THE ECONOMICS OF MEASURING FISCAL DECENTRALISATION

PART II:
NEW FISCAL DECENTRALISATION INDICES

By

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1 This paper comprises Chapters 3 and 4 of my PhD thesis, The Economics of Measuring Fiscal Decentralisation, The University of Western Australia, 2008. The full thesis is available as Discussion Papers 08.13 to 08.16.
CHAPTER 3
A NEW INDEX OF FISCAL DECENTRALISATION

3.1 Introduction

A nation state is traditionally classified as federal or unitary political systems, depending on whether or not its written (or unwritten) constitution legally provides for multiple tiers of “sovereign” governments with jurisdictions that feature over overlapping geographically defined areas of the nation. Within unitary countries, political and fiscal authority is generally centralised in the hands of the national government, whilst the powers and responsibilities of subnational governments (“SNGs”) are usually limited and ad hoc. In contrast, the general powers and responsibilities of various levels of government in federal countries are usually constitutionally protected and clearly allocated to different tiers of government. As such, SNGs in federal countries are generally expected to exert more autonomy when making policy decisions in their respective jurisdictions than is the case for unitary countries. However, the extent to which fiscal responsibilities are allocated across various levels of government or even shared among them varies from federation to federation.

A typical federal framework provides some legal authority for the assignment of responsibilities for service provision across all tiers of government, with SNGs having some degree of autonomy over their own spending programs. Similarly, there is an assignment of taxing powers with SNGs having some degree of autonomy over their tax rates and bases. The assignments of service provision responsibilities and tax powers are fundamental to fiscal federalism. Additionally, there are two other significant issues in fiscal federalism. The first issue is intergovernmental fiscal transfers, which usually take place from the national or higher levels of government to the lower levels of government. The second issue is borrowings by SNGs. These last two issues are particularly important when there is a mismatch between service provision responsibilities and revenue assignment between national and subnational levels of government. As discussed in Chapter 2, the assignment of responsibility for the provision of public services, the
assignment of revenue-raising powers, fiscal transfer, and subnational borrowing, represent the four pillars of fiscal federalism.

The early first generation literature on fiscal federalism tended to emphasise the analytics of intergovernmental transfers. The more recent literature has focused on the policy relevance of changing the fiscal constitution by varying the degree of fiscal authority assigned to SNGs – especially in developing nations. In a long term, when the relationship between the assignments of responsibility for spending and revenue-raising powers changes, there must be a corresponding change in the “degree” of fiscal autonomy among different tiers of government. In practice, federal nations tend to be more fiscally decentralised than unitary countries. This can be partly explained by the fact that federal countries have a tendency to assign greater powers and responsibilities to lower levels of government. However, this does not guarantee that federalism is a necessary condition for decentralisation.

The contribution of this chapter is the development of a fundamental fiscal decentralisation index (“FDI”) which takes two main attributes of fiscal activities of SNGs – fiscal autonomy and fiscal importance – into consideration. The theoretical basis for constructing this index is grounded in the theory of fiscal decentralisation, which, as mentioned in Chapter 2, is generally not the case for existing measures of fiscal decentralisation. The degree of fiscal decentralisation across countries can be compared using this FDI. Following this introduction, Section 3.2 outlines the theoretical grounding for the development of the FDI and examines the distinct notions of fiscal autonomy and fiscal importance of SNGs. Development of the fundamental index of fiscal decentralisation is outlined in Section 3.3, followed by the extensive discussion on the example of the index. The application of the index to a wide range of countries from the Association of South East Asian Nations (“ASEAN”) and the Organisation for Economic Cooperation and Development (“OECD”) is analysed in Section 3.4. Main conclusions are included in Section 3.5.
3.2 Fiscal decentralisation: fiscal autonomy and fiscal importance

The fiscal autonomy of SNGs primarily deals with the assignment of taxing powers and the assignment of responsibility for public provision of specific goods and services, although, it may also be influenced by arrangements pertaining to intergovernmental fiscal transfers and external limitations applying to the borrowing of SNGs. The fiscal importance of SNGs, however, is directly connected with the level of fiscal activities of SNGs relative to that of the fiscal activities of all levels of government.

3.2.1 Fiscal autonomy of subnational governments

In practice, agreement on the distribution of taxing powers is difficult since the institutional actors (national government and SNGs) approach their respective powers from two different perspectives. Under the core first generation theory of fiscal decentralisation, the national government needs to be responsible for a range of volatile, but high-yield tax bases to achieve economic stabilisation and realise income redistribution goals. SNGs focus on controlling immobile and stable tax bases that have stable revenue flows to implement their duties in the provision of public goods and services which are fundamental to community welfare. Examples include studies from Bird (2000, 1999); McLure (1998); and Musgrave (1983). Taxing at the national level provides a foundation to avoid distortionary competition among states in the country and to reduce compliance costs. When the gap between spending responsibility and the taxing power of SNGs is to be minimised, or even eliminated, the fiscal autonomy of SNGs increases.

Fiscal autonomy of SNGs implies that, to some extent, SNGs can arrange their revenue by exercising control over their own taxing bases to cover costs occurring in the provision of public goods and services. As a result, when SNGs’ fiscal autonomy is high, intergovernmental fiscal transfers will no longer be a significant source of revenue.

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2 When debts of SNGs are set aside, fiscal autonomy of SNGs is revealed when SNG expenditures are fully funded from SNG own-sourced revenues.
for SNGs. However, as McLure (1998) has perceptively noted, even in the absence of fiscal transfers (“grants”), SNGs will not enjoy full fiscal autonomy if they rely on revenues from taxes that are shared directly with the national government, especially when these tax bases and rates are centrally determined. The political corollary of this being that SNGs with responsibility for funding services are accountable through the election processes. When responsibility for tax bases, tax rates and the share from tax received from these bases among two or more governments is confined just to the higher level of government, the political accountability of SNGs and the fiscal autonomy of SNGs become compromised. The necessary condition for a high degree of fiscal autonomy is that SNGs themselves have the discretion to set tax rates and bases (so that they can adjust their revenue by varying the rates and/or bases) in response to fiscal demand for publicly provided goods and services. If this is not the case, flexibility and the potential for creativity by SNGs for the efficient provision of public goods and services are limited.

Autonomy of SNGs is a frequent theme in the literature on the theory of fiscal decentralisation within the first generation theory. The theme is evident in the core Musgrave – Oates approach (Musgrave, 1983 and Oates, 1972) and in the public choice approach (Brennan and Buchanan, 1980).

In the event of a long-period mismatch between SNGs’ spending responsibility and revenue capacity, vertical fiscal imbalance will inevitably emerge and must be managed by the national government through intergovernmental fiscal grants and advances. Vertical fiscal imbalance implies a mismatch between own-sourced revenue (total revenue less: (i) grants from other levels of government and (ii) revenue from shared taxes when one level of government controls the base, rate and revenue shared) and own purpose spending (expenditure less grants to other levels of government) for a particular level of government (Collins, 2001). When SNGs have adequate fiscal autonomy, ex-post vertical fiscal imbalance is expected to be minimised before any fiscal
transfer takes place. However, it is also suggested that if the national government has sole responsibility for determining the nation’s tax bases, and then filling the gap of vertical fiscal imbalance, this decision may reduce the incentive for the SNGs to increase their respective taxing powers and to manage public spending efficiently (Ahmad and Craig, 1997). History suggests that the mismatch between spending and taxing endures, leaving at least some balancing role for the national government in fiscal transfers (Bird and Smart, 2002). For example, small to moderate fiscal transfers may be seen as a largely unavoidable tendency in both federal and unitary countries because SNGs are not homogenous entities – some have relatively high revenue-raising capacity while others have relatively low revenue-raising power. In practice, though, the extent of fiscal transfers extends well beyond that required to equalise fiscal capacities.

Therefore, it is clear that fiscal autonomy of SNGs should be a very important element of any measure of fiscal decentralisation. Discussion of the degree of fiscal decentralisation of a particular country without dealing directly with the fiscal autonomy of SNGs is, as a consequence, only partial. Nevertheless, fiscal autonomy is still only one, albeit important, element in the theory of fiscal decentralisation. The degree of fiscal decentralisation also depends on the proportion of total public sector fiscal activities undertaken by SNGs. That is, “fiscal importance” is the other main “element” of fiscal decentralisation in the theory of fiscal decentralisation.

3.2.2 Fiscal importance of subnational governments and the “principle of subsidiarity”

In core first generation fiscal theory, economic performances of the government should become more productive, efficient and effective if services are provided by the lowest level of government. This was known in Europe when the Maastricht Treaty was being drafted, and is now referred to across the world as the “principle of subsidiarity” (Martinez-Vazquez, 2001, p.12). Services such as foreign affairs, defence, immigration, and the regulation (or deregulation) of international trade can be best implemented by the

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3 This happens at least for the aggregate of SNGs. It is still possible, of course, for individual SNGs to run deficits or surpluses, even when the vertical fiscal imbalance is to be eliminated between the national government and the aggregate of the SNGs.
national governments because they influence everyone in the nation in a broadly similar way. SNGs, however, are able to provide many important, but “impure” from a public finance theory perspective, public services for provincial communities such as law, education, health policy, as well as very local issues such as the street lighting system, garbage collection, and local paper deliveries. Services provided by the national government conform to the principle of subsidiarity when demand is at a broadly constant level across various subnational localities to efficiently supply national public goods to take advantage of economies of scale – an increase in production efficiency as the quantity of public goods and services being produced and provided rises; and economies of scope – potential cost savings from joint production even if services provided are not directly related to each other. However, when demand varies from location to location, national provision to a common standard leads to inefficient underprovision, in some areas, and inefficient overprovision, in other areas. In short, services provided by the national government assume tastes and preferences to be homogeneous across locations and for citizens within locations.

SNGs can provide goods and services based on the size of jurisdiction, and in accordance with local tastes and preferences (Shah, 2004). If the size of jurisdiction is considered, the principle of benefit matching will be achieved because local citizens who receive benefits also bear costs. Also, the cost for publicly provided goods and services can be recovered, at least at the margin by a system of fees and user charges, so that the pressures from the lack of financial resources for SNGs decrease. As a consequence, services are provided more efficiently. Levels of goods and services provided should be equal to the amount demanded by the community to avoid both under- or overprovision of public goods and services.

It should be noted that, to the extent that state (or local) owned enterprises are funded by state (or local) government expenditures through the purchase of goods and services for the community, these expenditures are reflected in the fiscal decentralisation index via the component of “fiscal importance of SNGs”. However, finances of a public
enterprise itself are not considered SNGs’ finances. Similarly, when a private enterprise
sells services to state or local governments, these values are also included in the index.

On the basis of the principle of subsidiarity, one would expect that it is efficient
for SNGs to account for a significant proportion of fiscal activity across the nation. The
larger the portion of public sector spending undertaken by SNGs, the greater the degree
of their fiscal importance. This issue of SNGs’ fiscal importance and the degree of fiscal
autonomy that the SNGs have over their revenue-raising decisions need to be recognised
in any index of fiscal decentralisation.

3.3 The development of a fundamental index of fiscal decentralisation

3.3.1 Background

To date, measurement of fiscal decentralisation in studies of public finances has
been very crude. Typically, either revenue or expenditure from SNGs has been used
without taking into account the level of fiscal autonomy of lower level governments. For
example, in his pioneering study, Oates (1972) uses the national government share in
total public revenue as the degree of fiscal centralisation. More recently, Woller and
Phillips (1998) measure fiscal decentralisation in one of four ways: (i) the ratio of local
government revenues to total government revenues; (ii) the ratio of local government
revenues less grants-in-aid to total government revenues; (iii) the ratio of local
government expenditures to total government expenditures and (iv) the ratio of local
government expenditures to total government expenditures less defence and social
security expenditures. Similarly, Davoodi and Zou (1998) measure the level of fiscal
decentralisation as the spending by SNGs as a fraction of total government spending. It is
widely-accepted that the measurement of fiscal decentralisation in previous works has
been undertaken on a superficial basis. There has, for example, been almost no
recognition of the important distinction between subnational “revenue” and own-sourced
revenue over which subnational jurisdiction has policy autonomy. The one exception to
this is the study, by Victoria Curzon Price and Jacques Garello (2003), of European
countries, but this study relies heavily on the subjective assessments of fiscal scholars with expertise in the state of affairs in particular European countries. As such, the index developed from their study is not readily applied to other countries for accurate international comparisons.

Problems with current indices are now recognised, as suffering “from lack of details on expenditure autonomy and own-sourced revenue to deficiencies regarding reported data for the subnational levels and information scarcity for analysing dispersion among subnational regions” (Breuss and Eller, 2004, p.12). In short, the above-mentioned measures are inadequate because fiscal autonomy of SNGs has not been properly taken into consideration. As a result, the theoretical literature is extended in this chapter through the development and application of a fundamental fiscal decentralisation index (“FDI”) that allows an international comparison of various nations’ degree of fiscal decentralisation.

3.3.2 Establishment of a fundamental fiscal decentralisation index

Consistent with the conceptual discussions in Section 3.2, two main components have been included in the FDI in this chapter – a component for fiscal autonomy and a component for the fiscal importance of SNGs.

Component 1: Fiscal autonomy of subnational governments

The core issue in fiscal autonomy centres on the relationship between SNGs’ own-sourced revenues and expenditures. In view of this, SNGs’ fiscal autonomy is, in the first instance, represented by the ratio of SNGs’ own-sourced revenue (OSR)$^4$ to SNGs’ expenditure (E). The ratio provides an indication of vertical fiscal imbalance between the national government and SNGs – the lower the ratio, the greater the degree of vertical fiscal imbalance with the difference between own-sourced revenue and expenditure being largely funded by fiscal transfers from the national government. More formally, the

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$^4$ As defined in Section 3.2.1
relative level of autonomy of SNGs, which is termed “fiscal autonomy” (FA) in this study, may be defined and measured as:

\[
FA = \frac{\sum_{i=1}^{n} OSR_i}{\sum_{i=1}^{n} E_i}, \quad 0 \leq FA \leq 1
\]

where \( OSR_i \) and \( E_i \) represent the own-sourced revenue and expenditure for subnational region \( i \) (the highest level of SNGs, usually states of federal countries or provinces of unitary nations). Fiscal autonomy of SNGs will be treated in a more comprehensive fashion in Chapter 4, with equation (3.1) extended to account for the impact on autonomy of fiscal transfers between governments, and restrictions on the borrowing authority of SNGs. For the remainder of this chapter, however, fiscal autonomy of SNGs is defined by equation (3.1).

**Component 2: Fiscal importance of subnational governments**

The relative importance of fiscal activities undertaken by SNGs depends on the fiscal activities of SNGs as well as the fiscal activities of all public bodies across the nation. For this study, public expenditure is taken as the “indicator” of fiscal activity, mainly because the law of subsidiarity is expressed in relation to expenditure. On this basis, the relative importance of SNGs or what we call “fiscal importance” may be defined and measured as:

\[
FI = \frac{\sum_{i=1}^{n} E_i}{TE}, \quad 0 \leq FI \leq 1
\]

where \( TE \) represents total public sector expenditures by all levels of government within the nation. This includes expenditures from the national government and from all SNGs, excluding fiscal transfers from one government to another (such as the national government fiscal transfers to SNGs).

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\(^5\) Equation 3.1 could give a value of fiscal autonomy that is greater than 1 when SNGs’ budget surplus exceeds transfers received from the national government. However, in such an (unlikely) case, the measure of fiscal autonomy would be capped at unity (1): 

\[
FA = \min \left[ \frac{\sum OSR}{\sum E}, 1 \right]
\]
In this study, fiscal importance is defined with reference to fiscal aggregates and without reference to the composition of expenditure across levels of governments. In practice, however, a dollar spent on health or education by a state government may have different welfare consequences, compared to a dollar spent on defence by the national government. As a result, the measure of the fiscal importance of SNGs developing in this study does not provide any direct linear correlation with economic welfare in general or any indication of welfare outcomes related to the provision of specific public services (see Section 3.3.4).

In both equations (3.1) and (3.2), the denominator is based on public expenditure — SNGs’ public expenditure in the case of equation (3.1) and total public expenditure in equation (3.2). As such, public expenditure may be viewed as the reference point against which both “fiscal autonomy” and “fiscal importance” are assessed. Fiscal autonomy is represented by SNGs’ own-sourced revenue to SNGs’ expenditures, and fiscal importance is SNGs’ expenditure to total public expenditure.

A fundamental index of fiscal decentralisation based on the “fiscal autonomy and fiscal importance” approach

Equations (3.1) and (3.2) provide measures of two important but distinct elements of fiscal decentralisation. The fundamental index of fiscal decentralisation (FDI) proposed in this study is the geometric mean of the measures of the two elements:

$$ FDI = (FA \times FI)^{\frac{1}{2}} = \left( \frac{\sum_{i=1}^{p} OSR_i}{\sum_{i=1}^{p} E_i} \right) \times \left( \frac{\sum_{i=1}^{p} E_i}{TE} \right) $$

In principle, this index would be greater than one when, and only when, there is a negative total expenditure from the national government, a completely implausible situation. In the unlikely event that it occurs, the measure of fiscal importance of SNGs is capped at unity (1.0). To illustrate how equation (3.3) represents a degree of fiscal decentralisation, four different hypothetical cases are considered in Table 3.1.
As shown in panel A, the first case is when the country has achieved a condition of a perfect decentralisation, indicated by $FDI = 1$ in column 6. This represents the unlikely case when all public sector fiscal activity is undertaken by SNGs. The second case is where the value of $FDI$ lies between the two extremes of 1 and 0, as shown in panels B and C. Here, the country has some degree of fiscal decentralisation, a situation which can be described as “relative fiscal decentralisation”, where $0.5 < FDI < 1$, as in the case of panel B, or “relative fiscal centralisation”, where $0 < FDI < 0.5$, as in the case of panel C. Perfect fiscal centralisation, in which subnational expenditure is fully funded by fiscal transfers from the national government (i.e. SNGs’ own-sourced revenue is zero), is the last extreme case ($FDI = 0$) which is considered in panel D.
For the first case (panel A), total own-sourced revenue and expenditure from SNGs are both 10 units. It is also assumed that total public sector expenditure is 10 units. This assumption implies that there is no expenditure from the national government because total public sector expenditure is equal to total subnational expenditure from subnational regions. In this case, the values of both fiscal autonomy and fiscal importance as represented by equations (3.1) and (3.2) are unity. As a result, the country has achieved a perfect fiscal decentralisation as $FDI = 1$. Perfect centralisation pertains in the example in row 6. This is the case when SNGs have no own-sourced revenue (column 1) and incur the expenditure of 10 units (column 2). As a consequence, the value of fiscal autonomy is zero. This implies that all expenditures that the SNGs have made are on behalf of the national government. In return, the national government will arrange some types of transfers which are usually conditional on specific programs and SNGs, in this case, have no discretion to allocate funding in accordance with their preferences.

In practice, the cases of perfect fiscal decentralisation and perfect fiscal centralisation are extreme and are not observed in modern societies. Accordingly, the cases represented in rows 2–5 would be consistent with typical real world examples, where the countries have some degree of fiscal decentralisation or some degree of fiscal centralisation. We consider panel B first. In row 2, it is assumed that SNGs’ own-sourced revenue is 40 units whereas subnational expenditure and total public sector expenditure are both 100 units, as represented in columns 1, 2 and 3 of the table. If fiscal decentralisation is defined by the fiscal autonomy equation (3.1) only, the index for this country would be 0.4 (column 4) – the relative “fiscal” centralised case. If fiscal decentralisation is defined by the fiscal importance equation (3.2) only, the index would be unity (column 5) – perfect fiscal decentralisation. As a result, misleading inferences will be made about the degree of fiscal decentralisation if it is defined only in terms of equation (3.1) or equation (3.2). When both equations are simultaneously used, as in equation (3.3), a truer indication of the degree of FDI for this country emerges: 0.63 (column 6) which suggests relative fiscal decentralisation. Similarly for the second scenario of panel B as presented in row 3, when own-sourced revenue, subnational expenditure and total public sector expenditure are assumed to be 40, 40 and 100 units.
The values from the fiscal autonomy and fiscal importance are 1 and 0.4 respectively. Individually, these values again provide misleading inference about the degree of fiscal decentralisation of the country: the value of fiscal autonomy indicates perfect fiscal decentralisation, whereas the value of fiscal importance points to relative fiscal centralisation. However, when equations (3.1) and (3.2) are simultaneously used, there is a balancing of the two potentially contradictory elements of fiscal decentralisation and the true value of FDI is 0.63 (column 6) – the case of relative fiscal decentralisation.

Examples of relative fiscal centralisation are shown in panel C of Table 3.1. In row 4, the values of SNGs’ own-sourced revenue, SNGs’ expenditure and total public sector expenditure are 60, 100, and 500, respectively. The values of fiscal autonomy and fiscal importance for this case are 0.6 and 0.2 respectively, so the FDI value is \((0.6 \times 0.2)^{0.5} = 0.35\) – relative fiscal centralisation. In row 5, an amount of 20 is assumed for the value of SNGs’ own-sourced revenue, an amount of 100 is assumed for SNGs’ expenditure, and an amount of 167 is assumed for total public sector expenditure. The measure of fiscal autonomy is: \(20/100 = 0.2\), the measure of SNGs’ fiscal importance is: \(100/167 = 0.6\), and the measure of fiscal decentralisation is: \((0.2 \times 0.6)^{0.5} = 0.35\). The conclusion to be drawn is that this country represents a case of relative fiscal centralisation. Once again, the inference on the degree of fiscal decentralisation of a particular country will be misleading if either equation (3.1) (fiscal autonomy) or equation (3.2) (fiscal importance) is used by itself.

The notion of fiscal decentralisation is conceived in this thesis as a relative concept that is determined by the proportion of total public sector expenditure financed by subnational own-sourced revenue. Subnational expenditure is a scaling factor that plays no role in determining relative magnitudes of fiscal decentralisation.

3.3.3 The form of the index

The two components of the fiscal decentralisation index are: (i) fiscal autonomy of subnational governments (SNGs), defined as the ratio of own-sourced revenue (OSR)
to total subnational expenditure (E); and (ii) the fiscal importance of SNGs, defined as $E/TE$, where TE is the total public sector expenditure. The first component $OSR/E$ is expected to be a positive fraction as subnational own-sourced revenue is expected to be always less than subnational expenditure, with the difference usually funded by transfers to subnational governments from the national government. The second ratio $ET/E$ also lies between zero and one as total public sector expenditure TE includes subnational expenditure $E$ and expenditure from the national government. The index is the geometric mean of fiscal autonomy and fiscal importance:

$$\text{(3.3)} \quad FDI = \sqrt{\frac{OSR}{E} \times \frac{E}{TE}}.$$ 

This form of the index means that it is also a positive fraction.

Why is the geometric mean used for the index (3.3) above, rather than, say, the arithmetic mean? To address this issue, we consider an “idealised” general index of fiscal decentralisation as a function of the two key dimensions OSR and TE, and write this index as:

$$\text{(3.4)} \quad I = I(\text{OSR}, \text{TE}).$$

Our approach is to identify the properties of the index function $I(\ldots)$ on the basis of economic considerations. This way of proceeding is not unlike Fisher’s (1927) test approach to price indices. It is to be noted that we do not assume that the OSR and TE will increase equally. The own-sourced revenue OSR of the states and the total public sector expenditure TE can vary independently.

By definition, SNGs have full autonomy over subnational own-sourced revenues generated by their own taxes and charges. As such, the higher the subnational own-sourced revenue, the higher the degree of fiscal decentralisation. On the other hand, total public sector expenditure will provide a negative effect on the value of the index. This is because an increase in total public sector expenditure relative to subnational own-sourced revenue ensures that subnational governments become more dependent, in relative terms, on the national government for revenue, and this is likely to be determined predominately.
at the national government’s discretion. As a result, it is reasonable to suppose that for a
given value of $TE$, the index $I$ increases with $OSR$; and that the index decreases with
$TE$ when $OSR$ is held constant. That is, $\partial I/\partial OSR > 0$ and $\partial I/\partial TE < 0$. Furthermore, if
$OSR$ and $TE$ increase by the same amount, it seems reasonable to suppose that one
would just counterbalance the other, so that the value of the index $I$ remains unchanged.
This means that $I(.,.)$ is homogenous degree of zero:

$$ \frac{\partial I}{\partial OSR} \times OSR + \frac{\partial I}{\partial TE} \times TE = 0, $$

or dividing both sides by $I$:

$$ \frac{\partial I}{\partial OSR/OSR} + \frac{\partial I}{\partial TE/TE} = 0. $$

(3.5)

The first term on the left-hand side of the above equation is the elasticity of the index
with respect to $OSR$, while the second term is the elasticity with respect to $TE$. Equation
(3.5) states that the two elasticities are constrained such that the second is the negative of
the first.

Let $\alpha = \frac{\partial I}{\partial OSR/OSR}$ be the own-sourced revenue elasticity of the index $I$. We can
establish that $\alpha$ is a positive fraction. As $\partial I/\partial OSR > 0, I > 0$; and $OSR > 0$, it follows
that $\alpha = \frac{\partial I}{\partial OSR/OSR} = \frac{\partial I/\partial OSR}{I/OSR} > 0$. Next, to show that the upper value of $\alpha$ is unity, we
fix the value of total public sector expenditure $TE$ at $TE_0$ and consider the index $I$ as a
function of $OSR$, as in the graph below.

As $\partial I/\partial OSR > 0$, the curve is clearly positively sloped and if, as is reasonable,
$I = I(0, TE_0) = 0$, it also comes out of the origin. The graph considers two possibilities:
the curve labelled a, which has a decreasing marginal effect, and the curve b with an
increasing marginal effect. It is clear that the curve a with the decreasing marginal effect
is the more attractive possibility, as this means that higher and higher $OSR$ is valued less
and less in terms of its impact on fiscal decentralisation (when $TE$ is held constant).
Consider the point \( z \) on the curve \( a \). Here the slope of the tangent is less than the slope of the ray from the origin. As the elasticity of the index \( I \) with respect to \( OSR \) is just the ratio of the former slope to the latter, it follows that this elasticity is less than unity at \( z \). This property holds for all points along the curve \( a \), but not along \( b \). This establishes that \( \alpha < 1 \).

As the above involves a constraint on the elasticity, it is convenient to use a constant elasticity formulation, so that:

\[
\log I = \alpha \log OSR - \alpha \log TE = \alpha \log \left( \frac{OSR}{TE} \right),
\]

or in exponential form:

\[
I = \left( \frac{OSR}{TE} \right)^{\alpha}.
\]  

(3.6)

To say more about the elasticity \( \alpha \), suppose that it is a random variable, \( \tilde{\alpha} \), with probability distribution \( f(\tilde{\alpha}) \). As \( \tilde{\alpha} \in [0,1] \), the expected value of \( \tilde{\alpha} \) is

\[
E(\tilde{\alpha}) = \int_0^1 \tilde{\alpha} f(\tilde{\alpha}) d\tilde{\alpha}.
\]

If each value of \( \tilde{\alpha} \) between zero and one is equiprobable, so that \( f(\tilde{\alpha}) \) is standard uniform, then \( E(\tilde{\alpha}) = 1/2 \). In the absence of further information on the
nature of the elasticity, it is reasonable to use this centre-of-gravity value of 1/2. Equation (3.6) then becomes:

\[ I = \left( \frac{OSR}{TE} \right)^{1/2} = \sqrt{\frac{OSR}{TE}} = \sqrt{\frac{OSR}{E} \times \frac{E}{TE}} , \]

which is equation (3.3).

3.3.4 Economic welfare and the new fiscal decentralisation index

The welfare consequences of fiscal activity will depend on many factors that have not been considered in the development of the fiscal decentralisation, such as: the composition of public expenditure across different levels of government; fiscal externalities including congestion and spill-over effects arising from the government provisions of public goods and services. However, some provisional commentary on the relationship between the values of the fiscal decentralisation index and economic welfare is no doubt useful.

Assume that: (i) there are two publicly provided services, service X is a pure public good, and service Y is an impure or local public good; and (ii) the national government only provides the pure public service X and the subnational governments only provide impure public service Y and each level of government enjoys full fiscal autonomy. When demand for public provision of services is limited to the pure public good X, the relationship between welfare and the fiscal decentralisation index will be very different to the case where the demand for public goods is limited to the impure local public good Y.

In the first two figures a and b, welfare is maximised under complete fiscal decentralisation (FDI = 1 when the impure public good Y is provided entirely by subnational government and no pure public good is provided at all) or complete fiscal centralisation (FDI = 0 when only the pure public good is provided by the national government and no impure public good is provided at all). However, these extreme cases are unrealistic - they are the outcomes of a thought experiment only. Figure c, adding a
tough (but only a touch) of reality, by assuming that the demand for public expenditure is divided equally between the pure public good (provided by the national government) and the impure public good (provided by SNGs).

Figure a: Demand entirely for impure public good Y  
Figure b: Demand entirely for pure public good X

Figure c shows that welfare is maximised when the degree of fiscal decentralisation matches the demand for the pure public good and the impure public good. That is, half the fiscal activities are undertaken by the national government (to supply pure public good X) and half by subnational governments (to provide the impure public good Y) giving the index value of 0.5 for fiscal decentralisation when each level of government has full fiscal autonomy. However, given that the precise benefits from fiscal decentralisation are not quantified, we do not have any information on the actual magnitude of the slope of the welfare curve represented by Figure c as one moves away from the FDI value of 0.5.

Figure c: Equal proportion between pure and impure public goods
Core first generation theory actually implies that the welfare function is skewed to the left, with the efficient value being above 0.5. This is because demand for impure public goods typically exceeds that of pure public goods. However, as the composition of demand for pure and impure public goods will vary across countries, there is no unique link between the fiscal decentralisation index and economic welfare. For one country, welfare may be maximised when the FDI = 0.75 (figure d) and for another country, it may be maximised when FDI = 0.6 (figure e) and so on. The relative level of welfare under the FDI = 0 and FDI = 1 in figures d and e is also uncertain for a realistic welfare function. In both cases, the outcome will be suboptimal when consumers demand a combination of the pure and impure public goods. However, it is unclear whether the welfare consequences of a FDI value of 1 is better, or worse, than a FDI value of 0.

![Figures d and e: Unequal proportion of pure and impure public goods](image)

3.4 The fiscal decentralisation index: applications for selected countries

3.4.1 Sample of countries

The main purpose of this section is to establish the fiscal decentralisation index for both developing and developed economies to facilitate subsequent and definitive comparison of the degree of fiscal decentralisation across countries. Countries from the Organisation for Economic Co-operation and Development (OECD) – advanced countries in the level of per capita income and the Association of South East Asian Nations (ASEAN) – developing countries with low level of per capita income, except for
Singapore, and some selected countries from outside these two groups, are considered. Due to a lack of data, some countries from the OECD and ASEAN are not included.

**TABLE 3.2**

COUNTRIES CONSIDERED IN THE APPLICATION

<table>
<thead>
<tr>
<th>Federal (F)</th>
<th>Unitary (U)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OECD</td>
<td>Australia, Austria, Belgium, Canada, Germany, Luxembourg, Mexico, Spain, Switzerland, and United States</td>
</tr>
<tr>
<td></td>
<td>Czech Republic, Denmark, Finland, France, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Slovak Republic, Sweden, and United Kingdom.</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Indonesia, The Philippines, Thailand and Vietnam.</td>
</tr>
<tr>
<td>Others</td>
<td>Argentina, Brazil, and India</td>
</tr>
</tbody>
</table>

### 3.4.2 Results

The results are reported in Table 3.3, which reports on countries from: the OECD (items 1 to 23 inclusive); the ASEAN (items 24 and 27 inclusive); and other countries (items 28 to 31). For example, consider the first row in Table 3.3, by reading across the row, it can be seen that, in 2005, total SNGs’ own-sourced revenue in Australia was $89,110, SNGs’ expenditure was $144,646, and total public sector expenditure was $319,379 (in millions of Australian dollars). The measure of the fiscal autonomy for Australia is: $89,110/$144,646 = 0.62, the measure of the fiscal importance is: $144,646/$319,379 = 0.45, and the FDI value is: $(0.62 \times 0.45)^{0.5} = 0.53$.

It is expected that median levels of fiscal decentralisation for “developed” and “developing” nations will be different. Similarly, there will be differences for federal versus unitary nations. To capture these possible variations for the comparison, countries are selected on these bases and on the availability of fiscal data. The indices presented in Table 3.3 reflect the expected various degrees of fiscal decentralisation between unitary and federal countries, and between developed and developing economies. The degree of
fiscal decentralisation in federal countries is generally higher than that of unitary countries. Also, with developed countries, the SNGs are more advanced in terms of managerial capability and experience in comparison with developing countries. As a result, the degree of fiscal decentralisation is generally expected to be greater in developed countries than in developing countries.

<table>
<thead>
<tr>
<th>No.</th>
<th>Country</th>
<th>Year</th>
<th>Units</th>
<th>( \sum_{i=1}^{p} OSR_i )</th>
<th>( \sum_{i=1}^{p} E_i )</th>
<th>TE</th>
<th>FA</th>
<th>FI</th>
<th>Fiscal Decentralisation Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Australia</td>
<td>2005</td>
<td>Mil. AUD</td>
<td>89,110</td>
<td>144,646</td>
<td>319,379</td>
<td>0.62</td>
<td>0.45</td>
<td>0.53</td>
</tr>
<tr>
<td>2.</td>
<td>Austria</td>
<td>2005</td>
<td>Mil. Euro</td>
<td>11,584</td>
<td>42,575</td>
<td>114,300</td>
<td>0.27</td>
<td>0.37</td>
<td>0.32</td>
</tr>
<tr>
<td>3.</td>
<td>Belgium</td>
<td>2005</td>
<td>Mil. Euro</td>
<td>25,546</td>
<td>62,456</td>
<td>150,840</td>
<td>0.41</td>
<td>0.41</td>
<td>0.41</td>
</tr>
<tr>
<td>4.</td>
<td>Canada</td>
<td>2005</td>
<td>Mil. CAD</td>
<td>305,000</td>
<td>397,000</td>
<td>550,000</td>
<td>0.77</td>
<td>0.72</td>
<td>0.74</td>
</tr>
<tr>
<td>5.</td>
<td>Czech Rep.</td>
<td>2005</td>
<td>Mil. Koruny</td>
<td>201,000</td>
<td>259,000</td>
<td>1,205,000</td>
<td>0.78</td>
<td>0.22</td>
<td>0.41</td>
</tr>
<tr>
<td>6.</td>
<td>Denmark</td>
<td>2004</td>
<td>Mil. Kroner</td>
<td>295,879</td>
<td>448,442</td>
<td>774,572</td>
<td>0.66</td>
<td>0.58</td>
<td>0.62</td>
</tr>
<tr>
<td>7.</td>
<td>Finland</td>
<td>2005</td>
<td>Mil. Euro</td>
<td>21,534</td>
<td>30,545</td>
<td>78,954</td>
<td>0.70</td>
<td>0.39</td>
<td>0.52</td>
</tr>
<tr>
<td>8.</td>
<td>France</td>
<td>2005</td>
<td>Mil. Euro</td>
<td>132,000</td>
<td>174,000</td>
<td>909,000</td>
<td>0.76</td>
<td>0.19</td>
<td>0.38</td>
</tr>
<tr>
<td>9.</td>
<td>Germany</td>
<td>2002</td>
<td>Mil. Euro</td>
<td>326,000</td>
<td>458,000</td>
<td>1,057,000</td>
<td>0.71</td>
<td>0.43</td>
<td>0.56</td>
</tr>
<tr>
<td>10.</td>
<td>Hungary</td>
<td>2005</td>
<td>Mil. Forint</td>
<td>1,377,000</td>
<td>2,850,000</td>
<td>10,875,000</td>
<td>0.48</td>
<td>0.26</td>
<td>0.36</td>
</tr>
<tr>
<td>11.</td>
<td>Ireland</td>
<td>2005</td>
<td>Mil. Euro</td>
<td>4,994</td>
<td>8,128</td>
<td>51,202</td>
<td>0.61</td>
<td>0.16</td>
<td>0.31</td>
</tr>
<tr>
<td>12.</td>
<td>Italy</td>
<td>2005</td>
<td>Mil. Euro</td>
<td>123,000</td>
<td>208,000</td>
<td>681,000</td>
<td>0.59</td>
<td>0.31</td>
<td>0.43</td>
</tr>
<tr>
<td>13.</td>
<td>Luxembourg</td>
<td>2005</td>
<td>Mil. Euro</td>
<td>825</td>
<td>1,315</td>
<td>11,903</td>
<td>0.63</td>
<td>0.11</td>
<td>0.26</td>
</tr>
<tr>
<td>14.</td>
<td>Mexico</td>
<td>2005</td>
<td>Mil. Pesos</td>
<td>248,299</td>
<td>468,941</td>
<td>1,058,919</td>
<td>0.53</td>
<td>0.44</td>
<td>0.48</td>
</tr>
<tr>
<td>15.</td>
<td>Netherlands</td>
<td>2005</td>
<td>Mil. Euro</td>
<td>27,426</td>
<td>80,534</td>
<td>228,991</td>
<td>0.34</td>
<td>0.35</td>
<td>0.35</td>
</tr>
<tr>
<td>16.</td>
<td>Norway</td>
<td>2005</td>
<td>Mil. Kroner</td>
<td>154,000</td>
<td>241,000</td>
<td>798,000</td>
<td>0.64</td>
<td>0.30</td>
<td>0.44</td>
</tr>
<tr>
<td>17.</td>
<td>Poland</td>
<td>2005</td>
<td>Mil. Zlotys</td>
<td>61,370</td>
<td>116,283</td>
<td>409,689</td>
<td>0.53</td>
<td>0.28</td>
<td>0.39</td>
</tr>
<tr>
<td>18.</td>
<td>Slovak Republic</td>
<td>2005</td>
<td>Mil. Koruny</td>
<td>63,000</td>
<td>85,000</td>
<td>552,000</td>
<td>0.74</td>
<td>0.15</td>
<td>0.34</td>
</tr>
<tr>
<td>19.</td>
<td>Spain</td>
<td>2005</td>
<td>Mil. Euro</td>
<td>115,792</td>
<td>171,634</td>
<td>330,912</td>
<td>0.67</td>
<td>0.52</td>
<td>0.59</td>
</tr>
<tr>
<td>20.</td>
<td>Sweden</td>
<td>2005</td>
<td>Mil. Kroner</td>
<td>542,000</td>
<td>638,000</td>
<td>1,464,000</td>
<td>0.85</td>
<td>0.44</td>
<td>0.61</td>
</tr>
<tr>
<td>21.</td>
<td>Switzerland</td>
<td>2002</td>
<td>Mil. Franc</td>
<td>81,663</td>
<td>98,021</td>
<td>153,759</td>
<td>0.83</td>
<td>0.64</td>
<td>0.73</td>
</tr>
<tr>
<td>22.</td>
<td>United Kingdom</td>
<td>2005</td>
<td>Mil. GBP</td>
<td>49,106</td>
<td>150,797</td>
<td>538,576</td>
<td>0.33</td>
<td>0.28</td>
<td>0.30</td>
</tr>
<tr>
<td>23.</td>
<td>United States</td>
<td>2002</td>
<td>Mil. USD</td>
<td>1,737,890</td>
<td>2,040,100</td>
<td>3,713,300</td>
<td>0.85</td>
<td>0.55</td>
<td>0.68</td>
</tr>
<tr>
<td>24.</td>
<td>Indonesia</td>
<td>1999</td>
<td>Mil. Rupiah</td>
<td>1,843,000</td>
<td>7,576,000</td>
<td>54,983,000</td>
<td>0.24</td>
<td>0.14</td>
<td>0.18</td>
</tr>
<tr>
<td>25.</td>
<td>The Philippines</td>
<td>1992</td>
<td>Bil. Pesos</td>
<td>11,847</td>
<td>25,305</td>
<td>265,629</td>
<td>0.47</td>
<td>0.10</td>
<td>0.21</td>
</tr>
<tr>
<td>26.</td>
<td>Thailand</td>
<td>2001</td>
<td>Bil. Bahts</td>
<td>84,964</td>
<td>141,722</td>
<td>1,154,715</td>
<td>0.60</td>
<td>0.12</td>
<td>0.27</td>
</tr>
<tr>
<td>27.</td>
<td>Vietnam</td>
<td>2007</td>
<td>Bil. VND</td>
<td>30,559</td>
<td>150,543</td>
<td>423,058</td>
<td>0.20</td>
<td>0.36</td>
<td>0.27</td>
</tr>
<tr>
<td>28.</td>
<td>China</td>
<td>2003</td>
<td>Mil. Yuan</td>
<td>492,499</td>
<td>1,722,985</td>
<td>2,464,995</td>
<td>0.29</td>
<td>0.70</td>
<td>0.45</td>
</tr>
<tr>
<td>29.</td>
<td>Argentina</td>
<td>2004</td>
<td>Mil. Pesos</td>
<td>25,373</td>
<td>35,567</td>
<td>90,689</td>
<td>0.71</td>
<td>0.39</td>
<td>0.53</td>
</tr>
<tr>
<td>30.</td>
<td>Brazil</td>
<td>1998</td>
<td>Mil. Reais</td>
<td>146,339</td>
<td>181,870</td>
<td>400,382</td>
<td>0.80</td>
<td>0.45</td>
<td>0.60</td>
</tr>
<tr>
<td>31.</td>
<td>India</td>
<td>1999</td>
<td>Bil. Rupees</td>
<td>1,188,400</td>
<td>2,675,800</td>
<td>5,869,500</td>
<td>0.44</td>
<td>0.46</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Source: Author's calculations. Data* from various issues of Government Finance Statistics (IMF), except for China and Vietnam (from the country’s Ministry of Finance).

* Due to data limitation, SNGs’ own-sourced revenue in the calculations excludes fiscal transfers from the national government, but it includes revenue from the shared tax with the national government.
3.4.3 The fundamental fiscal decentralisation index: a long-period perspective

The application of the FDI is now extended across countries for an extended period of time. The purpose of this section is to provide more evidence on the changes of a degree of fiscal decentralisation for the same country across years. Countries are selected purely based on an availability of fiscal data. A sample of countries, together with the period in which a degree of fiscal decentralisation is measured, is found in Table 3.4. Using equation (3.3) for the FDI, all fiscal data on governments’ revenue and expenditure are taken from various issues of the Government Finance Statistics yearbooks of the International Monetary Fund.

Figure 3.2 presents the changes in the degree of fiscal decentralisation across countries over a period of time. There is no clear trend in these changes, regardless of fiscal arrangement and level of economic growth of these countries. The degree of fiscal decentralisation is quite stable over the years in these countries. This view can be justified from the fact that fiscal decentralisation is closely related to other forms of decentralisation such as political and management decentralisations.
<table>
<thead>
<tr>
<th>No.</th>
<th>Country</th>
<th>Federal (F)/ Unitary (U)</th>
<th>Number of subnational governments (approximate)</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Argentina</td>
<td>F</td>
<td>23 States 2,221 Locals</td>
<td>1975-2004</td>
</tr>
<tr>
<td>2</td>
<td>Australia</td>
<td>F</td>
<td>8 States 700 Locals</td>
<td>1975-2005</td>
</tr>
<tr>
<td>3</td>
<td>Austria</td>
<td>F</td>
<td>8 States 2,358 Locals</td>
<td>1975-2005</td>
</tr>
<tr>
<td>4</td>
<td>Belgium</td>
<td>F</td>
<td>9 States 589 Locals</td>
<td>1978-2005</td>
</tr>
<tr>
<td>5</td>
<td>Brazil</td>
<td>F</td>
<td>27 States 5,508 Locals</td>
<td>1975-1994</td>
</tr>
<tr>
<td>6</td>
<td>Canada</td>
<td>F</td>
<td>13 States 5,000 Locals</td>
<td>1975-2005</td>
</tr>
<tr>
<td>7</td>
<td>Denmark</td>
<td>U</td>
<td>14 States 275 Locals</td>
<td>1975-2004</td>
</tr>
<tr>
<td>8</td>
<td>France</td>
<td>U</td>
<td>26 States 36,000 Locals</td>
<td>1975-2005</td>
</tr>
<tr>
<td>9</td>
<td>Germany</td>
<td>F</td>
<td>16 States 15,000 Locals</td>
<td>1975-2005</td>
</tr>
<tr>
<td>10</td>
<td>India</td>
<td>F</td>
<td>25 States 440 Locals</td>
<td>1975-1999</td>
</tr>
<tr>
<td>11</td>
<td>Indonesia</td>
<td>U</td>
<td>27 States 277 Locals</td>
<td>1975-1993</td>
</tr>
<tr>
<td>12</td>
<td>Luxembourg</td>
<td>U</td>
<td>12 States 168 Locals</td>
<td>1975-2002</td>
</tr>
<tr>
<td>13</td>
<td>Malaysia</td>
<td>F</td>
<td>13 States 118 Locals</td>
<td>1975-1997</td>
</tr>
<tr>
<td>14</td>
<td>Mexico</td>
<td>F</td>
<td>31 States 2,430 Locals</td>
<td>1975-2000</td>
</tr>
<tr>
<td>15</td>
<td>Netherlands</td>
<td>U</td>
<td>12 States 633 Locals</td>
<td>1975-2005</td>
</tr>
<tr>
<td>16</td>
<td>The Philippines</td>
<td>U</td>
<td>76 States 41,924 Locals</td>
<td>1978-1992</td>
</tr>
<tr>
<td>17</td>
<td>Spain</td>
<td>U</td>
<td>17 States 8,000 Locals</td>
<td>1975-2005</td>
</tr>
<tr>
<td>18</td>
<td>Sweden</td>
<td>U</td>
<td>23 States 2,545 Locals</td>
<td>1975-2005</td>
</tr>
<tr>
<td>19</td>
<td>Switzerland</td>
<td>F</td>
<td>26 States 3,000 Locals</td>
<td>1990-2002</td>
</tr>
<tr>
<td>20</td>
<td>Thailand</td>
<td>U</td>
<td>75 States 6,745 Locals</td>
<td>1975-2005</td>
</tr>
<tr>
<td>21</td>
<td>UK</td>
<td>U</td>
<td>540 States</td>
<td>1975-2005</td>
</tr>
<tr>
<td>22</td>
<td>USA</td>
<td>F</td>
<td>50 States 87,525 Locals</td>
<td>1975-2002</td>
</tr>
</tbody>
</table>

FIGURE 3.2
FISCAL DECENTRALISATION INDEX ACROSS COUNTRIES

ARGENTINA

FDI: 1975 - 2002

\[ y = 0.009x + 0.3716 \]
\[ R^2 = 0.553 \]

AUSTRALIA

FDI: 1975 - 2002

\[ y = -0.0053x + 0.6127 \]
\[ R^2 = 0.412 \]

AUSTRIA

FDI: 1978 - 2002

\[ y = -0.0004x + 0.4849 \]
\[ R^2 = 0.091 \]

BELGIUM

FDI: 1975 - 2002

\[ y = 0.0025x + 0.2166 \]
\[ R^2 = 0.2433 \]

BRAZIL

FDI: 1975 - 2002

\[ y = -0.006x + 0.5365 \]
\[ R^2 = 0.8157 \]

CANADA

FDI: 1975 - 2002

\[ y = 0.002x + 0.6091 \]
\[ R^2 = 0.3823 \]

DENMARK

FDI: 1975 - 2002

\[ y = 0.0024x + 0.467 \]
\[ R^2 = 0.6218 \]

FRANCE

FDI: 1975 - 2002

\[ y = -0.0015x + 0.3685 \]
\[ R^2 = 0.1698 \]
FIGURE 3.2
FISCAL DECENTRALISATION INDEX ACROSS COUNTRIES (Cont.)

FDI: 1975 - 2002
GERMANY

\[ y = -0.0014x + 0.5673 \]
\[ R^2 = 0.4257 \]

FDI: 1975 - 1999
INDIA

\[ y = -0.0019x + 0.505 \]
\[ R^2 = 0.5156 \]

FDI: 1975 - 1993
INDONESIA

\[ y = 0.0008x + 0.1519 \]
\[ R^2 = 0.0774 \]

FDI: 1975 - 1997
MALAYSIA

\[ y = 0.0003x + 0.3522 \]
\[ R^2 = 0.0053 \]

FDI: 1975 - 2002
NETHERLANDS

\[ y = 0.0113x + 0.1076 \]
\[ R^2 = 0.6756 \]

FDI: 1975 - 2002
PHILIPPINES

\[ y = -0.0047x + 0.2846 \]
\[ R^2 = 0.7368 \]
In addition, using the fiscal decentralisation indices developed in this study, no consistently positive (or negative) relationship between fiscal decentralisation and economic growth was identified when a panel regression was conducted for many countries in a period of time\textsuperscript{7}. This may be related to the non-unique relationship between

\textsuperscript{7} As a result, the finding was not reported in the study.
our measure of fiscal decentralisation and economic welfare as discussed in Section 3.3.4.

3.5 Concluding remarks

The “fiscal autonomy” and “fiscal importance” of SNGs are the two core elements of fiscal decentralisation which provide the basis for measuring the degree of fiscal decentralisation in a manner that is consistent with fiscal theory. Fiscal autonomy of SNGs deals with the extent to which SNGs have the autonomy over their revenue-raising powers necessary to fund their chosen expenditure programs. SNGs’ fiscal importance, however, concerns the extent to which total spending on public sector activities is undertaken by SNGs. Using the fundamental index of fiscal decentralisation (FDI) developed in this chapter, the degrees of fiscal decentralisation for various countries are systematically measured and compared.

Until now, measures of fiscal decentralisation utilised in the English-speaking literature (be it ratio between local spending and total spending; or the ratio between local revenue and total revenue) have been crude and partial. As a result, the fundamental index of fiscal decentralisation developed with reference to the “fiscal autonomy and fiscal importance” approach in this chapter represents a broadly accurate, although approximate, basis for measuring the degree of fiscal decentralisation for the purpose of international comparisons.
CHAPTER 4
FISCAL DECENTRALISATION INDEX:
AN EXTENSION AND COMPARISON

4.1 Introduction

The fundamental index of fiscal decentralisation (FDI) based on the “fiscal autonomy and fiscal importance” approach to measuring fiscal decentralisation, as developed in Chapter 3, has deliberately abstracted from the influences of intergovernmental transfers and subnational governments’ debt on the fiscal autonomy of SNGs. By extensions, that “simplifying” assumption is now removed in this chapter.

It is also relevant that the first formal index of fiscal decentralisation was developed in Italy by Scotto in the 1950s. Importantly, this index is superior to those developed in the English-language literature (Thieben, 2003; Yilmaz, 1999; Davoodi and Zoo, 1998; and Woller and Phillips, 1998), at least until now. This index is unknown in the English-speaking world, but has the advantage of being grounded in theory (generally Paretian fiscal theory) and providing a degree of sensitivity to important elements of fiscal decentralisation missing from the range of indices used in modern research.

Even though Scotto’s index was developed in the 1950s, it has been completely ignored in the English-language literature until 2007, when it was discussed by Michael McLure (2007). In view of this, it is useful to revive the “Scotto index” of fiscal decentralisation and compare it with the fundamental index developed in Chapter 3 and the enhanced index of fiscal decentralisation developed in this chapter. The first contribution of this chapter is the development of the enhanced index. In addition, the second significant contribution of this chapter is the comparison and contrast of the first index of fiscal decentralisation (Scotto’s index) and the fundamental index of fiscal decentralisation developed in Chapter 3 and the enhanced index of fiscal decentralisation developed in this chapter.
Section 4.2 investigates the influences of intergovernmental fiscal transfers and SNGs’ debts on the fiscal autonomy of SNGs. The impact of these influences is then incorporated into the fundamental index (FDI) from Chapter 3 to develop an enhanced index of fiscal decentralisation (eFDI). The first index of fiscal decentralisation developed by Scotto is then examined in Section 4.3. Section 4.4 investigates the strengths and weaknesses of the fiscal decentralisation index developed by Scotto relative to the fundamental and enhanced indices of fiscal decentralisation (FDI and eFDI) developed in this study based on the “fiscal autonomy and fiscal importance” approach. Section 4.5 presents the applications of these two approaches to a measurement of fiscal decentralisation in Australia. Concluding remarks are in Section 4.6.

4.2 The fiscal autonomy of subnational governments revisited

The ratio of “own-sourced revenue” to “expenditure” of SNGs, as discussed in Section 3.3.2 of Chapter 3, provides the primary measure of fiscal autonomy. However, it is not a complete measure. Among other things, it does not account for either fiscal transfer from the national government to SNGs or the restriction of SNGs’ capacity to borrowings under their own authority.

Of course, fiscal transfers do not influence SNGs’ autonomy to the same degree as own-sourced revenue does, as, in the case of the latter, SNGs have complete autonomy over their own tax rates and tax bases. Fiscal transfers to redress vertical fiscal imbalance act, on one perspective, to shield SNGs from responsibility for their own-sourced revenue-raising decisions. Nevertheless, such transfers have varying degrees of influence over subnational autonomy – it all depends on the form of the transfer. For example, unconditional grants provide SNGs with autonomy over the allocation of those grants. As such, they may provide a secondary, but nonetheless positive, influence on fiscal autonomy of SNGs. Conditional grants, in contrast, not only shield SNGs from autonomy over revenue-raising matters, but they also restrict the autonomy of SNGs by imposing conditions on the type of services that SNGs must provide when expending their grants.
The assignment of revenue-raising powers and expenditure responsibility of SNGs is already reflected in the measure of fiscal autonomy and fiscal importance in equations (3.1) and (3.2) of Chapter 3. In principle, these equations could be readily adjusted to account for the influence of intergovernmental fiscal transfers on SNGs’ fiscal autonomy. The degree of autonomy associated with fiscal transfers across levels of government is summarised in Table 4.1.

| The impact on autonomy of SNGs from fiscal transfers received from the national government |
|---|---|
| • High negative impact on autonomy | All transfers to SNGs are conditional. |
| • Moderate negative impact on autonomy | Fiscal transfers are almost all conditional on their use. |
| • Moderate positive impact on autonomy | Almost all fiscal transfers are unconditional. |
| • High positive impact on autonomy | Clear transfer mechanism is set up and it is assured by the Constitution and/or laws and transfers are significantly unconditional. |

Source: Author’s development.

The adjustment to equation (3.1) of Chapter 3 needs to account for the positive impact from unconditional transfers (from the national government to SNGs), and the negative impact of conditional transfers (from the national government to SNGs) on SNGs’ fiscal autonomy. As the amount of the transfer is determined by the national government, it must have less positive significance for the autonomy of SNGs than the own-sourced revenue decisions made by SNGs. However, as the expenditure of unconditional grants is at the discretion of SNGs, it has some positive impact. The task is then to measure the ratio of net unconditional transfers to SNGs (i.e. unconditional transfers less conditional transfers) to total SNGs’ expenditure, and then discount it by some value in recognition of the fact that the national government, and not SNGs, has determined the value of unconditional grants. For simplicity, this discount is determined by the ratio of unconditional transfers (from the national government to SNGs) to the total transfers (from the national government to SNGs). This reflects the view that the greater the national government’s propensity to provide grants to SNGs on an unconditional basis, then the greater the national government’s propensity to account for
local preferences by setting the amount of the transfer close to the level that the welfare-
maximising SNGs would collect if they had the national government’s taxing powers (but
not the national government’s expenditure responsibilities). More formally, SNGs’ fiscal
autonomy from fiscal transfers received (“SNGs-T autonomy”) is:

\[
SNGs-T\text{ autonomy} = \left[ \frac{\sum_{i=1}^{n} T^U_i - \sum_{i=1}^{n} T^C_i}{\sum_{i=1}^{n} E_i} \times \left( \frac{\sum_{i=1}^{n} T^U_i}{\sum_{i=1}^{n} T^C_i} \right) \right] = k
\]

where \( \sum_{i=1}^{n} T_i \), \( \sum_{i=1}^{n} T^U_i \), and \( \sum_{i=1}^{n} T^C_i \) represent total transfers, total unconditional
transfers, and total conditional transfers to SNGs from the national government,
respectively. By way of definitional classification, it should be noted that, for the purpose
of this index, unconditional transfers include SNGs’ share of revenue from shared taxes
when the national government has the authority to define the tax base, set the tax rate and
determine the rules under which the tax revenue is shared between different levels of
government. Revenue from such “taxes” is not classed as “own-sourced revenue” and is
instead treated as a transfer from the national government. For example, in the case of
Australia, Goods and Services Tax (GST) revenue would be classed as unconditional
Commonwealth Government transfers to the states because the Commonwealth
Government’s legislation sets the tax base, specifies the rate and determines the share
(100 per cent) of revenue that goes to the states.

In conclusion, when fiscal autonomy of SNGs is strictly considered, the fiscal
autonomy, represented by equation (3.1) of Chapter 3, should be adjusted to reflect the
effect of intergovernmental fiscal transfers from the national government to fiscal
autonomy of SNGs. As a result, an enhanced measure of fiscal decentralisation is:

\[
eFDI = \sqrt{\left( \frac{\sum_{i=1}^{n} OSR_i}{\sum_{i=1}^{n} E_i} \right) + k} \times \left( \frac{\sum_{i=1}^{n} E_i}{TE} \right)
\]
In addition, SNGs’ fiscal autonomy may also be influenced by constraints of SNGs’ borrowing. In principle, this could be accounted for the degree of fiscal autonomy in the following manner:

<table>
<thead>
<tr>
<th>a</th>
<th>Fiscal Autonomy of SNGs Over Subnational Borrowings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Very low autonomy: No subnational borrowings are allowed.</td>
</tr>
<tr>
<td>0.25</td>
<td>Low autonomy: SNGs can borrow with a heavy administration from the national government.</td>
</tr>
<tr>
<td>0.5</td>
<td>Moderate autonomy: SNGs arrange borrowings from both domestic and overseas sources but all borrowings must satisfy strict requirements from the national government.</td>
</tr>
<tr>
<td>0.75</td>
<td>High autonomy: Borrowing is acceptable given some economic regulations are met.</td>
</tr>
<tr>
<td>1.0</td>
<td>Very high autonomy: SNGs can borrow without any intervention from the national government.</td>
</tr>
</tbody>
</table>

Source: Author’s development.

The adjusted factor of fiscal autonomy of SNGs (“SNGs-Debt autonomy”) is:

\[
SNGs - Debt\ autonomy = \left[ \frac{\sum_{i=1}^{p} D_i}{\sum_{i=1}^{p} E_i} \right] \times a = l
\]

where \( \sum_{i=1}^{p} D_i \) represents total SNGs’ debts and \( 0 \leq a \leq 1 \). As such, the complete version of the fiscal autonomy of SNGs which takes into account SNGs’ autonomy over their expenditure decisions, revenue-raising powers, fiscal transfers and SNGs’ borrowings are in the form of:

\[
FA = \left[ \frac{\sum_{i=1}^{p} OSR_i}{\sum_{i=1}^{p} E_i} \right] + k + l
\]

Therefore, an even more comprehensive index would be represented by:

\[
eFDI = \left( \frac{\sum_{i=1}^{p} OSR_i}{\sum_{i=1}^{p} E_i} + k + l \right) \times \left( \frac{\sum_{i=1}^{p} E_i}{TE} \right)
\]

Unfortunately, the values of \( a \) would, in practice, have to be determined subjectively; data are simply not available to obtain an objective measure. In view of this,
the impact of the authority of SNGs over their borrowings has been set aside in the remainder of this dissertation. As a consequence, the enhanced index of fiscal decentralisation, as presented in equation (2.2), is used in this chapter.

It is important to note that while the importance of equation (2.2) of this section is clearly evident from an “in principle” perspective, it is of more limited relevance to cross-country studies, such as that considered in Section 3.4 of Chapter 3, because of data limitations. Data on the share of conditional and unconditional transfers from national government to SNGs are not published by international institutions such as the IMF. However, the enhanced index can still be used for countries in which data are published on both conditional and unconditional grants. An illustration from Australia’s fiscal data is considered in Section 4.4 of this chapter.

4.3 The first index of fiscal decentralisation: Scotto’s index

In the Italian article “Di un indice di decentramento finanziario” (1950), Aldo Scotto (1916–1992) is the first pioneer who developed the first fiscal decentralisation index in the history of public economics (McLure, 2007), known as Scotto’s index ($FDI_s$). Scotto’s index is still not available in English, but a summary of it appears in The Paretian School and Italian Fiscal Sociology from McLure (2007, pp.156-8). In his first index, two main components are considered: (i) the public-revenue raising, and (ii) the expenditure of public fund. In a typical setting of an economy, there are three levels of government: national government, regional (or state/provincial) government, and local government. The last two levels form SNGs. Two components of Scotto’s index, one for revenue and the other for expenditure, are defined as:

\[ d_k = \frac{1}{n_1 n_2} \left( p_o + \frac{p_1}{n_1} + \frac{p_2}{n_2} \right); \text{ and} \]

\[ d_k = \frac{1}{n_1 n_2} \left( p_o + \frac{p_1}{n_1} + \frac{p_2}{n_2} \right). \]
where \( p \) stands for proportion, \( R \) and \( E \) represent revenue and expenditure and \( n \) indicates the number of governments. The subscripts of 0, 1, and 2 represent the order of the government level – national, regional (the first-order level of SNGs), and local (the second-order level of SNGs) levels, respectively. For example, \( p_0^R, p_1^R, p_2^R \) are the revenue shares of the national, regional, and local levels, respectively. The sum of all revenue (expenditure) shares is unity. As such, it is clear that:

\[
\begin{align*}
(3.3) & \quad p_0^R + p_1^R + p_2^R = 1; \text{ and} \\
(3.4) & \quad p_0^E + p_1^E + p_2^E = 1.
\end{align*}
\]

Scotto’s index is the arithmetic mean of two components. That is:

\[
(3.5) \quad FDI_s = \frac{d_R + d_E}{2}.
\]

The country is considered as perfectly fiscally centralised if the national government generates all revenue and arranges all public spending. It means that \( p_0^R = 1 \); and \( p_0^E = 1 \). In this case, from equations (3.3) and (3.4), revenue shares and expenditure shares for all levels of SNGs are zero (i.e. \( p_1^R + p_2^R = 0; \) and \( p_1^E + p_2^E = 0 \)). Using equations (3.1), (3.2), and (3.5), Scotto’s index is 1. As a result, it is clear that the minimum value of Scotto’s index is 1 when the country is under a perfect centralisation. Also, Scotto’s index concludes that the higher the index, the more fiscally decentralised the economy is, given that the lower bound of the index is 1 (McLure, 2007).

Scotto’s index considers two dimensions to the importance of SNGs when measuring fiscal decentralisation. First, when revenue (expenditure) shares of each level of SNGs increase (i.e. an increase of \( p_1^R, p_2^R, p_1^E, p_2^E \)), the index will increase and vice versa. As such, Scotto’s index is sensitive with the revenue (expenditure) shares of each government level. Second, when the number of governments in each tier of SNGs increases (i.e. an increase of \( n_1 \) and \( n_2 \)), Scotto’s index will also increase. So, the number of SNGs does contribute to the sensitivity of Scotto’s index.
TABLE 4.3
THE ILLUSTRATIONS OF SCOTTO'S INDEX

<table>
<thead>
<tr>
<th>Row No.</th>
<th>Item</th>
<th>Case No. 1</th>
<th>Case No. 2</th>
<th>Case No. 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Expenditure shares:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>National (p^n_E)</td>
<td>0.50</td>
<td>0.30</td>
<td>0.50</td>
</tr>
<tr>
<td>3.</td>
<td>Regional (p^R_E)</td>
<td>0.40</td>
<td>0.45</td>
<td>0.40</td>
</tr>
<tr>
<td>4.</td>
<td>Local (p^L_E)</td>
<td>0.10</td>
<td>0.25</td>
<td>0.10</td>
</tr>
<tr>
<td>5.</td>
<td>Sum</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>6.</td>
<td>Revenue shares:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>National (p^n_R)</td>
<td>0.60</td>
<td>0.50</td>
<td>0.60</td>
</tr>
<tr>
<td>8.</td>
<td>Regional (p^R_R)</td>
<td>0.35</td>
<td>0.40</td>
<td>0.35</td>
</tr>
<tr>
<td>9.</td>
<td>Local (p^L_R)</td>
<td>0.05</td>
<td>0.10</td>
<td>0.05</td>
</tr>
<tr>
<td>10.</td>
<td>Sum</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>11.</td>
<td>No. of governments:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Regional (n_R)</td>
<td>10</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>13.</td>
<td>Local (n_L)</td>
<td>20</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>14.</td>
<td>Summary of results:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>(d_E)</td>
<td>1.83</td>
<td>2.80</td>
<td>1.95</td>
</tr>
<tr>
<td>16.</td>
<td>(d_R)</td>
<td>1.57</td>
<td>1.83</td>
<td>1.64</td>
</tr>
<tr>
<td>17.</td>
<td>(FDI_s)</td>
<td>1.70</td>
<td>2.32</td>
<td>1.80</td>
</tr>
</tbody>
</table>

To illustrate the sensitivity of this index, three cases are examined. It is assumed that a country consists of three levels of government: the national government, and a number of regional and local governments. Expenditure shares, revenue shares and the number of government in each tier of SNGs are provided in Table 4.3. Case 1 is considered as the base case. Using equations (3.1), (3.2), and (3.5), Scotto’s index and two main components are calculated. As shown in row 17 of Case 1, Scotto’s fiscal index for this hypothetical country is 1.70.

Revenue and expenditure shares for the national government fall when moving from Case 1 to Case 2. Conversely, as a result, revenue and expenditure shares for
regional and local governments increase in Case 2 as the sum of all revenue (or expenditure) shares must equal unity. With other variables (the number of government by each level held fixed between Case 1 and Case 2), Scotto’s index is now 2.32 (as shown in row 17), up from 1.70 in Case 1. This case illustrates the sensitivity of Scotto’s index when the relative fiscal shares among levels of government change.

In Case 3, revenue and expenditure shares of each level government are unchanged from Case 1, but the number of SNGs increases, from 10 to 40 for the provincial level (as shown in row 12), and from 20 to 50 for the local level (as shown in row 13). This allows us to test the sensitivity of Scotto’s index when the number of SNGs increases while holding other variables constant. Scotto’s index changes because the index for Case 3 is 1.80, up from 1.70 in Case 1 (as shown in row 17). In conclusion, the above example illustrates that Scotto’s index does take into account changes in: (i) revenue and expenditure shares of all tiers of government, and (ii) the number of SNGs.

4.4 Scotto’s index versus the two new indices (FDI and eFDI)

While many studies have attempted to develop a fiscal decentralisation index in various ways, a complete measure of the fiscal decentralisation has not been developed. The partial nature of the most typical approach to a measurement of fiscal decentralisation, such as ratios of local revenue (or expenditure) in the total public revenue (or expenditure) are self-evident. Nevertheless, Scotto’s index did take into account the distribution of aggregate revenue and expenditure between each tier of SNGs. Furthermore, his index is sensitive to a number of subnational units whereas all other measures are not.

As noted earlier, the indices of fiscal decentralisation developed in the English-language literature are partial and poorly connected to theory. As such, they are clearly inferior to the indices developed in Chapters 3 and 4. However, as Scotto’s pioneering index, unknown outside Italy, is much better linked to fiscal theory than that of English-
language literature, it is useful to compare it with the indices developed under the “fiscal autonomy and fiscal importance” approach.

### TABLE 4.4
**SCOTTO’S INDEX VERSUS INDICES IN THE “FISCAL AUTONOMY AND FISCAL IMPORTANCE” APPROACH**

<table>
<thead>
<tr>
<th>Item</th>
<th>Scotto’s index ( (FDI_s) )</th>
<th>Indices in the “fiscal autonomy and fiscal importance” approach: ( (FDI \text{ and eFDI}) )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advantages</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conceptual</td>
<td>Scotto’s index is sensitive to: (i) fiscal shares (revenue and expenditure) of SNGs; and (ii) a number of SNGs. It is fundamental.</td>
<td>Autonomy of SNGs is considered by developing the autonomy ratio (equation 3.1 of Chapter 3) and SNGs – fiscal transfer autonomy as discussed in Section 4.2 of Chapter 4. This fills in the fundamental gap in Scotto’s index.</td>
</tr>
<tr>
<td>Practical</td>
<td>Simplicity.</td>
<td>Fiscal data is required at an adequate level for the FDI in equation (3.3) of Chapter 3. This requirement can be easily met by many developing and transition economies. International Financial Statistics of the IMF are a good source of required data.</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conceptual</td>
<td>Fiscal autonomy is completely ignored.</td>
<td>The indices developed in Chapters 3 and 4 are sensitive to fiscal shares of SNGs. However, they do not take into account the number of SNGs. This potential weakness is addressed in chapters 5 and 6.</td>
</tr>
<tr>
<td>Practical</td>
<td>Substantial fiscal data for both the national government and SNGs are required. This is not practical for developing and transition economies.</td>
<td>Data for unconditional transfers to SNGs are not widely available. As such, the eFDI, as shown in equation (2.2) of this chapter, is difficult to use widely because of data limitations.</td>
</tr>
</tbody>
</table>

Scotto’s index enjoys the distinction of being the first index of fiscal decentralisation in the public finance literature. Until now, it has also enjoyed the distinction of being the best index of fiscal decentralisation available. The new indices (FDI and eFDI) developed under the “fiscal autonomy and fiscal importance” approach should represent the advancement. Table 4.4 presents the relative advantages and disadvantages of Scotto’s index and the two newly-developed indices.

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Scotto’s index is the index *par excellence* for the “fiscal importance” of decentralisation. This alone makes it superior to many indices which also emphasised fiscal importance. Indices developed under the “fiscal autonomy and fiscal importance” approach, in contrast, have a clear advantage relating to the treatment of the “fiscal autonomy” of SNGs.

4.5 **Measuring fiscal decentralisation: application for Australia**

The relative comparisons between Scotto’s index and the enhanced index of fiscal decentralisation (eFDI) are now discussed. Australia is used for this purpose over the period from 1975 to 2002. As previously discussed, the minimum value of the index of fiscal decentralisation, indicating perfect fiscal centralisation, is one for Scotto’s index and zero for the enhanced index. The Scotto approach has no maximum, whereas the enhanced index has a maximum value, indicating perfect fiscal decentralisation, of one. Figure 4.1 reveals that the trends of Scotto’s index and the enhanced index are very consistent.

![FIGURE 4.1
SCOTTO’S INDEX AND eFDI
AUSTRALIA, 1975 - 2002](image)

The first point to note is how close the trends of the two indices are. When considered more closely, though, the percentage changes in the index values between two years are significant, as shown in Figure 4.2. For the period of 28 years, from 1975 to 2002, the relative changes in these two indices are very similar. However, in some particular instances, the enhanced index (eFDI) developed in this chapter is more...
sensitive to variations in comparison with Scotto’s index. This is because the enhanced index is able to pick up the changes in autonomy which are reflected in the degree of fiscal decentralisation.

The relative change in the degree of fiscal decentralisation in Australia was more volatile in 1983, 1988, and 1997. These significant changes can be justified by particular events in Australian fiscal federalism. From 1983 to 1989, states introduced franchise fees and financial institutions duty on tobacco, fuel and liquor. As such, SNGs’ own-sourced revenue increased and, as a result, the degree of fiscal decentralisation increased because of the increase in states’ fiscal revenue-raising capacity relative to its expenditure obligations. Importantly, SNGs’ own-sourced revenue does not equal their expenditure due to the debts, which is authorised by the federal government via the operation of the Australian Loan Council. Also, a decrease in the degree of fiscal decentralisation in 1997 can be explained by the fact that, in 1997, the state governments lost the taxing powers on the franchise fees, which was replaced by Commonwealth Revenue Replacement Payments, after the decision from the High Court stating that states’ franchise fees are constitutionally invalid (Department of Treasury and Finance of Western Australia, 2006). As such, own-sourced revenue of SNGs fall and their fiscal autonomy must also fall. These payments, together with financial institutions duty and debits tax, have now been replaced by the Goods and Services Tax grants imposed by the Commonwealth Government.
An important example of a reduction in fiscal autonomy of SNGs is illustrated in the year 2000 onwards. Since the year 2000, the degree of fiscal decentralisation has decreased. This can be explained by a decrease in the level of fiscal autonomy. In June 1999, the Intergovernmental Agreement on the Reform of Commonwealth-State Financial Relations (“IGA”) was signed between Australia’s Prime Minister and the state premiers. From the federal view, the main purpose of this agreement was to allow all states access into a stable and growing-revenue base with the introduction of the Goods and Services Tax. In return, the financial assistance grants from the federal government to states, together with financial institutions duty, and other taxes were abolished. In money terms, all states are better off. However, this scheme makes states depend more heavily on the federal government for revenue because the bases and rates of the Goods and Services Tax are determined by the federal government. As such, states cannot increase their revenue from the Goods and Services Tax. In this sense, fiscal autonomy of SNGs in Australia decreases, and, as a result, the degree of fiscal decentralisation falls.

From Figure 4.2, it is clear that Scotto’s index and the enhanced index have a similar trend. While Scotto’s index provides a relatively more comprehensive measure of the fiscal importance of SNGs, the enhanced index represents an absolutely more comprehensive measure of the fiscal autonomy of SNGs. In addition, the enhanced index is more sensitive to short-term changes of fiscal decentralisation compared with its companion – Scotto’s index.

4.6 Conclusion

The first contribution of this chapter is to develop a complete measure of fiscal autonomy of SNGs, and, by extension, the enhanced index which is developed on the grounds of the fundamental index of fiscal decentralisation developed in Chapter 3. In the enhanced index, the fiscal autonomy of SNGs takes into account the impact of intergovernmental fiscal transfers on subnational fiscal autonomy. However, a practical limitation of this enhanced index, as represented by equation (2.2) of this chapter, is that its application is constrained in a wide range of countries because of data limitations.
The second contribution of the chapter is to revive the first index of fiscal decentralisation and compare the relative strengths and weaknesses of this first index and the enhanced index. Scotto developed the first systematic index of fiscal decentralisation. Its main strengths are simplicity and sensitivity to a number of governments and their respective shares. This is an index *par excellence* for capturing the “fiscal importance” of SNGs. However, this index largely ignores the fundamental issue of the fiscal autonomy of SNGs and its index values have no upper bounds.

Until now, fiscal autonomy of SNGs has been largely ignored in the measurement of fiscal decentralisation. On these issues, the “fiscal autonomy and fiscal importance” approach is superior. The “fiscal autonomy and fiscal importance” approach highlights the autonomy of SNGs and the index value is bounded between zero and one. However, in regards to fiscal importance, the “fiscal autonomy and fiscal importance” approach is insensitive to a number of governments, and from that perspective, is less effective than Scotto’s index. However, this potential weakness is, in part, addressed in Chapters 5 and 6 of this study from a different perspective – through the use of the notion of entropy to identify the dispersion, or inequality, of fiscal activities within and between different regions.