }\{S_{AUS}\}; N_L\text{: }\mathbf{L}; \varnothing)$	$DSL(N_L) =$ $SLF(1; N_L; \varnothing)$	$N_S = 1$	$\mathbf{S} = \{S_{AUS}\}$	var	var	$\mathbf{F} = \varnothing$
DN3	$DN3(N_L \geq 1\text{: }\mathbf{L}) =$ $SLF(1\text{: }\{S_{AUS}\}; N_L \geq 1\text{: }\mathbf{L}; \varnothing)$	$DN3(N_L \geq 1) =$ $SLF(1; N_L \geq 1; \varnothing)$	$N_S = 1$	$\mathbf{S} = \{S_{AUS}\}$	var $N_L \geq 1$	var	$\mathbf{F} = \varnothing$
DN2	$DN2 =$ $SLF(1\text{: }\{S_{AUS}\}; 0\text{: }\varnothing; \varnothing)$	$DN2 =$ $SLF(1; 0; \varnothing)$	$N_S = 1$	$\mathbf{S} = \{S_{AUS}\}$	$N_L = 0$	$\mathbf{L} = \varnothing$	$\mathbf{F} = \varnothing$
DNC	$DNC =$ $SLF(1\text{: }\{S_{AUS}\}; N_{LCU}\text{: }\mathbf{L_{CU}}; \varnothing)$	$DNC =$ $SLF(1; N_{LCU}; \varnothing)$	$N_S = 1$	$\mathbf{S} = \{S_{AUS}\}$	$N_L = N_{LCU}$	$\mathbf{L} = \mathbf{L_{CU}}$	$\mathbf{F} = \varnothing$
NS	$NS(N_S \geq 9\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}) =$ $SLF(N_S \geq 9\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}; \varnothing)$	$NS(N_S \geq 9; N_L \geq 1) =$ $SLF(N_S \geq 9; N_L \geq 1; \varnothing)$	var $N_S \geq 9$	var	var $N_L \geq 1$	var	$\mathbf{F} = \varnothing$
FS	$FS(2 \leq N_S \leq 7\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}) =$ $SLF(2 \leq N_S \leq 7\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}; \varnothing)$	$FS(2 \leq N_S \leq 7; N_L \geq 1) =$ $SLF(2 \leq N_S \leq 7; N_L \geq 1; \varnothing)$	var $2 \leq N_S \leq 7$	var	var $N_L \geq 1$	var	$\mathbf{F} = \varnothing$
NSC	$NSC(N_S \geq 9\text{: }\mathbf{S}) =$ $SLF(N_S \geq 9\text{: }\mathbf{S}; N_L = N_{LCU}\text{: }\mathbf{L}; \varnothing)$	$NSC(N_S \geq 9) =$ $SLF(N_S \geq 9; N_L = N_{LCU}; \varnothing)$	var $N_S \geq 9$	var	$N_L = N_{LCU}$	var	$\mathbf{F} = \varnothing$
FSC	$FS(2 \leq N_S \leq 7\text{: }\mathbf{S}) =$ $SLF(2 \leq N_S \leq 7\text{: }\mathbf{S}; N_L = N_{LCU}\text{: }\mathbf{L}; \varnothing)$	$FS(2 \leq N_S \leq 7) =$ $SLF(2 \leq N_S \leq 7; N_L \geq 1; \varnothing)$	var $2 \leq N_S \leq 7$	var	$N_L = N_{LCU}$	var	$\mathbf{F} = \varnothing$
SNS	$SNS(N_S \geq 9\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}; \mathbf{F} \neq \varnothing) =$ $SLF(N_S \geq 9\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}; \mathbf{F} \neq \varnothing)$	$SNS(N_S \geq 9; N_L \geq 1; \mathbf{F} \neq \varnothing) =$ $SLF(N_S \geq 9; N_L \geq 1; \mathbf{F} \neq \varnothing)$	var $N_S \geq 9$	var	var $N_L \geq 1$	var	$\mathbf{F} \neq \varnothing$
SFS	$SFS(2 \leq N_S \leq 7\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}; \mathbf{F} \neq \varnothing) =$ $SLF(2 \leq N_S \leq 7\text{: }\mathbf{S}; N_L \geq 1\text{: }\mathbf{L}; \mathbf{F} \neq \varnothing)$	$SFS(2 \leq N_S \leq 7; N_L \geq 1; \mathbf{F} \neq \varnothing) =$ $SLF(2 \leq N_S \leq 7; N_L \geq 1; \mathbf{F} \neq \varnothing)$	var $2 \leq N_S \leq 7$	var	var $N_L \geq 1$	var	$\mathbf{F} \neq \varnothing$
SNC	$SNC(N_S \geq 9\text{: }\mathbf{S}; \mathbf{F} \neq \varnothing) =$ $SLF(N_S \geq 9\text{: }\mathbf{S}; N_L = N_{LCU}\text{: }\mathbf{L}; \mathbf{F} \neq \varnothing)$	$SNC(N_S \geq 9; \mathbf{F} \neq \varnothing) =$ $SLF(N_S \geq 9; N_L = N_{LCU}; \mathbf{F} \neq \varnothing)$	var $N_S \geq 9$	var	$N_L = N_{LCU}$	var	$\mathbf{F} \neq \varnothing$
SFC	$SFC(2 \leq N_S \leq 7\text{: }\mathbf{S}; \mathbf{F} \neq \varnothing) =$ $SLF(2 \leq N_S \leq 7\text{: }\mathbf{S}; N_L = N_{LCU}\text{: }\mathbf{L}; \mathbf{F} \neq \varnothing)$	$SFC(2 \leq N_S \leq 7; \mathbf{F} \neq \varnothing) =$ $SLF(2 \leq N_S \leq 7; N_L = N_{LCU}; \mathbf{F} \neq \varnothing)$	var $2 \leq N_S \leq 7$	var	$N_L = N_{LCU}$	var	$\mathbf{F} \neq \varnothing$
SRS	$SRS(N_S \geq 1\text{: }\mathbf{S}; \mathbf{F} \neq \varnothing) =$ $SLF(N_S \geq 1\text{: }\mathbf{S}; 0\text{: }\varnothing; \mathbf{F} \neq \varnothing)$	$SRS(N_S \geq 1; \mathbf{F} \neq \varnothing) =$ $SLF(N_S \geq 1; 0; \mathbf{F} \neq \varnothing)$	var $N_S \geq 1$	var	$N_L = 0$	$\mathbf{L} = \varnothing$	$\mathbf{F} \neq \varnothing$

Figure 9-3: Subsets of SLF AND SL Models



Models underlined in Figure 9-3 above are those which are considered most extensively in subsequent analyses. Figure 9-4 following provides a "tree diagram" representation of the subset relationships among the 26 model classifications defined here.

Figure 9-4: Government Structure Model Tree Diagram



Government Structure Models of Particular Interest

Conceptually at least, Australia could transform to a vast range of the SLF models and the other 25 subsets of SLF models as defined above, within its present constitutional provisions. This thesis will focus, however, on those models which are most viable in terms of historical and contemporary support, and which host realistic numbers of State-Territory type governments.

As described in Chapters 2 and 3 especially, several government structure models have particular historical significance. New States models have been supported since pre-Federation times, and two-level models such as the National-Local and Regional States models have also attracted varying degrees of support among Unificationists and Regional Government advocates.

Local government amalgamations and reorganisations have occurred at regular intervals in Australia's six States and the Northern Territory throughout much of Australia's post-Federation history, so Local Government Reform (LGR) models as defined here have been active in practice throughout the history of Australian local government. Australia's current (CU) model can be considered a static "snapshot" example of a continually evolving LGR model.

As previewed in Chapter 1, this present focuses on rearrangement at the Commonwealth and State-Territory levels, so, unless specified to the contrary, it is henceforth assumed that local government numbers will remain at more or less current levels (so $N_L = N_{LCU}$). So LGR models will not be examined henceforth.

The Single Level National Government (NAT) model and Dual National State-Local (DSL) models would never be seriously considered for actual implementation. But as noted previously (Drummond 2002: 45), the Dual National models prove especially useful as intermediate stages in the transition to other models – especially the National-Local models. The Dual National Current Local (DNC) model will be considered quite extensively in subsequent analyses.

Among the 26 families of models introduced above, the following ten will be focused on in subsequent chapters:

- Australia's Current (CU) model;
- New States Current Local (NSC) and Simplified New States Current Local (SNC) models;
- Fewer States Current Local (FSC) and Simplified Fewer States Current Local (SFC) models;
- Regional States (RS) and Simplified Regional States (SRS) models;
- Functional Transfer Current Local (FTC) models;
- the Dual National Current Local (DNC) model; and
- the National Current Local (NCL) model.

The classifications as above are often employed in following chapters, but it is sometimes more convenient to describe these models in terms which better align with common usage and historical labels as identified in Chapters 2 to 4. Accordingly, as noted earlier in this chapter, the NSC and SNC models are sometimes referred to collectively as the New States models; the FSC and SFC models are similarly referred to as Fewer States models; the DNC and NCL models as Unification models; the RS and SRS models as Regional Government models; and the FTC models as Functional Transfer models.

Table 9-3 below lists the models previously summarised in Table 9-2 and Figures 9-3 and 9-4, and states, with reasons, which models will be considered in the relative cost and benefit analyses which are described in the chapters that follow.

Table 9-3: Models Used in Subsequent Analyses

MOD	Simplified Model Notation	Considered in Subsequent Analyses?	Comments on Significance if Considered in Subsequent Analyses, or on why not Considered Further
SLF	SLF(N_S; N_L; **F**)	NO	insufficiently specific
3LF	3LF($N_S \geq 1$; $N_L \geq 1$; **F**) = SLF($N_S \geq 1$; $N_L \geq 1$; **F**)	NO	insufficiently specific
NAT	NAT = SLF(0; 0; $\mathbf{F_{ALL}}$)	NO	A single level monolithic government model would never be seriously considered.
RSF	RSF($N_S \geq 1$; **F**) = SLF($N_S \geq 1$; 0; **F**)	NO	The RSF models are subdivided into two distinct subsets of models which *shall* be considered in subsequent analyses: RS models (in which **F** = Ø) and SRS models (in which **F** ≠ Ø). To avoid unnecessary duplication, subsequent analyses shall refer to RS and SRS models in place of the parent RSF classification.
NL	NL($N_L \geq 1$) = SLF(0; $N_L \geq 1$; $\mathbf{F_{ALL}}$)	NO	but the NCL model will be considered prominently
NCL	NCL = SLF(0; N_{LCU}; $\mathbf{F_{ALL}}$)	YES	The NCL model is a two level model supported by those who believe that all State-Territory functions should be taken over by Commonwealth government, and that local governments should remain in their current numbers.
SL	SL(N_S; N_L) = SLF(N_S; N_L; Ø)	NO	insufficiently specific
3L	3L($N_S \geq 1$; $N_L \geq 1$) = SLF($N_S \geq 1$; $N_L \geq 1$; Ø)	NO	insufficiently specific
RS	RS($N_S \geq 1$) = SLF($N_S \geq 1$; 0; Ø)	YES	Such models would comprise ACT type Regional Governments.
FT	FT($N_L \geq 1$; **F**) = SLF(8; $N_L \geq 1$; **F**)	NO	Local government reform is not the focus of the analysis and research reported herein.
FTC	FTC(**F**) = SLF(8; N_{LCU}; **F**)	YES	Such models are often proposed and debated. Recent examples include the push for a national industrial relations system and recent proposals for health to be transferred from the State-Territory level to the Commonwealth (see Chapter 4 and Appendices 4A, 4B, 4D and 4E).
CU	CU = SLF(8; N_{LCU}; Ø)	YES	Australia's current government structure is the benchmark against which other models are compared and analysed
LGR	LGR($N_L \geq 1$) = SLF(8; $N_L \geq 1$; Ø)	NO	Local government reform is not the focus of this present study.
DSL	DSL(N_L) = SLF(1; N_L; Ø)	NO	The DSL models are not considered in total, but one form of DSL model is: the DNC model.
DN3	DN3($N_L \geq 1$) = SLF(1; $N_L \geq 1$; Ø)	NO	but its subset DNC model will be considered prominently
DN2	DN2 = SLF(1; 0; Ø)	NO	system with one State-Territory type government and no local governments would never seriously be considered
DNC	DNC = SLF(1; N_{LCU}; Ø)	YES	Assumes a pivotal role in expenses and costing analyses
NS	NS($N_S \geq 9$; $N_L \geq 1$) = SLF($N_S \geq 9$; $N_L \geq 1$; Ø)	NO	Just one subset of NS models is considered: the NSC models.
FS	FS($2 \leq N_S \leq 7$; $N_L \geq 1$) = SLF($2 \leq N_S \leq 7$; $N_L \geq 1$; Ø)	NO	Just one subset of FS models is considered: the FSC models.
NSC	NSC($N_S \geq 9$) = SLF($N_S \geq 9$; $N_L = N_{LCU}$; Ø)	YES	New States models have received significant support for more than a century over many different parts of Australia, as described in Chapter 2 and Appendix 2A.
FSC	FSC($2 \leq N_S \leq 7$) = SLF($2 \leq N_S \leq 7$; $N_L = N_{LCU}$; Ø)	YES	Not often supported historically but includes "obvious" possibilities such as the absorption of ACT into NSW (which has been advocated), or of TAS into VIC etc.
SNS	SNS($N_S \geq 9$; $N_L \geq 1$; **F** ≠ Ø) = SLF($N_S \geq 9$; $N_L \geq 1$; **F** ≠ Ø)	NO	Just one subset of SNS models is considered: the SNC models.
SFS	SFS($2 \leq N_S \leq 7$; $N_L \geq 1$; **F** ≠ Ø) = SLF($2 \leq N_S \leq 7$; $N_L \geq 1$; **F** ≠ Ø)	NO	Just one subset of SFS models is considered: the SFC models.
SNC	SNC($N_S \geq 9$; **F** ≠ Ø) = SLF($N_S \geq 9$; $N_L = N_{LCU}$; **F** ≠ Ø)	YES	as per NSC
SFC	SFC($2 \leq N_S \leq 7$; **F** ≠ Ø) = SLF($2 \leq N_S \leq 7$; $N_L = N_{LCU}$; **F** ≠ Ø)	YES	as per FSC
SRS	SRS($N_S \geq 1$; **F** ≠ Ø) = SLF($N_S \geq 1$; 0; **F** ≠ Ø)	YES	as per RS

The following section now classifies and describes various *transformations* between government structures as defined herein.

Complete Government Structure Transformation System

Extending on the transformation categories described above (see Figures 9-1 and 9-2), a *complete government structure transformation* (CGST) *system* (CGSTS) is now defined in order to describe the shift from any one government structure model to any other among those presented in Tables 9-2 and 9-3 and Figures 9-3 and 9-4 above. This CGST system includes a *complete government structure transformation algebra* (CGSTA) comprising the equations, notations and symbolic representations employed to describe the full range of government structure transformations.

The CGST system describes transformations in terms of four categories which are defined in turn below: *model transformations*, *horizontal transformations*, *vertical transformations* and *functional transformations*. All transformations can be described by model transformations alone, but horizontal, vertical and functional transformations provide an additional capacity to focus on particular dimensions of interest among the S-, L- and F-dimensions.

Horizontal transformations include the *horizontal amalgamations* and *New State formations* previously defined as above (see Figures 9-1 and 9-2). Vertical transformations include the *vertical amalgamations* and *State-Local integrations* as above. Functional transformations are the same as the *Functional Transfers* as previously classified. Fuller descriptions of these transformations now follow.

Model Transformations

Model transformations or *M-transformations* shall describe the shift from one government structure model MOD_1 to a second government structure model MOD_2, and shall be represented symbolically by the expression $T_{M[MOD_1 \rightarrow MOD_2]}$. So model transformations can involve shifts in all three government structure dimensions as defined herein: the S-dimension, L-dimension and F-dimension.

Horizontal Transformations

Horizontal transformations or *H-transformations* describe shifts in the number of State-Territory or local level governments, and apply only to the S-dimension or L-dimension. Horizontal transformations include integrations (or amalgamations or absorptions) and disintegrations (or divisions or additions) which occur horizontally across a single level of government. So horizontal transformations can occur at State-Territory (S-dimension) and local (L-dimension) levels. State-Territory level horizontal transformations shall be referred to as S-transformations, and local level horizontal transformations shall be referred to as L-transformations, as follows:

S-transformations

$T_{S[N_{S_1}:\mathbf{S_1} \to N_{S_2}:\mathbf{S_2}(N_L:\mathbf{L};\mathbf{F})]}$ denotes a transformation from the set $\mathbf{S_1}$ of State-Territory government type units (N_{S_1} in number) to the set $\mathbf{S_2}$ of State-Territory type units (N_{S_2} in number), with the L-dimension (the set $\mathbf{L}$ of local government type units, N_L in number) and F-dimension remaining unchanged.

L-transformations

$T_{L[N_{L_1}:\mathbf{L_1} \to N_{L_2}:\mathbf{L_2}(N_S:\mathbf{S};\mathbf{F})]}$ denotes a transformation from the set $\mathbf{L_1}$ of local government type units (N_{L_1} in number) to the set $\mathbf{L_2}$ of local government type units (N_{L_2} in number), with the S-dimension (the set $\mathbf{S}$ of State-Territory type governments, N_S in number) and F-dimension remaining unchanged.

Horizontal amalgamations and New State formations as previously described (see Figures 9-1 and 9-2) form subsets of S-transformations.

Vertical Transformations

Vertical transformations or *V-transformations* describe shifts in the number of levels of government and can again only apply to the S-dimension or L-dimension. *Vertical transformations* include integrations (or amalgamations or absorptions) and disintegrations (or divisions or additions) between adjacent levels of government. Vertical amalgamations and State-Local integrations as previously described (see Figures 9-1 and 9-2) are example of vertical transformations here. Vertical transformations involving Commonwealth and State-

Territory levels shall be referred to as *C-S-transformations*, and vertical transformations involving State-Territory and local levels shall be referred to as *S-L-transformations*, as follows:

C-S-transformations can be further sub-divided into:

C-S-integrations

$T_{CSI\,[C+N_S:\mathbf{S}\rightarrow C\,(N_L:\mathbf{L})]}$ denotes the coalescence of N_S State-Territory type governments (forming the set **S**) and the Commonwealth government into a new national – or central – government, with the L-dimension unchanged. There is no need to specify the F-dimension for C-S-integrations because all powers held by State-Territory and Commonwealth governments prior to integration are assumed by the resultant national government.

C-S-disintegrations

$T_{CSD\,[C\rightarrow C+N_S:\mathbf{S}\,(N_L:\mathbf{L};\mathbf{F_S})]}$ denotes the transformation from a system with a central national government, and no State-Territory level governments, to a system with a Commonwealth government and N_S separate State-Territory type governments (forming the set **S**) hosting a function set $\mathbf{F_S}$, with the L-dimension remaining unchanged.

S-L-transformations can be further sub-divided into:

S-L-integrations

$T_{SLI\,[N_S:\mathbf{S}+N_L:\mathbf{L}\rightarrow N_S:\mathbf{S(F)}]}$ denotes the absorption of N_L local level governments (forming the set **L**) into their N_S parent State-Territory level governments (forming the set **S**), forming new consolidated State-Territory level governments (still N_S in number, forming the same set **S** of geographical units), leaving no local governments, with the F-dimension remaining unchanged.

S-L-disintegrations

$T_{SLD\,[N_S:\mathbf{S}\rightarrow N_S:\mathbf{S}+N_L:\mathbf{L(F)}]}$ denotes the transformation from a system with N_S State-Territory level governments (forming the set **S**) and no local level governments to a system with the same N_S State-Territory governments (again in set **S**) but also N_L separate local level governments (forming the set **L**) with powers, responsibilities and functions matching (as far as possible) those held by local governments in Australia's current system, with the F-dimension (defining the division of functions between Commonwealth and State-Territory levels) remaining unchanged. The assumption that local governments will host functions matching those held by current local governments is an imperfect one, noting the variations in functions held by local governments in the different States and the Northern Territory in the current system, but is necessary to avoid the need to define a fourth dimension (in addition to the S-, L- and F-dimensions) to describe the division of functions between the State-Territory and local levels. A more complete taxonomy could accommodate such additional dimensions, but would introduce an unnecessary complication to the present analysis.

Functional Transformations

Functional transformations or *F-transformations* describe functional shifts between State-Territory and Commonwealth levels, and so only apply to the F-dimension. Functional transformations are shifts from a system with $\mathbf{F} = \mathbf{F_1}$ to a system with $\mathbf{F} = \mathbf{F_2}$, in which the S-dimension and L-dimension remain unchanged, as denoted by $T_{F[\mathbf{F_1} \rightarrow \mathbf{F_2}(N_S:\mathbf{S};N_L:\mathbf{L})]}$. If $\mathbf{F_1}$ is the empty set (Ø), an F-transformation becomes a shift from the current system to a system with $\mathbf{F} = \mathbf{F_2}$; that is, a system in which a set of functions $\mathbf{F_2}$ is transferred from the State-Territory level in the present system to the Commonwealth level.

Summary of Transformation Classifications

The transformations defined above are summarised in Table 9-4 below. These transformations are not fully exhaustive. A form of *C-S-disintegration* which is not considered here, but which could be defined theoretically, is that in which Commonwealth and State-Territory level governments coalesced so as to produce enhanced State-Territory governments and no national government. The transformations that are defined are sufficient, however, to provide pathways from the current system of government to all of the models listed and illustrated in Tables 9-2 and 9-3 and Figures 9-3 and 9-4.

Table 9-4: Summary of Transformation Classifications

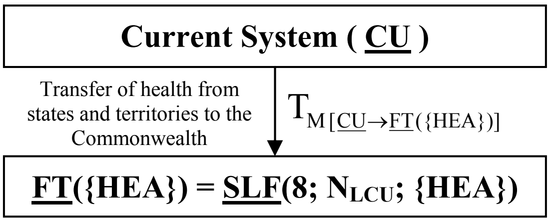
Transformation Type	Symbology	Description	Examples
Model Transformations or M-transformations			
M-transformations	$T_{M[MOD_1 \to MOD_2]}$	Shift from one model MOD_1 to a second model MOD_2 such that shifts can take place in any or all of the S-, L- and F-dimensions.	$T_{M[CU \to MOD_A]}$ describes the shift from the current model to a model MOD_A
Horizontal Transformations or H-transformations			
S-transformations	$T_{S[N_{S_1}:\mathbf{S_1} \to N_{S_2}:\mathbf{S_2}(N_L:\mathbf{L};\mathbf{F})]}$	Shift from the set $\mathbf{S_1}$ of State-Territory government type units (N_{S_1} in number) to the set $\mathbf{S_2}$ of State-Territory type units (N_{S_2} in number), with the L-dimension (the set **L** of N_L local governments, N_L in number) and F-dimension remaining unchanged.	Establishment of New States or amalgamation of State-Territory governments to form Dual National models
L-transformations	$T_{L[N_{L_1}:\mathbf{L_1} \to N_{L_2}:\mathbf{L_2}(N_S:\mathbf{S};\mathbf{F})]}$	Shift from the set $\mathbf{L_1}$ of local government type units (N_{L_1} in number) to the set $\mathbf{L_2}$ of local government type units (N_{L_2} in number), with the S-dimension (the set **S** of State-Territory type governments, N_S in number) and F-dimension remaining unchanged.	Local government amalgamations
Vertical Transformations or V-transformations			
C-S-integration	$T_{CSI[C+N_S:\mathbf{S} \to C(N_L:\mathbf{L})]}$	Coalescence of N_S State-Territory type governments (forming the set **S**) and the Commonwealth government into a new national – or central – government, with the L-dimension unchanged.	Formation of National-Local Model
C-S-disintegration	$T_{CSD[C \to C+N_S:\mathbf{S}(N_L:\mathbf{L};\mathbf{F_S})]}$	Transformation from a system with a central national government, and no State-Territory level governments, to a system with a Commonwealth government and N_S separate State-Territory type governments (forming the set **S**) hosting a function set $\mathbf{F_S}$, with the L-dimension remaining unchanged.	Shift from a National-Local model back to the current system
S-L-integration	$T_{SLI[N_S:\mathbf{S}+N_L:\mathbf{L} \to N_S:\mathbf{S}(\mathbf{F})]}$	Absorption of N_L local level governments (forming the set **L**) into their N_S parent State-Territory level governments (forming the set **S**), forming new consolidated State-Territory level governments (still N_S in number, forming the same set **S** of geographical units), leaving no local governments, with the F-dimension remaining unchanged.	Abolition of local government
S-L-disintegration	$T_{SLD[N_S:\mathbf{S} \to N_S:\mathbf{S}+N_L:\mathbf{L}(\mathbf{F})]}$	Shift from a system with N_S State-Territory level governments (forming the set **S**), and no local level governments, to a system with the same N_S State-Territory governments (again in set **S**) but also N_L separate local level governments (forming the set **L**) with powers, responsibilities and functions matching (as far as possible) those held by local governments in Australia's current system, with the F-dimension remaining unchanged.	Establishment of a separate level of local government in the ACT
Functional Transformations or F-transformations			
F-transformations	$T_{F[\mathbf{F_1} \to \mathbf{F_2}(N_S:\mathbf{S};N_L:\mathbf{L})]}$	Shift from a system with $\mathbf{F} = \mathbf{F_1}$ to a system with $\mathbf{F} = \mathbf{F_2}$, with the S-dimension and L-dimension remaining unchanged	Creation of a national health care system by transferring health functions from States and Territories to the Commonwealth

Selected Transformations

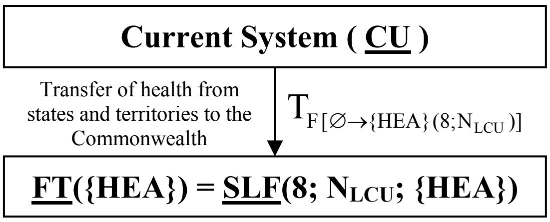
Seven examples of transformations of particular interest are now presented in terms of the CGST algebra and basic government structure (BGS) notation, so the model symbols MOD are underlined (MOD). Transformations are illustrated in *government structure transformation diagrams*, or *transformation diagrams* for short, and are also described in terms of *government structure transformation equations*, or *transformation equations* for short, as follows:

Example 9-1: Health Function Only Transferred to Commonwealth
– All Else Unchanged from the Current System

M-transformation diagram:



F-transformation diagram:



M-transformation equation:

$$\underline{\mathbf{CU}} \xrightarrow{T_{M[\underline{CU}\rightarrow\underline{FT}(\{HEA\})]}} \underline{\mathbf{FT}}\mathbf{(\{HEA\})} \qquad ...[9.31a]$$

OR

$$T_{M[CU\rightarrow FT(\{HEA\})]}[\ \underline{\mathbf{CU}}\ ] = \underline{\mathbf{FT}}\mathbf{(\{HEA\})} \qquad ...[9.31b]$$

F-transformation equation:

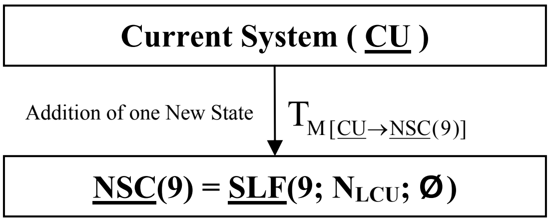
$$\underline{\mathbf{CU}} \xrightarrow{T_{F[\varnothing\rightarrow\{HEA\}(8;N_{LCU})]}} \underline{\mathbf{FT}}\mathbf{(\{HEA\})} \qquad ...[9.31c]$$

OR

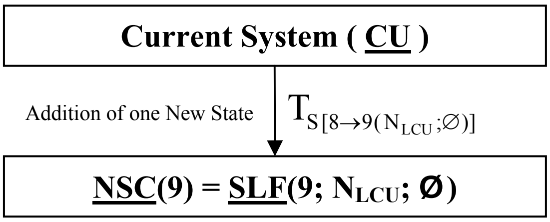
$$T_{F[\varnothing\rightarrow\{HEA\}(8;N_{LCU})]}[\ \underline{\mathbf{CU}}\ ] = \underline{\mathbf{FT}}\mathbf{(\{HEA\})} \qquad ...[9.31d]$$

Example 9-2: Addition of Just One New State – All Else Unchanged

M-transformation diagram:



S-transformation diagram:



M-transformation equation:

$$\underline{CU} \xrightarrow{T_{M[\underline{CU}\rightarrow\underline{NSC}(9)]}} \underline{NSC}(9) \qquad \text{...[9.32a]}$$

OR

$$T_{M[\underline{CU}\rightarrow\underline{NSC}(9)]}[\ \underline{CU}\ ] = \underline{NSC}(9) \qquad \text{...[9.32b]}$$

S-transformation equation:

$$\underline{CU} \xrightarrow{T_{S[8\rightarrow 9(N_{LCU};\varnothing)]}} \underline{NSC}(9) \qquad \text{...[9.32c]}$$

OR

$$T_{S[8\rightarrow 9(N_{LCU};\varnothing)]}[\ \underline{CU}\ ] = \underline{NSC}(9) \qquad \text{...[9.32d]}$$

Example 9-3: Addition of New States to Achieve 41 State-Territory Governments – All Else Unchanged

M-transformation diagram:

Current System ($\underline{\mathbf{CU}}$)

Addition of 33 New States $\downarrow$ $T_{M\,[\underline{CU}\rightarrow\underline{NSC}(41)]}$

$\underline{\mathbf{NSC}}\mathbf{(41)} = \underline{\mathbf{SLF}}\mathbf{(41;\ N_{LCU};\ \emptyset)}$

S-transformation diagram:

Current System ($\underline{\mathbf{CU}}$)

Addition of 33 New States $\downarrow$ $T_{S\,[8\rightarrow 41(N_{LCU};\emptyset)]}$

$\underline{\mathbf{NSC}}\mathbf{(41)} = \underline{\mathbf{SLF}}\mathbf{(41;\ N_{LCU};\ \emptyset)}$

M-transformation equation:

$$\underline{\mathbf{CU}} \xrightarrow{T_{M\,[\underline{CU}\rightarrow\underline{NSC}(41)]}} \underline{\mathbf{NSC}}\mathbf{(41)} \qquad \text{...[9.33a]}$$

OR

$$T_{M\,[\underline{CU}\rightarrow\underline{NSC}(41)]}\,[\ \underline{\mathbf{CU}}\ ] = \underline{\mathbf{NSC}}\mathbf{(41)} \qquad \text{...[9.33b]}$$

S-transformation equation:

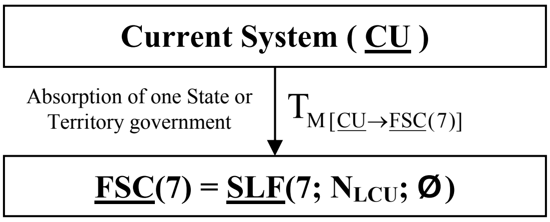
$$\underline{\mathbf{CU}} \xrightarrow{T_{S\,[8\rightarrow 41(N_{LCU};\emptyset)]}} \underline{\mathbf{NSC}}\mathbf{(41)} \qquad \text{...[9.33c]}$$

OR

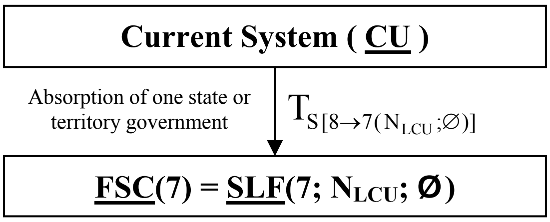
$$T_{S\,[8\rightarrow 41(N_{LCU};\emptyset)]}\,[\ \underline{\mathbf{CU}}\ ] = \underline{\mathbf{NSC}}\mathbf{(41)} \qquad \text{...[9.33d]}$$

Example 9-4: Absorption of One State Only – All Else Unchanged

M-transformation diagram:



S-transformation diagram:



M-transformation equation:

$$\underline{\mathbf{CU}} \xrightarrow{T_{M[\underline{CU}\rightarrow\underline{FSC}(7)]}} \underline{\mathbf{FSC}}\mathbf{(7)} \qquad \text{...[9.34a]}$$

OR

$$T_{M[\underline{CU}\rightarrow\underline{FSC}(7)]}[\ \underline{\mathbf{CU}}\ ] = \underline{\mathbf{FSC}}\mathbf{(7)} \qquad \text{...[9.34b]}$$

S-transformation equation:

$$\underline{\mathbf{CU}} \xrightarrow{T_{S[8\rightarrow 7(N_{LCU};\varnothing)]}} \underline{\mathbf{FSC}}\mathbf{(7)} \qquad \text{...[9.34c]}$$

OR

$$T_{S[8\rightarrow 7(N_{LCU};\varnothing)]}[\ \underline{\mathbf{CU}}\ ] = \underline{\mathbf{FSC}}\mathbf{(7)} \qquad \text{...[9.34d]}$$

Example 9-5: Horizontal Integration to DNC Model Followed by Vertical Integration to NCL Model

M-transformation diagram:

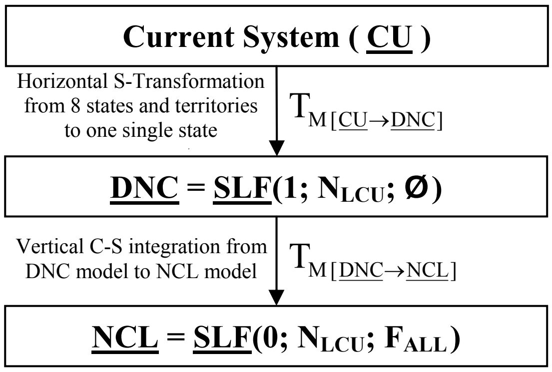
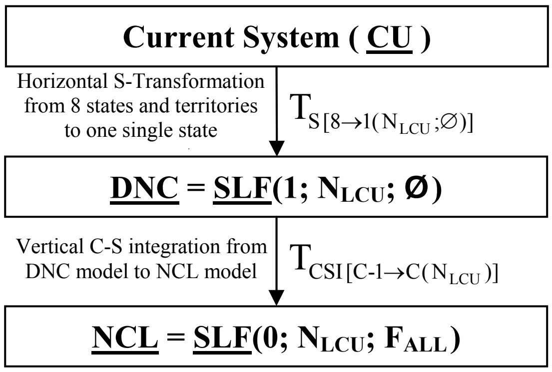


Diagram Showing S- and V-transformations:



M-transformation equations:

$$\underline{\mathbf{CU}} \xrightarrow{T_{M[\underline{CU}\rightarrow\underline{DNC}]}} \underline{\mathbf{DNC}} \xrightarrow{T_{M[\underline{DNC}\rightarrow\underline{NCL}]}} \underline{\mathbf{NCL}} \qquad \text{...[9.35a]}$$

OR, considered as a single overall transformation:

$$\underline{\mathbf{CU}} \xrightarrow{T_{M[\underline{CU}\rightarrow\underline{NCL}]}} \underline{\mathbf{NCL}} \qquad \text{...[9.35b]}$$

OR

$$T_{M[\underline{CU}\rightarrow\underline{DNC}]}[\ \underline{\mathbf{CU}}\ ] = \underline{\mathbf{DNC}} \qquad \text{...[9.35c]}$$

$$T_{M[\underline{DNC}\rightarrow\underline{NCL}]}[\ \underline{\mathbf{DNC}}\ ] = \underline{\mathbf{NCL}} \qquad \text{...[9.35d]}$$

and

$$T_{M[\underline{CU}\rightarrow\underline{NCL}]}[\ \underline{\mathbf{CU}}\ ] = \underline{\mathbf{NCL}} \qquad \text{...[9.35e]}$$

S- and V-transformation equations:

$$\underline{\mathbf{CU}} \xrightarrow{T_{S[8\to 1(N_{LCU};\varnothing)]}} \underline{\mathbf{DNC}} \xrightarrow{T_{CSI[C+1\to C(N_{LCU})]}} \underline{\mathbf{NCL}} \qquad ...[9.35f]$$

OR

$$T_{S[8\to 1(N_{LCU};\varnothing)]}[\ \underline{\mathbf{CU}}\ ] = \underline{\mathbf{DNC}} \qquad ...[9.35g]$$

and

$$T_{CSI[C+1\to C(N_{LCU})]}[\ \underline{\mathbf{DNC}}\ ] = \underline{\mathbf{NCL}} \qquad ...[9.35h]$$

Also, in combination, substituting [9.35c] into [9.35d] gives the following compound equation:

$$T_{M[\underline{DNC}\to\underline{NCL}]}[\ T_{M[\underline{CU}\to\underline{DNC}]}[\ \underline{\mathbf{CU}}\ ]\ ] = \underline{\mathbf{NCL}} \qquad ...[9.35i]$$

Equivalently, substituting [9.35g] into [9.35h] gives:

$$T_{CSI[:C+1\to C(N_{LCU})]}[\ T_{S[8\to 1(N_{LCU};\varnothing)]}[\ \underline{\mathbf{CU}}\ ]\ ] = \underline{\mathbf{NCL}} \qquad ...[9.35j]$$

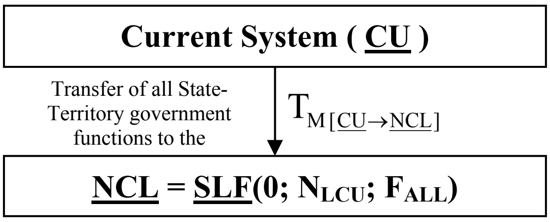
So [9.35e], [9.35i] and [9.35j] show the following equivalences:

$$T_{M[\underline{CU}\to\underline{NCL}]}[\ \underline{\mathbf{CU}}\ ] = T_{M[\underline{DNC}\to\underline{NCL}]}[\ T_{M[\underline{CU}\to\underline{DNC}]}[\ \underline{\mathbf{CU}}\ ]\ ]$$

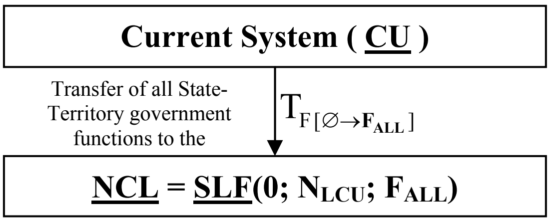
$$= T_{CSI[C+1\to C(N_{LCU})]}[\ T_{S[8\to 1(N_{LCU};\varnothing)]}[\ \underline{\mathbf{CU}}\ ]\ ] = \underline{\mathbf{NCL}} \qquad ...[9.35k]$$

Example 9-6: NCL Model Through Transfer of All State-Territory Functions

M-transformation diagram:



F-transformation diagram:



M-transformation equation:

$$\underline{\mathbf{CU}} \xrightarrow{T_{M[\underline{CU}\rightarrow\underline{NCL}]}} \underline{\mathbf{NCL}} \qquad ...[9.36a]$$

OR

$$T_{M[\underline{CU}\rightarrow\underline{NCL}]}[\,\underline{\mathbf{CU}}\,] = \underline{\mathbf{NCL}} \qquad ...[9.36b]$$

F-transformation equation:

$$\underline{\mathbf{CU}} \xrightarrow{T_{F[\varnothing\rightarrow\mathbf{F_{ALL}}]}} \underline{\mathbf{NCL}} \qquad ...[9.36c]$$

OR

$$T_{F[\varnothing\rightarrow\mathbf{F_{ALL}}]}[\,\underline{\mathbf{CU}}\,] = \underline{\mathbf{NCL}} \qquad ...[9.36d]$$

It is seen that equation [9.36b] is identical to [9.35b] from the previous example 5. And [9.36d] combines with [9.35k] to give:

$$T_{M[\underline{CU}\rightarrow\underline{NCL}]}[\,\underline{\mathbf{CU}}\,] = T_{M[\underline{DNC}\rightarrow\underline{NCL}]}[\,T_{M[\underline{CU}\rightarrow\underline{DNC}]}[\,\underline{\mathbf{CU}}\,]\,]$$

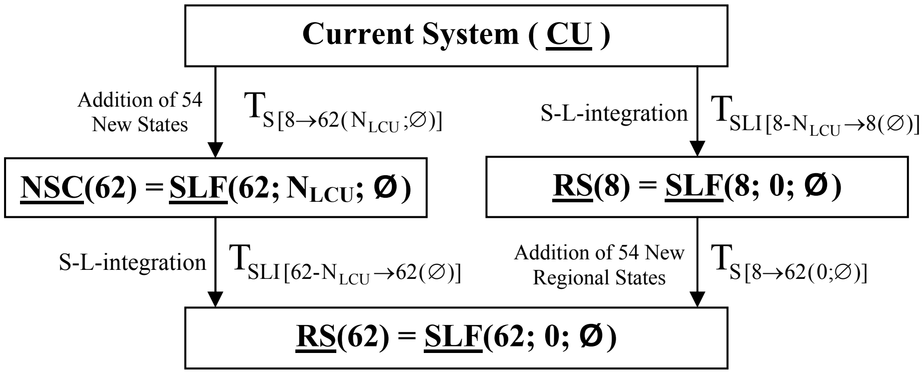
$$= T_{CSI[C+1\rightarrow C(N_{LCU})]}[\,T_{S[8\rightarrow 1(N_{LCU};\varnothing)]}[\,\underline{\mathbf{CU}}\,]\,]$$

$$= T_{F[\varnothing\rightarrow\mathbf{F_{ALL}}]}[\,\underline{\mathbf{CU}}\,] = \underline{\mathbf{NCL}} \qquad ...[9.36e]$$

Example 9-7: Regional States Model Formation Through the Addition of 54 New State-Territory Units and the Absorption of Local Governments into State-Territory Units by Vertical Integration

To avoid symbolic overload, this example shall be described just in terms of S-transformations and V-transformations, but not in terms of M-transformations.

Diagram Showing S- and V-transformations:



Transformation equations, noting the two alternative but equivalent pathways:

$$\underline{\mathbf{CU}} \xrightarrow{T_{S[8\to 62(N_{LCU};\varnothing)]}} \underline{\mathbf{NSC}}\mathbf{(62)} \xrightarrow{T_{SLI[62\text{-}N_{LCU}\to 62(\varnothing)]}} \underline{\mathbf{RS}}\mathbf{(62)} \qquad \text{...[9.37a]}$$

OR

$$\underline{\mathbf{CU}} \xrightarrow{T_{SLI[8\text{-}N_{LCU}\to 8(\varnothing)]}} \underline{\mathbf{RS}}\mathbf{(8)} \xrightarrow{T_{S[8\to 62(0;\varnothing)]}} \underline{\mathbf{RS}}\mathbf{(62)} \qquad \text{...[9.37b]}$$

Furthermore, for [9.37a]:

$$T_{S[8\to 62(N_{LCU};\varnothing)]}[\ \underline{\mathbf{CU}}\ ] = \underline{\mathbf{NSC}}\mathbf{(62)} \qquad \text{...[9.37c]}$$

and

$$T_{SLI[62\text{-}N_{LCU}\to 62(\varnothing)]}[\ \underline{\mathbf{NSC}}\mathbf{(62)}\ ] = \underline{\mathbf{RS}}\mathbf{(62)} \qquad \text{...[9.37d]}$$

So substituting [9.37c] into [9.37d] gives:

$$T_{SLI[62\text{-}N_{LCU}\to 62(\varnothing)]}[\ T_{S[8\to 62(N_{LCU};\varnothing)]}[\ \underline{\mathbf{CU}}\ ]\ ] = \underline{\mathbf{RS}}\mathbf{(62)} \qquad \text{...[9.37e]}$$

And for [9.37b]:

$$T_{SLI[8\text{-}N_{LCU}\to 8(\varnothing)]}[\ \underline{\mathbf{M}}_{\mathbf{CU}}\ ] = \underline{\mathbf{M}}_{\mathbf{RS}}\mathbf{(8)} \qquad \text{...[9.37f]}$$

and

$$T_{S[8\to 62(0;\varnothing)]}[\ \underline{\mathbf{RS}}\mathbf{(8)}\ ] = \underline{\mathbf{RS}}\mathbf{(62)} \qquad \text{...[9.37g]}$$

So substituting [9.37f] into [9.37g] gives:

$$T_{S[8\to 62(0;\varnothing)]}\,[\,T_{SLI[8\text{-}N_{LCU}\to 8(\varnothing)]}\,[\,\underline{\mathbf{CU}}\,]\,] = \mathbf{\underline{RS}(62)} \qquad \text{...[9.37h]}$$

As is implied in the transformation diagram here, results [9.37e] and [9.37h] show that:

$$T_{SLI[62\text{-}N_{LCU}\to 62(\varnothing)]}\,[\,T_{S[8\to 62(N_{LCU};\varnothing)]}\,[\,\underline{\mathbf{CU}}\,]\,]$$
$$= T_{S[8\to 62(0;\varnothing)]}\,[\,T_{SLI[8\text{-}N_{LCU}\to 8(\varnothing)]}\,[\,\underline{\mathbf{CU}}\,]\,] = \mathbf{\underline{RS}(62)} \qquad \text{...[9.37i]}$$

Result [9.37i], like [9.36e] earlier, show that the same government structure destination can be reached via alternative paths. Example 7 here also shows that government structure transformations as defined, and their associated algebra, can sometimes comply with *the commutative law* which arises in logic and mathematics – including the mathematics associated with matrices and linear or geometric transformations. Two government structure transformations T_A and T_B will obey the commutative law if the following result holds true for an initial government structure MOD_1:

$$T_A\,(\,T_B\,[MOD_1]\,) = T_B\,(T_A\,[MOD_1]\,) \qquad \text{...[9.37j]}$$

Result [9.37i] and the transformation diagram for example 7 here show that the same Regional States model RS(62), comprising 62 State-Territory type governments and no local governments, can be achieved irrespective of the order in which the two contributing transformations take place, these being the addition of 54 State-Territory type units and the absorption of local governments into the State-Territory type units.

As a further illustration of the order independence, or commutativity, of government structure transformations as defined, it is clear that if transformation T_A describes the addition of 10 New State-Territory type units, T_B describes the transfer of education and health from the State-Territory level to the Commonwealth, and T_C describes a reduction in the number of local governments by 40, then the same final government structure model (a *Simplified New States* model in this latest example) will be arrived at irrespective of the order in which these three constituent transformations apply.

Chapters 10 to 13 following seek to analyse several of the government structures classified here in terms of estimates of their financial benefits or costs relative to Australia's current government structure.