

WPS1822

POLICY RESEARCH WORKING PAPER

1822

Intergovernmental Fiscal Transfers in Nine Countries

Lessons for Developing Countries

Jun Ma

How nine major countries—Australia, Canada, Germany, India, Indonesia, Japan, the Republic of Korea, the United Kingdom, and the United States—handle intergovernmental fiscal transfers, with an emphasis on equalization transfers and a special look at fiscal transfers in China.

The World Bank
Economic Development Institute
Macroeconomic Management and Policy Division
September 1997



Summary findings

Jun Ma presents an overview of intergovernmental fiscal transfer systems used in nine developing and industrial countries and draws implications for other developing countries.

On the basis of a comparison of these countries, Ma classifies equalization transfer formulas into four categories, analyzes the data requirements of each type of formula, discusses the applicability of these formulas in developing countries, and uses illustrative examples to show how the calculations should be carried out. The author also discusses implementation issues, including the transition from an old to a new transfer system. Finally, he presents an illustrative equalization transfer model for China.

Ma concludes that the formula-based equalization transfer system has at least three advantages over the discretionary system prevailing in many countries:

- It provides the single most important means to address regional disparities.
- It bases the evaluation of a subnational government's entitlement on objective variables, thus minimizing bargaining and lobbying and keeping distribution fair.
- If properly designed, the formula-based system eliminates the disincentive inherent in many discretionary systems that encourages overspending and weak tax collection efforts.

This paper — a product of the Macroeconomic Management and Policy Division, Economic Development Institute — is part of a larger effort in the department to study and disseminate international experience in fiscal management. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Chiharu Ima, room G8-004, telephone 202-473-5856, fax 202-676-9879, Internet address cima@worldbank.org, September 1997. (78 pages)

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Intergovernmental Fiscal Transfer in Nine Countries: Lessons for Developing Countries

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Macroeconomic Management and Policy Division
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The views expressed in this paper are those of the author and should not be attributed to any organizations that he has been associated with. The author would like to thank Kenji Yamauchi, Malcolm Nicholas, Richard Bird, Anwar Shah, Ehtisham Ahmad, William McCarten, Ching-Hsiou Chen, Kee-sik Lee, Nobuki Mochida, Toshihiro Fujiwara, Shunsuke Mutai, Jungsoo Park, Robert Brightwell, Paul Bernd Spahn, Wolfgang Fottinger, Bob Searle, Jon Craig, Madras S. Guhan, Colin Bruce, Burkhard Drees, Xiaoping Yu, Jinfa Jiang, and Rui Coutinho for helpful discussions and comments. He also appreciates the excellent research assistance of Chiharu Ima.

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Intergovernmental Fiscal Transfer in Nine Countries: Lessons for Developing Countries

Jun Ma

PART I. INTRODUCTION

This paper provides an overview of the intergovernmental fiscal transfer mechanisms in nine major industrial and developing countries, with special reference to the design of equalization transfers. The countries selected are the United States, Canada, the United Kingdom, Australia, Germany, Japan, Korea, India, and Indonesia. Most of these countries have relatively developed formula-based transfer systems, and represent the major varieties of transfer systems adopted in the world.

The three sections in Part I present a brief review of the economic rationales and basic criteria for designing an intergovernmental transfer system. The following nine sections in Part II discuss the mechanisms adopted by these nine countries, respectively. Part III compares and contrasts the nine countries' transfer systems and, based on the comparison, attempts to draw implications for developing countries that are considering or are in the process of reforming their intergovernmental transfer systems. It classifies the transfer formulas into four categories, analyzes the data requirements of each type of formula, and uses illustrative examples to show how the calculations should be implemented. A few implementation issues, including the transitional arrangement from an old to a new system, are also considered in this part. Part IV presents an illustrative equalization transfer model for China and the simulation results using 1994 data. The appendix of this paper discusses a number of country cases on fiscal transfers from state (provincial) level governments to lower level governments.

In this paper, we use "grant" and "transfer" interchangeably to refer to payment of funds from one level of the government to another.

1.1. Economic Rationales for Intergovernmental Transfer

The literature of fiscal federalism suggests several economic rationales for intergovernmental transfers:¹

A. Addressing vertical fiscal imbalances. In most countries, the national government retains the major tax bases, leaving insufficient fiscal resources to the subnational

¹ See Broadway et al (1993), Shah (1994), and Rosen (1995).

governments for covering their expenditure needs. Intergovernmental transfer is therefore needed to balance the budget at the subnational levels.

B. Addressing horizontal fiscal imbalances. On one hand, some jurisdictions may have better access to natural resources or other tax bases that are not available in others. They may also have higher income levels than those in other jurisdictions. These are referred to as differences in fiscal capacities. On the other hand, some jurisdictions may have extraordinary expenditure needs, because they have high proportions of poor, old, and young population, or because they need to maintain national airports and harbors. The net fiscal benefits, measured by the gap between fiscal capacity and fiscal need, is often caused by such uncontrollable factors and therefore should be addressed by central government transfer.²

A weaker version of this argument states that the central government has the obligation to maintain a minimum standard of public service in all the subnational units. Regions without sufficient resources to reach this minimum level should be subsidized.

C. Addressing inter-jurisdictional spill-over effects. Some public services have spill-over effects (or externalities) on other jurisdictions. Examples are pollution control (water or air), inter-regional highway, higher education (graduates may leave for other regions to work), fire departments (may be used by neighboring areas), etc. Without reaping all the benefits of these projects, a local government tends to underinvest in such projects. Therefore, the center government needs to provide incentives or financial resources to address such problems of under-provision.

1.2. Criteria for an Effective Transfer System

An effective transfer system should satisfy several criteria³:

² Some scholars have argued that the market itself will perform the function of equalization, and there is no need for the government to be involved. This argument is based on the assumption that population and other resources have a high degree of mobility. If a country's population is perfectly mobile across regions, then the differentials of public service will not exist, because people can always move to jurisdictions that provide better services. With an increasing population in such a jurisdiction, the benefits each person can receive will decline, and equalization of fiscal benefits takes place. However, in no country is the population perfectly mobile, due to factors such as moving costs and employment constraints, and people may not have the perfect information about levels and qualities of public services in all regions. The lack of mobility among the population tends to create a high level, or even increasing levels, of uneven development patterns across regions, as financially strong regions tend to save and invest more and develop faster than financially weak regions.

³ Shah (1995).

Revenue adequacy: the subnational authorities should have sufficient resources, with the transfers, to undertake the designated responsibilities.

Local tax effort and expenditure control: ensuring sufficient tax efforts by local authorities. Formulas should not encourage fiscal deficits.

Equity: transfer should vary directly with local fiscal needs and inversely with local fiscal capacity.

Transparency and stability: the formulas should be announced and each locality should be able to forecast its own total revenue (including transfers) in order to prepare its budget. And the formulas should be stable for at least a few years (3-5 years) to allow long-term planning at the local level.

1.3. Types of Intergovernmental Transfer

There are basically two types of grants, conditional and unconditional.

A. Conditional grants. These are sometimes called specific purpose grants or categorical grants. The central government specifies the purposes for which the recipient government can use the funds. Such a grant is often used to address concerns that are highly important to the center but are considered less so by the subnational governments. Examples are projects with inter-regional spill-over effects. Within conditional grants, there are several types:

1. **Matching Open-Ended Grants.** For a unit of money given by the donor to support a particular activity, a certain sum must be expended by the recipient. For example, a grant might indicate that whenever a local government spends a dollar on education, the central government will contribute a dollar (or fifty cents) as well. With an open-ended matching grant, the cost to the donor ultimately depends upon the recipient's behavior. If the local government's expenditure is vigorously stimulated by the program, then the central government's contributions will be quite large and vice versa.

2. **Matching Closed-Ended Grants.** To put a ceiling on the cost borne by the central government, the center may specify some maximum amount that it will contribute. This is called a closed-ended matching grant. This mechanism is used by most countries due to concerns of budget control. In some countries, the total sum of matching grants is limited by the government selection mechanism.

3. **Non-matching Grants.** In this case, the central government offers a fixed sum of money with the stipulation that it be spent on a specified public good. The recipient government is not required to match the contribution of the central government.

B. Unconditional grants. An unconditional grant places no restrictions on the use of funds. In effect, it is a lump sum grant to the recipient government. The main justification for the central government to give unconditional grants to states/provinces and localities is that such grants can be used to equalize fiscal capacities of different local governments to ensure the provision of a minimum (or reasonable) level of public services. In most countries, the equalization grants are transfers made from the central government to the subnational governments (e.g., Canada, Australia, the United Kingdom, Japan, Korea, etc.), while in Germany, the equalization transfer is made from states with above-average fiscal capacities to states with below-average fiscal capacities. In other countries, unconditional equalization grants take the form of a general revenue-sharing. The formulas used to allocate the equalization transfers to subnational government are the central element of this grant system, and are subject to intense debate both academically and in practice. And this is the main focus of this paper.

PART II. INTERGOVERNMENTAL TRANSFERS IN NINE COUNTRIES

2.1. The United States

Over the past four decades, grants from the federal government have increased both in dollar amount and as a proportion of total federal outlays (Table 2.1). Grants as a percentage of state and local expenditures have also increased over the long run. In 1993, grants from federal and state government were about one third of the total amount that localities spend (Rosen 1995, p.536).

Table 2.1. Relation of Federal Grant-in-Aid Outlays to Federal, State, and Local Expenditures (Selected fiscal years)

| Fiscal Year | Total Grants (Bn 1990\$) | Grants as % of Total Federal Outlays | Grants as % of State & Local Expenditures |
|-------------|-----------------------------|--|---|
| 1950 | 12.7 | 5.3 | 10.4 |
| 1960 | 30.0 | 7.7 | 14.7 |
| 1970 | 75.7 | 12.3 | 20.0 |
| 1980 | 141.5 | 15.9 | 28.0 |
| 1990 | 135.4 | 10.9 | 20.0 |
| 1993 | 176.7 | 14.0 | 22.0 |

Source: Rosen (1995), p.536.

Unlike most other developed countries, the United States emphasizes the use of conditional grants rather than unconditional grants. In the early 1990s, conditional, or categorical grants accounted for more than 90 percent of federal intergovernmental transfers (Rosen 1995, p.537). About two-thirds of this aid were granted to state governments, while the remainder was given directly to local governments. The four most important categories of federal aid to states are for health, income security, education and training, and transportation. Health and income security accounted for 55 percent of federal grant outlays in 1988.

The major functions for which federal transfers are made directly to local governments include education, housing and community redevelopment, waste treatment facilities, and airport construction (Hyman 1993).

While all three forms of conditional grants (closed-ended matching, open-ended matching, and non-matching) are used, the most common form is closed ended matching grant.

The intervention of the federal government into state and local affairs through conditional grants is pervasive. In 1991, a law was passed to discourage drunken driving and voted to give money to states that established anti-drunken driving programs. The House specified everything from the percent of blood-alcohol concentration that would be the criterion for intoxication to the length of time the driver's license would be suspended for a first offense. This is not atypical. According to one count, the federal government imposed more than one thousand spending mandates upon states and localities (Rosen 1995, p.537).

Since the early 1980s, a new form of transfer, block grants, became popular under the Reagan administration. Many categorical grants were consolidated into a few broad block grants, which are essentially non-matching conditional grants. Within a given "block" of programs, the recipient state and local governments have more flexibility in spending funds than with categorical grants. One example of a block grant program is the Job Training Partnership Act of 1982. This act provided funds from federal revenue to finance human resource training programs administered by state and local governments designed to be tailored to the particular needs of workers and employees in local labor markets (Hyman 1993). Despite the efforts of the Reagan administration, the categorical grant still remains the dominant means of transferring funds from the federal government to state and local governments.

The fact the United States has a marked preference for conditional grants--and its corresponding bias against unconditional grants--has aroused the interests of many scholars. One reason that has been offered to explain the marked U.S preference for conditional grants is the peculiar US problems of fiscally fragmented metropolitan areas, with concentrations of low-income people (often ethnically distinct) clustered in the decaying urban core as a result of the flight to the suburbs by the white middle class. It is argued that conditional grants are a better response to U.S. needs than are unconditional grants, because the major interregional disparities are not in taxes but in service levels. "Congress wants to focus on particular services rather than on the general level of service or tax capacity, a substantial portion of the remaining grant system is focused on very narrow purposes." (Davis and Lucker 1982, p.355) This view presupposes that the federal interest is in actually providing certain service levels, rather than merely the possibility of attaining such levels at average tax rate, as in the equalization systems of Canada and Australia (Bird, 1986, p.159).

2.2. Canada⁴

Canada is a federation of ten provinces (British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland) and two

⁴ This section is based on Broadway and Hubson (1993) and Shah (1995a).

territories (Northwest Territories and Yukon). The specific purpose transfers from the federal government to the territories are similar to those from the federal government to the provinces. But for equalization transfers, the territories receive more than the provinces on per capita basis as the equalization scheme reflects the greater needs and costs that arise as a result of the territories' remoteness and sparse populations.

The transfer of funds from higher to lower levels of government has been an important aspect of the Canadian federal system since Confederation. At the time of Confederation, customs and excise duties constituted the principal revenue sources of government. Because the Constitution Act 1867 restricted the provinces to direct taxation, a system of grants and statutory subsidies was established to compensate for lost revenues. In addition to cash payments, close-ended per capita grants were instituted. The federal government also assumed the provinces' existing debts and made special grants to New Brunswick and Nova Scotia. These special grants were subsequently enhanced and also extended to the western prairie provinces.

Both the magnitude and the nature of federal-provincial transfers have changed dramatically since World War II. The scope of Canada's equalization program has increased, and transfers under the program have assumed a major role as a revenue source for the "have-not" provinces. In the 1980s, major changes in the equalization program took place, both in the formula and in the growth rate of payments.

Currently, there are three major programs of federal transfers to the provinces: (1) the Canadian Equalization Program: a constitutionally mandated unconditional block transfer program to support reasonably comparable levels of services at reasonably comparable levels of taxation in all provinces; (2) the Established Programs Financing (EPF): conditional block (per capita) transfers for health and education with federal conditions on accessibility and standards of service; and (3) the Canadian Assistance Plan (CAP): conditional matching transfers for welfare assistance; and In 1994/95 fiscal year, the total federal transfers amounted to \$41.9 billion, among which EPF accounted for \$21.3 billion, equalization program accounted for \$7.7 billion, and CAP accounted for \$8.2 billion (Shah 1995a, p.244).

The Equalization Program. The Canadian equalization program uses a notional average standard as the basis for equalization. The basic calculation for the equalization formula is that of a province's tax capacity. Tax capacity is calculated as the amount of per capita revenue that a province could raise by applying the national average tax rates to its tax bases. The tax capacity of each province is then compared with the amount of per capita revenue that could be raised if the province has a standard (five province average) per capita tax base. A province whose per capita tax base is below the standard receives an equalization payment equal to the difference between the province's tax capacity and the standard tax capacity, multiplied by the province's population. The actual formula is:

$$E_{ij} = t_j [B_{sj}/P_s - B_{ij}/P_i] P_i$$

where

E_{ij} is entitlement under revenue source j in province i ,

B_{sj} is the base in five provinces (standard) for revenue source j ,

P_s is the population of five provinces,
 B_{ij} is province i 's base for revenue sources j ,
 t_j is the national average tax rate for revenue source j , or:
 $t_j = \sum_i TR_{ij} / \sum_i B_{ij}$

where TR_{ij} is actual revenues under revenue source j in province i . The total entitlement of province i , TE_i , equals the sum of all the entitlement under different revenue sources:

$$TE_i = \sum_j E_{ij}$$

This program equalizes have-not provinces up to the national average--only those provinces that were below the national average are affected by the program--and is paid for out of general federal revenues. Provinces whose tax capacities are above the national average--the have provinces---are not equalized down. Thus, the system does not fully equalize tax capacities across all provinces.

Currently, there are 30 revenue sources for this program. The main sources include personal income taxes, corporate income tax, secession duties, general sales taxes, gasoline taxes, motor vehicle license fees, alcoholic beverage taxes, forestry taxes, oil royalties, natural gas royalties, sales of Crown leases and reservations on oil and gas lands, other oil and gas revenues, metallic and non-metallic mineral revenues, water power rentals, other provincial taxes, and miscellaneous provincial revenues.

Table 2.2. Provincial Per Capita Notional Revenues Before and After Equalization, 1990-91

| Provinces | Notional revenue yield ^a | Equalization | Index of Tax capacity ^b | Index of fiscal capacity ^c |
|----------------------|-------------------------------------|--------------|------------------------------------|---------------------------------------|
| Newfoundland | 2,898 | 1,686 | 0.63 | 0.93 |
| Prince Edward Island | 2,988 | 1,595 | 0.65 | 0.93 |
| Nova Scotia | 3,517 | 1,066 | 0.76 | 0.93 |
| New Brunswick | 3,295 | 1,288 | 0.71 | 0.93 |
| Quebec | 3,973 | 610 | 0.86 | 0.93 |
| Ontario | 5,085 | ... | 1.10 | 1.03 |
| Manitoba | 3,737 | 847 | 0.81 | 0.93 |
| Saskatchewan | 4,058 | 525 | 0.88 | 0.93 |
| Alberta | 6,306 | ... | 1.36 | 1.28 |
| British Columbia | 4,808 | ... | 1.04 | 0.97 |

a/ Per capita yield of tax bases at national average tax rates.

b/ Notional revenue before equalization relative to the national average.

c/ Notional revenue yield after equalization relative to the national average.

Source: Broadway and Hubson (1993), p.59.

In most cases the determination of tax bases is relatively straight forward, based on provincial data. The most complex calculation involves the determination of the property tax base. Because assessment practices vary markedly from province to province, a standardized base cannot be inferred from provincial data. Instead, the value of land and capital in residential property, commercial, industrial and federal property, and farm property must be calculated by province. In the case of residential property, the value of buildings in residential use is calculated as a percentage of the value of the total residential capital stock. The value of land in residential use is calculated as a percentage of personal disposable income (net

of indirect taxes) weighted according to the degree of urbanization and the share of residential capital in determining the remaining components of the property tax base.

Established Programs Financing (EPF). EPF transfers are made on an equal per capita basis to all provinces. This program is based on the terms of the Federal-Provincial Fiscal Arrangements and Federal Post-Secondary Education and Health Contributions Act of 1977. The federal government has provided each province with a total tax abatement of equalized under the terms of the equalization program. Specifically, the procedure involves three steps:

Step 1. Calculate each province's total per capita entitlement, which is the same for all provinces. It equals the national average per capita federal contribution to shared-cost programs in 1975 plus \$20 per capita for Extended Health Care Services (starting in 1977), escalated to the current year by the growth in the Canadian economy, as measured by GNP per capita. Beginning in 1986, the rate of escalation was reduced to two percentage points below the GNP escalator. The 1989 federal budget reduced the rate of escalation to three percentage points below the GNP escalator. However, this was suppressed by the Expenditure Control Plan. As part of the Expenditure Control Plan, from 1990-91 to 1994-95, the per capita entitlement is frozen at its 1989-90 level. In 1994-95, the total per capita entitlement is \$735.

Step 2. Calculate the per capita values of tax transfer to provinces (13.5 percentage points of personal income tax revenue and 1 percentage point of corporate income tax revenue) and the equalization associated with it. This amount is paid to provinces under the equalization program.

Step 3. Subtract the equalized tax transfer (amount calculated from step 2) from the total entitlement per capita (calculated in step 1), and the remainder is paid to each province in cash (Shah 1995, p.245).

Thus, although total per capita transfers will be the same for all provinces, the per capita cash transfer may differ depending on the per capita equalized value of the tax abatements to provinces. In addition, the cash transfer to Quebec is reduced by the calculated value of the special abatements in lieu of EPF cash.

Provinces are given complete flexibility in the allocation of block transfers under EPF across the areas covered--health care and post-secondary education. Provinces must, however, adhere to federal standards in health care and technically demonstrate that federal funds have indeed been spent within the designed areas. In fact, the latter requirement is virtually meaningless since the amount of the transfers themselves has been less than the amount of provincially funded expenditures in these areas. It is practically impossible to determine the extent to which funds meant to be used for health care and post-secondary education have actually contributed to expenditures in these areas rather than being diverted to other uses.

Canada Assistance Plan (CAP). Canada Assistance Plan (CAP) evolved from the federal-provincial shared-cost programs that existed in the areas of old age assistance, blind persons allowance, disabled persons allowance, and unemployment assistance. Currently, the CAP encompasses not only those four categories of assistance but also assistance to any other persons who require public support,

such as needy mothers, dependent children, homes for special care, nursing homes, homes for unmarried mothers, hostels for transients, child-care institutions, work activity programs, and welfare programs for native people. The costs of direct financial assistance, welfare services, and administrative costs are eligible for subsidy. Capital costs and the operating costs of plant and equipment, however, are not. The primary advantage of the CAP is that it leaves wide discretion to the provinces in the allocation of expenditures to particular areas of social assistance in accordance with provincial circumstances.

Grants under the CAP are matching and open-ended. The federal government pays 50 percent of all provincial expenditures for assistance to persons in need and for welfare services. Provincial welfare expenditures must meet only a few requirements to be eligible for federal grants. The provinces must agree to meet adequately the basic requirements of the recipients, including food, shelter, clothing, fuel, utilities, household supplies, and personal requirements. The only "eligibility" requirement is that of the individual recipient (as opposed to the income or means test). In addition, no residence requirement may be imposed as a condition of receiving aid. Provinces are free to choose their own rates and categories of assistance, since federal support is completely open-ended.

2.3. Australia

In Australia, the tax bases of the federal and lower level governments (state and local governments) are divided in such a way that the federal government receives about two thirds of the total government revenues. In terms of expenditure, however, the federal government spends only one third of the total government revenues. This means half of the federal government revenues are distributed through various forms of transfers to the state and local governments. As in other western countries, the Australian federal government grants to lower level governments include general purpose grants and specific purpose grants. In 1994-95, about 47 percent of the total federal transfers are general purpose grants and the rest are specific purpose grants (Rye and Searle, 1996). This section focuses on the mechanism of the general purpose transfer.

The federal grants to lower level governments are administered by the Commonwealth Grants Commission established in 1933. This commission consists of three federal appointees. Mainly due to its long history, it has received substantial attention by scholarly studies worldwide. The Commission has been commented by foreign observers as, for example, "a model in the international context for the objective appraisal of spending needs." (Bird, 1986). Many countries that developed their formula-based transfer systems later has adopted methods substantially similar to those used in Australia.

Currently, the Grants Commission distributes general purpose grants using a system that measures the states' fiscal capacities and fiscal needs.⁵ The objective of this system is to make it possible for any state with reasonable tax efforts to provide the level of public services not substantially below other states. The formula used for calculation the distribution has several alternative presentations, which are

⁵ The idea to base grant distribution on fiscal needs was developed in as early as 1936.

mathematically equivalent. According to one presentation, the entitlement to state i can be written as follows:⁶

$$\text{entitlement}_i = \text{standard financial assistance} + \text{special revenue needs}_i + \text{special expenditure needs}_i - \text{assessed needs met by specific purpose transfers}_i$$

where

$$\text{standard financial assistance} = \text{an equal per capita grant}$$

The amount of standard financial assistance is determined based on the difference between the total expenditures and revenues of the states, and adjusted for the center's resource availability for transfer. The objective of the standard financial assistance is to close the vertical fiscal imbalance (the fact that the states' total expenditure is higher than their total revenue) for the states as a whole, without adjusting for the specific needs arising from individual states' revenue and expenditure situations.

$$\text{special revenue needs}_i = P_i (R_s/Y_s)(Y_s/P_s - Y_i/P_i) = P_i (R_s/P_s)[1 - (Y_i/P_i)/(Y_s/P_s)]$$

where P_i is the population of state i , R_s is the total revenue of all the states, Y_s is the total tax bases of all the states, R_s/Y_s is the national average effective tax rate (standard tax effort), P_s is the country's population, Y_s/P_s is national average per capita tax base (standard tax capacity), Y_i is the tax base in state i , and P_i is the population of state i , and Y_i/P_i is per capita tax base of state i (own tax capacity). If $(Y_i/P_i)/(Y_s/P_s) < 1$, that is, state i 's tax capacity is lower than the national average, then the state will receive a positive entitlement as special revenue needs, and vice versa.

Special expenditure needs of state i is the sum of the needs of many expenditure categories of that state. In each category, the need is calculated using the following formula:

$$P_i (E_s/P_s) (\gamma_i - 1)$$

where P_i is the population of state i , E_s is the total expenditure of all the states, E_s/P_s is per capita standard expenditure. γ_i is the category disability ratio of state i , which measures the extend to which state i 's need differs from the standard. Generally, a state's category disability ratio is calculated by combining (usually by multiplying but sometimes by adding) individual disability factors which express relevant cost influences as a ratio of the Australian average. The general formula for most individual disability factors can be written as:

$$\gamma_i = \text{disability factor of state } i = (x_i/P_i)/(x_s/P_s)$$

⁶ See Commonwealth Grants Commission (1996), pp.65-66.

where x_i and x_s are measures of a cost influence for state i and the total of the cost influence for all states. There are some exceptional cases where category disability ratios are expressed in the equal per capita method or actual per capita method.⁷

The 11 expenditure categories and the factors that used to determine the disability ratio in each category are as follows:

Welfare: relevant population, administration scale, age/sex, dispersion, input cost, social-economic composition

Cultural and recreation: administration scale, cross-boarder, dispersion, input cost, land rights, national capital, sacred sites, social-economic composition, transient population, combined urbanization and physical environment

Community development: administration scale, input cost, land rights, national capital, social-economic composition, stage of development, urbanization

General public services: administration scale, dispersion, expenditure relativities, input cost, land rights

Services to industry: administration scale, dispersion, expenditure relativities, input cost, land rights, physical environment

Education: relevant population, administration scale, age/sex, cross-boarder, dispersion, economic environment, grade cost, input cost, physical environment, service delivery scale, social-economic composition, urbanization, vandalism and security

Health: administration scale, cross-boarder, dispersion, inpatient services, input cost, non-inpatient services, combined age/sex and social economic composition

Law, order and public safety: relevant population, administration scale, age/sex, commonwealth offenders, cross-boarder, dispersion, input cost, land rights, national capital, physical environment, service delivery scale, social-economic composition, transient population, urbanization, vandalism and security, combined age/sex and social economic composition

Transport: administration scale, dispersion, input cost, land rights, road length, road usage, social economic composition

Economic affairs and other purposes: administration scale, dispersion, expenditure relativities, input cost, physical environment, social-economic composition

⁷ See Rye and Searle (1996) for details.

Trading enterprises: relevant population, administrative scale, expenditure relativities, input cost, interest, land rights, physical environment, service delivery scale, social economic composition, urbanization, vandalism and security

The main difference between the Australia model and that used in Canada is that the Australian model takes both expenditure needs and fiscal capacities into account, while the Canadian model considers revenues only.

It was decided in 1988 that every five years the Grants Commission would conduct a major review of the existing grant distribution method. The first such review took place in 1993. Between two major reviews, the Grants Commission updates the coefficients used in the formula based on most recent data. These data are often calculated as moving averages of the last three years.

2.4. Germany

Compared with other countries, a unique feature of the German tax assignment is that all major taxes are shared by the federal and state governments. These shared taxes include the personal income tax, corporate income tax, and VAT. Altogether these shared taxes amount to about two thirds of tax revenues in the country. The main federal taxes are the excises on mineral oil, tobacco, and alcohol (except beer). The states only have minor taxes such as the motor vehicle tax and net wealth tax. The local governments levy property taxes and receive income from user charges. In 1990, about 64 percent of the state revenues came from shared taxes and 15 percent from federal grants. For the local governments, 30 percent of their revenues came from shared taxes and 22 percent from federal grants.⁸

If revenue sharing is included, Germany has three schemes of intergovernmental transfer: revenue-sharing, the interstate equalization payments, and the supplementary grants. All these transfer schemes are administered by the Ministry of Finance.

Revenue sharing. VAT sharing is the most important tax sharing arrangement in Germany and is primarily an equalization scheme. Currently, 44 percent of VAT is assigned to the states. Among this, 75 percent of the state share of VAT is distributed to states on an equal per capita basis--a measure that is of course equalizing. The remaining 25 percent are distributed to states with below-average tax capacity (per capita revenues) to enable them to achieve 92 percent of the national average. In addition to the VAT sharing, 42.5 percent of the personal income tax and 50 percent of the corporate income tax are distributed to the states. But these two taxes are shared on the basis of derivation, thus having no equalization effect.

Interstate equalization payments. The direct transfer scheme, named interstate equalization payments, were first introduced in Germany in 1951 as a form of compensation for the "special burdens" borne by certain states with respect to refugees, harbor maintenance, and so on. In 1955, these payments

⁸ See Spahn (1995), p.141.

were given a constitutional basis in Article 107, which provided that the revenue received by the states should be adjusted to offset differences in their tax capacity, although still with some allowance for the special burdens facing particular states. The federal law currently regulating these interstate transfers --the Financial Settlement Act--was passed in 1969 and revised in 1977 (Bird, 1986).

Currently, the interstate equalization formula is as follows (Shah, 1994a):

$$E_i = ATC_i - NEED_i$$

where ATC_i is the adjusted taxable capacity of state i , and $NEED_i$ is the fiscal need of state i .⁹ If $E_i > 0$ then state i contributes to the equalization pool; if $E_i < 0$, then it receives transfer from the pool.

Fiscal capacity, or adjusted taxable capacity is defined as:

$$ATC_i = TC_i - SB_i$$

where TC_i is taxable capacity and SB_i is special burden of state i . Taxable capacity is calculated by adding revenues from state taxes, the state's share of the joint taxes according to local yields, and half the property and trade taxes of municipalities according to local yields and uniform assessments. The disbursement of the transfers to the states are initially based on taxable capacities using forecasted tax bases, but an adjustment is made when actual figures of the tax bases become available. Special burden is the deduction to be made for extraordinary expenditures facing a particular state. It is constant in Deutsche Mark terms and is embedded in the Law of Fiscal Equalization.¹⁰

Expenditure need is defined by

$$NEED_i = (\sum_j TC_j / \sum_j POP_j)(PDC_i)(POP_i)$$

where $\sum_j TC_j / \sum_j POP_j$ is the national average per capita revenue, POP_i is the population of state i . $\sum_j TC_j / \sum_j POP_j$ is used as a proxy of per capita standard expenditure need. PDC_i is the weighted population index of the state i . For city states, the weight is 1.35; for municipalities, the weights are graduated between 1.0 and 1.3 (according to the population of the municipalities). Note that this approach to determining "need" is much simpler than those used in Australia or Japan and, as a result, the German interstate transfer system is nearly a pure revenue equalization scheme.

⁹ Prof. Paul Bernd Spahn of University of Frankfurt refers to NEEDS in this equation as "fiscal yardstick," because the method to determine NEEDS considers very few factors and, as a result, the interstate transfer system is almost a pure revenue equalization scheme.

¹⁰ There is only one important category--the maintenance of harbors--in determining the special burden. Correspondence with Prof. Paul Bernd Spahn.

Supplementary grants. In addition to the VAT sharing and interstate equalization scheme, the federal government offers additional grants to the states. These include: grants to lift up financially weak states (east and west) to 90 percent of the average fiscal capacity, about DM 5 billion in 1996; grants to Eastern States at a minimum of DM 14 billion a year, until the year of 2004; grants to some financially weak Western States to compensate partly for the revenue losses due to the integration of the Eastern States into the interstate equalization scheme, at DM 1.2 billion each year, for a ten year period; grants to the States of Bremen and Saarland to help them deal with debt service problems, at DM 3.4 billion, from 1994 to 1998; grants to some smaller Eastern and Western states at DM 1.5 billion each year.

Upon the German unification, in 1990, the states in the Western Germany refused to accept the Eastern states to join the interstate equalization program. Accepting the Eastern states meant all the recipient states in the west would become contributing states. As a compromise, the German Unity Fund was established to assist the poor Eastern states. This fund had DM16.1 billion and was distributed to the Eastern states during 1990-95. Sources of the fund include contributions from the federal government (5 billion), the states' budgets (1.6 billion), and borrowing from the capital market. The fund is distributed to the states based on an equal per capita basis, and 40 percent of these distributions must be further distributed to the municipalities (Spahn 1995). This temporary program was terminated by the end of 1995 and currently all the Eastern states are incorporated in the standard equalization schemes.

The following table shows the significant equalization effects of the three transfer schemes. According to an estimate for 1996, the Western states' per capita own revenue will be DM 3705, while that of the Eastern States will be DM 2030. After equalization, the Western States' per capita revenue will be DM 5510, and that of the Eastern States will be DM 5190.

Table 2.3. Per Capita Revenue Relative to the National Average before and after Transfers: Estimates for 1996

| | Own Revenue | After VAT sharing | Interstate Equalization | Supplementary Grants |
|----------------|-------------|----------------------|----------------------------|-------------------------|
| Western States | 11% | 5% | 2% | 1% |
| Eastern States | -39% | -18% | -7% | -5% |

Source: Data provided by Prof. Wolfgang Föttinger.

2.5. The United Kingdom

Unlike federally structured states such as American, Canada, and Germany, the United Kingdom is a unitary state in which local governments derive their powers and functions from the central government. The central government can, at any time, by the ordinary process of legislation, change the powers of local authorities or abolish them altogether.

The local government system in the United Kingdom experienced several phases of re-organization over the past decades. It was reorganized by the Local Government Acts in 1972 (for England and Wales) and 1973 for Scotland. These acts created a two-tier local government system. The largest units of local government were the county councils or, in Scotland, the regional councils.

Within the geographical area they covered were district councils. In 1985, the Local Government Act abolished the county councils of London and the major cities, and transferred most of their functions to the lower tier district councils. In 1991, the British government re-examined this structure and the reviews undertaken has led the government to favor a general move towards single-tier authorities in order to reduce bureaucracy and cost and improve the coordination and quality of services. However, no concrete measure has been taken in this direction.

The central government retains almost all major taxes--e.g., personal income tax and corporate income tax--except the council tax (local residential property tax). Revenue for local authority in the United Kingdom can be grouped under three broad heads: grants-in-aid from the central government, property tax, fees and charges on services provided by local governments--trading profits, rent, interest and miscellaneous charges--of which the largest component is council house rents. Grants from the central government are necessary because the division of tax powers between levels of government leaves the local authorities with very limited fiscal resources.

There are basically two types of grants: general purpose grants and specific purpose grants. The general purpose grant has existed since 1929. In 1967, it was renamed the Rate Support Grant (RSG); in 1990, it was renamed the Revenue Support Grant; and this system continues to operate today. The general purpose grants are mainly used to address the issue of regional inequality. The higher the ratio of need to resources available to a particular local authority, the more grant aid it receives. The specific purpose grants are used to address the spill-over or externality effect of specific projects, such as roads, education, and social welfare.¹¹

In the fiscal year of 1995-96, the amount of general purpose transfers amounted to about 28 billion pounds, including 10 billion of non-domestic rate (tax on business properties, or business tax, collected by the local authorities, remitted to a national pool, and then transferred back to localities based on their populations and a common amount per head of population.) and 18 billion of RSG, the main equalization transfer. In the same year, the specific purpose grants totaled approximately 16 billion pounds, including 4 billions of matching grants to programs such as subsidies to handicapped and mentally-ill people, teachers training programs, and 12 billions on agency delegated functions such as living expense subsidies to students in high education, housing benefits to low income people, etc. The matching grants use various different matching rates, examples of which are 50 percent, 60 percent, and 100 percent from the center.

The Revenue Support Grant. RSG assumes overwhelming importance within the provision of general purpose grants. The formula used calculate the entitlement of each locality consists of three

¹¹ These arrangements, as described in this and the following paragraphs, operate within England. There are similar but separate arrangements within Wales and Scotland. Northern Ireland has a different system, reflecting the limited functions of the local authorities there.

elements: Standard Spending Assessment, which measures the locality's expenditure needs; standard local tax income, which measures the locality's tax capacity; and income from non-domestic rates, another type of transfer from the center. The formula is as follows:

$$\text{RSG} = \text{SSA} - \text{standard local tax income} - \text{income from NDR}$$

RSG is distributed so that if all local authorities were to spend at the level of their SSA then broadly the same level of council tax could be set in all areas for dwellings in the same valuation band (of local residential properties). Consequently RSG equalizes for the differences in assessed costs between areas (the SSAs) leaving council tax payers everywhere able to pay broadly the same council tax for their valuation band and receive the same standard of service.

An Standard Spending Assessments (SSA) is the national government's assessment of the appropriate amount of revenue expenditure which would allow the authority to provide a standard level of service, consistent with the government's view of the appropriate amount of revenue expenditure for all local authorities. The calculation of an authority's SSA follows general principles applied equally to all authorities and takes account of each authority's demographic, geographic, and social characteristics. Differences in SSAs between authorities with the same service responsibilities are thus due solely to differences in their underlying characteristics.

The standard local tax income is calculated based on the centrally-set rates on local residential property tax (e.g., 551.55 per band D dwelling) and the previous year's local tax base reported by the local authority. Income from Non-domestic Rates (NDR) is another type of transfer, the standard amount of which is 233.95 per head. The RSG formula is in effect calculating the gap between the standard expenditure needs and the revenues sources (including transfer from DNR income) of a locality.

The most complicated part is the calculation of SSA. SSA of each locality is broke down into seven fields of expenditure need. These seven fields are education, social services, highway maintenance, police, fire, capital expenditure (debt payment for principal and interest) and other services. Other services mainly include local planning and development control, collection of council tax, administration of housing benefits, museums, parking control, local support for the arts, registration of voting, libraries, local (Magistrates) courts, subsidies for buses, garbage disposal and collection. For each of these seven blocks, there are many elements (factors) that should be considered to determine the amount of need.

Education

- Number of school pupils
- Number of school pupils who have special needs (pupils born outside the United Kingdom and English as the second language, children from single parent families, children from low income families, etc.)
- Free meals (children from low income families)
- Cost differentials across regions (average earning--reflecting wage level for school teachers, property cost--reflecting rent for school buildings, sparsity--reflecting the need to subsidize children who travel distance to schools)

Highway Maintenance

- The length of existing roads of different types (major road versus small roads)
- Cost adjustment factors (mainly wage level)

Social Services

There are three sub-blocks:

Age structure

- Number of elderly people (over 65, 75 and 85. Each category has a different weight, and the relative weights are: 1 for people of age 65-74, 5 for people of age 75-84, 21 for people of age 85-)

Children

- Number of children of single parent families
- Number of children with low income families
- Number of children living in rented accommodations
- Number of children of homeless families
- Population of non-white ethnic minorities

Other Social Services

- Population between age 18-64
- Number of mentally ill people
- Number of physically handicapped people
- Population living in overcrowded accommodations
- Population living in rented accommodations
- Families sharing properties with others
- Population of ethnic minorities

Fire

- Resident population in the area
- Number of fires last year
- Density of population
- Properties of high risk (e.g., chemical plants)
- Length of coastal line in the area

Police

- Population in the area
- Number of calls to police in the previous year
- Number of crime in the previous year
- Volume of traffic
- Population living in overcrowded accommodations
- Population living in rented accommodations
- Families sharing properties with others
- Population density
- Road length
- Security expenditure need (e.g., national government located in London)

Other Services

- Population
- Population density
- Area cost (average wage and rent)

Capital Expenditure

- Principal and interest repayment for the amount of debt allowed by the center

The assessment of local expenditure need in each field is based on a formula that incorporates the respective factors. Most formulas consists of a client group (measurement unit) multiplied by the unit cost for the client group. For example, the number of students is the client group and per student expenditure is the unit cost in the case of education. Adjustments are made to some assessments to take account of the differences in the extra cost of providing a service which result from variations in additional needs (cost adjustment). For some assessments, regression analysis has been used to determine the relative weights of the factors in the formulas (Department of the Environment, 1995). For others, weights are assigned based on the designers' judgement and their consultation with local authorities.

2.6. India

Intergovernmental fiscal transfers from the central government to the states in India go as far back as 1919, and experienced many changes since the independence of India in 1947. As in other countries, the purposes of India's fiscal transfer system today include correcting vertical fiscal imbalances between the federal and the states and correcting horizontal imbalances in fiscal capacity among the states. These two aims are not always independent of each other and have both been integrated into the actual operation of the system.

The indian intergovernmental transfer system consists of three elements: (1) A general purpose grants mechanism designed to assist the backward areas using states' shares of income taxes and excise tax (a revenue-sharing scheme). This system is operated by the Finance Commission. Transfers via the

Finance Commissions declined from 65 percent during 1969-74 to 58 percent of total net transfers in 1992-93 (World Bank 1995, p.44). (2) Transfers from the federal government to state development plans. Such transfers are authorized by the Planning Commission, whose major responsibilities include formulating national five-year plan as well as annual plans. The plan transfers consist of formula-based unconditional transfers and specific purpose transfers some of which are matching grants. In 1992-93, transfers authorized by the Planning Commission amounted to 38 percent of the total transfers (World Bank 1995, p.45). (3) Local government borrowing authorized by the central government. These are not transfers in the strict sense.

The following table provides a summary of the relative magnitude of the three types of transfers.

Table 2.4. The Composition (%) of Transfers from the Center to the States, 1969-93

| | Finance Commission Transfers | Planning Commission Transfers | Other Transfers |
|---------------------------|---------------------------------|----------------------------------|--------------------|
| Fourth Plan (1969-74) | 64.6 | 24.4 | 11.0 |
| Seventh Plan (1985-90) | 61.0 | 35.1 | 3.1 |
| 1992-93 | 58.9 | 38.3 | 2.7 |

Source: World Bank (1995), p.45.

The Finance Commission, which is appointed every five years, is the agency that suggests the method for allocating the transfers based on revenue-sharing. It is not a standing body, however; it is dissolved after it has made the recommendation on transfer formula. Since the independence of India, there have been ten Finance Commissions, and the transfer formula suggested by the Tenth Finance Commission will cover the period 1995-2000 (Gurumurthi 1995). Currently, the pool used for transfers allocated by the Finance Commission consists of 85 percent of income tax and 45 percent of union excise duty. The tenth Finance Commission has proposed that for fiscal year 1995-96 the pool includes 47.5 percent of the reformed union excise duty (MODVAT) and 77.5 percent of income tax.

On the distribution method, all the commissions up to the Eighth Finance Commission (1984) followed what is known as the "gap-filling" approach. This consists of assessing the revenue receipts and expenditure based on the actual numbers and recommending non-plan deficit grants to fill the financing gaps arrived at on this basis. This approach has encouraged the state governments to understate the predicted growth of their own tax revenues, to increase their commitments on non-plan expenditure, and to run deficit budgets in the expectation that their financing gaps would be filled by grants from the Finance Commission. Apart from encouraging inefficiency, this approach also resulted in relatively better off states qualifying for such grants while some poor states were not eligible (Gurumurthi 1995).

The tenth Finance Commission has suggested that the allocation adopt the following new criteria: (a) 20 percent on the basis on population; (b) 60 percent on distance of per capita income from the highest income

major state; (c) 5 percent on the basis of infrastructure; (d) 5 percent on the basis of the area of states subject to certain normative limits; and (e) 10 percent on the basis of tax effort defined as the ratio of per capita own tax revenue to the square of per capita income. This formula differs from the previous ones by reducing (for income taxes) the weight of population; increasing the weight given to "distance" of per capita income; introducing a weight for infrastructure; and removing the "gap filling weight." (World Bank, 1995, p.57) It is expected that this formula will strengthen the redistribution function of the Finance Commission transfers.

The detailed procedure for applying the above formula is as follows:¹²

Step 1. Divide the whole pool for transfers into five parts, 20%, 60%, 5%, 5%, 10%.

Step 2. Allocate 20 percent of the pool on the basis of population. That is, the *i*th state gets P_i/P of the 20 percent, where P_i is the *i*th state's population, and P is the country's total population. The population figures used are those in the 1971 Census.

Step 3. Allocate 60 percent of the pool on the basis on income distance. The respective "distances" are multiplied by the population of the states and the share of each state is obtained by dividing the product for that state by the sum of the products for all states. That is, the *i*th state gets $P_i D_i / \sum_j P_j D_j$ of the 60 percent, where P_i is the *i*th state's population, and D_i is the per capita income distance of the *i*th state from the state with the highest per capita income (Goa in the case of the Tenth Commission). Goa is taken to be the same as for the state with the second highest per capita income (Punjab) from that of the next one (Maharashtra) since otherwise Goa will not get any share at all.

Step 4. Allocate 5 percent of the pool on the basis on area, i.e., the *i*th state gets A_i/A of the 5 percent, where A_i is the *i*th state's area, and A is the country's total area. An adjustment is however made so that no state gets a share higher than 10 percent or less than 2 percent.

Step 5. 5 percent for infrastructure is on the basis of an aggregate index computed by an expert group. The details are given in Appendix 5 to the Tenth Commission's report.

Step 6. 10 percent for tax effort is allocated using the ratio of per capita own tax revenue to the square of per capita income with the respective products being scaled by population as in the distance criterion. That is, the *i*th state gets $P_i E_i / \sum_j P_j E_j$ of the 10 percent where E_i is the *i*th state's effort index defined as $E_i = (R_i/P_i)/(Y_i/P_i)^2$.

¹² The author would like to thank Mr. S. Guhan for providing me with detailed information on the Finance Commission formula.

The formula based plan transfers operated by the Planning Commission consist of about 30 percent grants and 70 percent loans. These grants and loans are distributed as packages to the state governments based on a formula, that is, the amount allocated to any recipient state includes 30 percent of grant and 70 percent loan; the state cannot just accept the grant without accepting the loan. The formula used by the Planning Commission to allocate the transfers is as follows:

Distribution is made with 60 percent weight for population, 25 percent for per capita state domestic product (SDP), 7.5 percent for fiscal management (include speed of utilization of committed foreign aid and the state's performance of revenue collection), and another 7.5 percent for special problems of states (using indicators of population control, literacy, and land reform). Of funds allocated on the basis of 25 percent weight attached to per capita SDP, 20 percent is given only to states with less than average per capita SDP on the basis of the inverse formula; and the remaining 5 percent according to the "distance formula." The inverse formula is given by:

$$(P_i/Y_i)/\Sigma(P_i/Y_i)$$

which is inversely related to the per capita income of a state. The distance formula is expressed as:

$$(Y_h-Y_i)P_i/\Sigma(Y_h-Y_i)P_i$$

where Y_i and Y_h denote per capita SDP of the i th and the richest state, P_i , the population of the i th state (Y_h-Y_i) in the case of the "h" state is computed as the difference between the highest and the next highest per capita SDP. This indicator increases as a state's distance from the richest state increases. These two formulas are clearly redistributive, but the weights given to them in the overall allocation formula are rather limited.

The application procedure of the Planning Commission formula is similar to that of the Finance Commission formula. The 20 percent for per capita SDP distributed under the inverse formula and 5 percent under the distance formula are scaled by population. 7.5 percent for performance takes into account (a) tax effort (b) fiscal management and (c) progress in respect of national objectives. The latter have been specified as population control and maternal and child health; universalization of primary education and adult education; timely completion of externally-aided projects; and land reforms. The 7.5 per cent for special problems is allocated on the basis of the Planning Commission's discretionary determination at the annual plan discussions with the States.

Some studies have shown that the transfer operated by the Finance Commission has been strongly redistributive, in the sense that the distribution is highly negatively correlated with per capita income of the states. But the redistributive role of the plan transfers is relatively weak (Sato, 1992), and in some years, the plan transfers might even be progressive, i.e, favoring high-income states rather than low-income states. It has also been suggested by some scholars that the two main transfer schemes are not coordinated and even contradictory in their objectives, and should be consolidated into one.

2.7. Japan¹³

As in many other countries, the fiscal relations between the central and local governments in Japan are markedly a vertical financial imbalance. In recent years, the central government has received tax revenues that exceeded its expenditure, while the local governments have received less than the amount needed to perform their functions. This imbalance can be seen from Table 2.5, which presents the relative share of all tax revenues and expenditures of the two levels of government. As suggested by the table, the central government has collected more than 60 percent of the total tax revenue every fiscal year since 1970, while it has expended less than 35 percent of the total tax revenue.

Table 2.5. Vertical Fiscal Imbalance (in percent)

| | Tax Revenue Received by | | Tax Revenue Spent by | |
|------|-------------------------|-------|----------------------|-------|
| | National | Local | National | Local |
| 1970 | 67.5 | 32.5 | 33.7 | 66.3 |
| 1980 | 64.1 | 35.9 | 23.1 | 76.9 |
| 1989 | 64.2 | 35.8 | 34.9 | 65.1 |

Source: Yonehara (1993).

Transfers from the central government to the local governments are the primary means to address the vertical imbalance, i.e., the gap between local governments' tax revenues and their expenditures. In Japan, there are five types of transfers from the central government to local governments: the local allocation tax, central government disbursement, local transfer taxes, special traffic safety disbursements, and transfers as a substitution for fixed-assets tax. Of these transfers, the local allocation tax and central government disbursements are the most important, and comprise about 90 percent of the total transfers from the central government to local governments. The local allocation tax is allocated to local governments to equalize their fiscal capacity and to ensure sufficient funds for the public services that local governments are required to provide. The number of central government disbursement programs exceeds one thousand. These disbursements cover almost all fields of local government activities including education, social welfare, public works, transportation, and regional development. The local transfer taxes are levied by the central government, which imposes them as local rather than as central taxes. The central government collects these taxes on behalf of local governments because of advantages in assessment and collection. In a sense, local transfer taxes can be viewed as local taxes that are delegated to the central government for their collection. The remaining part of this subsection discusses in detail how local allocation tax, central government specific purpose disbursements, and local transfer tax are implemented.

Local Allocation Tax: An Equalization Scheme

¹³ This section is based on Ma (1994), Yonehara (1993), Fujiwara (1992), and Ishi (1993).

The local allocation tax aims to equalize the fiscal capacities of local governments by supplementing the shortage of their tax revenues. This tax enables local governments to provide public services at the standard level prescribed by the central government. When a local government does not maintain the level prescribed for public services, or has paid an excessive amount for the services, the central government may reduce the local allocation tax for that local government.

Compared to other transfer schemes, the local allocation tax is the only equalization scheme in Japan. It is allocated both to prefectures and municipalities in the same way. Table 2.6 presents the distribution of the local allocation tax to prefectures and municipalities. The amount allocated to prefectures is slightly larger than the amount allocated to municipalities.

Table 2.6. Distribution of Local Allocation Tax among Prefectures (Per Capita base, in Yen), 1989

| | Index of Fiscal Capacity | Per Capita Tax Revenue (A) | Per Capita Allocation Tax (B) | (A)+(B) |
|----------------------------|--------------------------|----------------------------|-------------------------------|---------|
| High-capacity group | | | | |
| Tokyo | 1.527 | 324,898 | ... | 324,898 |
| Osaka | 1.102 | 145,185 | ... | 145,185 |
| Aichi | 1.075 | 143,109 | ... | 143,109 |
| Kanagawa | 1.051 | 115,614 | ... | 115,614 |
| Low-capacity group | | | | |
| Kochi | 0.224 | 58,973 | 192,572 | 253,545 |
| Shimane | 0.227 | 66,898 | 205,484 | 272,379 |
| Aomori | 0.244 | 54,837 | 152,677 | 207,514 |
| Akita | 0.250 | 59,201 | 160,437 | 219,638 |

Source: Yonehara (1993).

The local allocation tax is distributed mainly (94 percent) as an ordinary allocation tax and partly (6 percent) as a special allocation tax. The ordinary allocation tax is paid to local governments whose basic fiscal needs exceed their basic fiscal revenue. Generally, local governments located within large metropolitan areas have strong fiscal capacity compared with those in rural areas. Among the 47 prefectures, in fiscal year 1989, Tokyo had the highest index of fiscal capacity followed by Osaka, Aichi, and Kanagawa prefectures. The low-capacity groups are Kochi, Shimane, Aomori, and Akita prefectures (in ascending order of index fiscal capacity). The strong prefectures receive no allocation tax, while the low-capacity prefectures receive a large per-capita allocation tax. In Table 2.6, the top four prefectures and the bottom four prefectures in the ranking of fiscal capacity index are listed for comparison.

Mathematically, the formula to calculate the local allocation tax transfer to a locality is:

$$\text{Transfer} = \text{Basic fiscal needs (N)} - \text{Basic fiscal revenues (R)}.$$

However, the total amount of the ordinary allocation tax, which is calculated in advance, does not necessarily cover the aggregate amount of the deficiencies of local governments whose basic needs exceed their basic revenues. This being the case, some modification is necessary in the calculation of the total allotted amount by using an adjustment coefficient α . The actual amount of ordinary allocation tax to local governments is

$$\text{Actual transfer} = N - R - \alpha N$$

where α is chosen in such a way that the total amount of the actual transfers equal the predetermined amount.

Basic fiscal need is a standardized amount necessary to provide public services at the level prescribed by the central government. The total fiscal need of a local government is the sum of the basic fiscal need for each item of public service. These services include the operating and maintaining of police departments, fire departments, schools to provide compulsory education, as well as the construction of parks, roads, and bridges. In the calculation, "needs" do not have to correspond to actual expenditures by specific local governments, rather, reasonable and standard fiscal needs are calculated based the average condition of a "model local government."

At present, the model local government is conceived of as a prefecture with population of 1.7 million and an area of 6900 square kilometers. Similarly, the hypothetical municipality is assumed to have 100,000 people and an area of 160 square kilometers. In each case, a standard level and range of basic fiscal needs and revenues are assumed. In calculating the fiscal needs of a real local government, the fiscal activities of the government is divided into six categories. In the case of prefectures, the categories are: police, public works, education, welfare and labor, industry and economy, and the administrative functions. For each item, the basic fiscal needs are calculated according to the following equation, and the fiscal needs of a local government is the total needs for all the services.

$$\text{Basic fiscal need} = \text{unit of measurement} \times \text{modification coefficient} \\ \times \text{unit cost.}$$

In this equation, the unit of measurement is a figure that provides an appropriate measure for the cost of a particular service. For example, the number of police necessary for police protection, the number of residents requiring fire protection, or the length and area of roads within a district are examples of units of measurement. The basic fiscal need for a particular category is first calculated for a single unit of measurement for the model local government case. Because the cost of providing public services is affected by various factors such as geographical, social, economic, and institutional characteristics of each locality, modification coefficients are applied to the equation to adjust for these factors. The unit costs are calculated each fiscal year, taking into account the change in price levels and the change in the people's demand for the particular public service.

It is necessary to explain further the nature of the modification coefficients. Without modification, the results of the basic financial needs calculations would not always be precise, because they reflect only

aggregate figures of all indicators multiplied by unit costs, which is considerably different from the real picture. For example, when population is used as an indicator, the greater the population, the less the cost per unit. Likewise, unit costs must differ from one area to another must often be modified. Currently, modification coefficients are classified according to the following eight categories:

1. Class modification coefficients. A typical example is in calculating the financial needs of a high school. The indicator for a high school is the number of its students. However, educational expenses are likely to differ depending on the types of school (i.e., academic, engineering, agricultural). In such cases, class modification coefficients are applied to adjust for differences in unit costs.

2. Size modification coefficient. When economies of scale occur in the provision of public services, lower unit costs should be applied to local governments with larger population. For example, the per capita cost of hiring a mayor is smaller in a larger city than in a small city. For such adjustments, size modification coefficients are used.

3. Density modification coefficients. The unit costs of some services decrease as the population increases. For example, the unit cost (per capita cost) of a hospital is lower in a city with a population of 100,000 than in a town with a population of 1,000. The density modification coefficients are used for such adjustments.

4. Modification coefficients for special factors. These coefficients are designed to adjust for differences in unit costs that vary according to factors such as degree of urbanization, salary level, and housing allowance.

5. Modification coefficient for cold areas. This coefficient is used to reflect higher unit costs in cold areas due to additional expenses on heating systems, consumption of fuels, etc.

6. Modification coefficients to allow for rapid increases in the units of measurement. This coefficient is used to reflect the increase in basic fiscal needs such as city planning that would occur in case of rapid increase in population.

7. Modification coefficients related to rapid decreases in the units of measurement. This coefficient is applied, for example, to minimize any sharp reductions of the local allocation tax that would occur in the case of a rapid decrease in the population of a municipality.

8. Modification coefficients related to financial capacity. This coefficient is applied to reflect the higher fiscal needs of localities with higher debt service ratios.

Basic fiscal revenue is defined as general revenue that can be appropriated to meet the basic fiscal need. It is the sum of the local transfer tax (which will be discussed below) and a prescribed percentage of the standardized local tax revenue--80 percent for prefectures, and 75 percent for municipalities. The standardized local tax revenue is calculated by summing the products of local tax bases and the standard local tax rates prescribed by the center. Note that the basic fiscal revenue is not simply the total tax revenue. There are two reasons for adopting such prescribed percentages. First, it is impossible to measure

completely the basic financial needs of all local governments by a uniform formula. Many local governments have their own peculiar fiscal needs requiring a certain amount of tax revenues. Second, it is necessary to retain incentives for local governments to collect their own taxes. If total tax revenue was included in the calculation of basic fiscal revenue, any increase in local tax revenue would reduce the local allocation tax by the same amount, and this would serve as a disincentive for the local governments to collect taxes. On the other hand, all revenues allotted from the local transfer tax are included, mainly because it is collected by the national government and has no relation to the tax collection efforts at the local level.

The local allocation tax is essentially a tax-sharing grant. Article 6 of the Local Allocation Tax Law provides that this tax be the sum of specified percentages of major national taxes: 24 percent of the consumption tax, 25 percent of tobacco tax, and 32 percent of income tax, corporate tax, and the liquor tax. These percentages, however, are flexible. Paragraph 2 of Article 6(3) provides that if the amount of the local allocation tax is deficient, these percentages may be increased. In fact, when the local allocation tax was introduced in 1954, it consisted only of 20 percent of income tax, corporation tax, and the liquor tax.

The special local allocation tax compensates for shortfalls in the ordinary local allocation tax. Transfers are made in the following circumstances:

(1) When there are special fiscal needs not included in the basic fiscal needs. Examples are expenditures for local assembly elections (which take place every four years), for protection of historical properties, or for natural disaster relief.

(2) When local government tax-revenue estimates (estimated by the central government) are greater than actual local tax revenue. Overestimates of local tax revenue result in a decrease in the local allocation tax, and the shortfall is supplied by the special local allocation tax.

(3) When there are unforeseeable local government financial needs not included in the ordinary allocation tax arise. Ordinary local allocation tax is determined before the end of August, but sometimes substantial fiscal needs arise afterwards. Such cases result in transfer by a special local allocation tax.

Central Government Disbursements: Specific Purpose Grants

The most important instrument the central government has to influence the structure of local expenditures is the central government specific purpose disbursements. These disbursements are distributed under the condition that the recipient follows the directives issued by the central government. If a local government fails to observe central government directives, it may be requested to refund the disbursement in whole or in part.

The basic principle that underlies the central government control is uniformity throughout the country. The central government seeks to standardize local taxation as well as the distribution of public services. As a policy, the central government tries to treat all local governments equally. When a

department of the central government distributes a specific-purpose disbursement, it takes great care not to discriminate against any local government.

The specific purpose disbursements from the central government constitute a fairly large portion of the total revenue of local governments. For prefecture governments, the disbursements constitute about 17 percent of their total revenue in 1989. If we assume the average matching rate of the central government specific-purpose disbursements is one-third, about half of the prefecture government expenditures are for subsidized activities.

Table 2.7. Distribution of Central Government Disbursements for Specific Purpose, 1989 (Yen billion, percent)

| | Prefectures | Municipalities | Net total |
|--------------------------------------|-----------------|-----------------|----------------|
| Subsidies for compulsory education | 2,564.5 (36.40) | ... | 2,564.5 (24.7) |
| Livelihood protection | 178.3 (2.5) | 868.0(26.0) | 1,046.3 (10.1) |
| Welfare allowances for children | 124.2 (1.8) | 239.6 (7.20) | 363.9 (3.5) |
| Medical expenses for mental patients | 18.4 (0.3) | 10.9 (0.3) | 29.3 (0.3) |
| Welfare allowances for the aged | 43.4 (0.6) | ... | 43.4 (0.4) |
| Ordinary construction outlays | 2,457.3 (34.9) | 1,074.2 (32.2) | 3,531.5 (34.0) |
| Restoration work after disasters | 291.2 (4.1) | 105.9 (3.2) | 397.1(3.8) |
| Others | 1,277.5 (18.1) | 897.4 (26.9) | 2,174.9 (21.0) |
| Total (100.0) | 7,043 (100.0) | 3,333.1 (100.0) | 10,376.8 |

Source: Yonehara (1993).

The distribution of specific purpose disbursements in 1989 by categories established by the Ministry of Home Affairs is presented in Table 2.7. Nearly 34 percent of the total central government specific purpose disbursements (of both prefecture and municipal governments) are subsidies for ordinary constructions. These subsidies include grants for roads, bridges, parks, river banks, harbors and public housing. As a single program, that subsidizing the salaries of teachers engaged in compulsory education is the largest. In Table 2.6, this disbursement program is included in the subsidy for compulsory education disbursed to prefectures. For municipalities, the largest disbursement program is for ordinary construction.

Almost all special purpose disbursements are cost-sharing grants. They subsidize a certain percentage of the standard cost prescribed by the central government. The rate of subsidy differs from one program to another. For instance, the grant for teachers' salaries in public primary and junior schools

subsidizes 50 percent of the standard expenditures. The grant for livelihood protection subsidizes 75 percent of the standard expenditures. The subsidizing share is generally large for those programs that impose heavy fiscal burdens on local governments, or in which the central government has strong interests.

Conversely, the subsidizing share is small for programs that are inherently the functions of local governments. The grant rates of some typical local activities are as follows:

| Local Activities | Typical Grant Rates |
|---|---------------------|
| Capital Grants | |
| Local road construction | 1/2 |
| Local road improvement | 2/3 |
| River riparian works and dams | 2/3 |
| Port construction and improvement | 1/2 |
| Local airport construction and improvement | 3/4 |
| Sewage pipes | 2/3 |
| Sewage treatment plants | 1/3 |
| Public housing | 1/2 |
| Public health office appliances | 1/2 |
| Primary and secondary school building | 1/2 |
| High school buildings | 1/3 |
| Recurrent Grants | |
| National road maintenance | 1/2 |
| River maintenance | 1/3 |
| Primary and secondary school teachers' salary | 1/2 |

Source: Fujiwara (1992).

Generally speaking, local governments with strong fiscal capacities spend more on subsidized programs than local governments with low fiscal capacities. Thus, if the actual amount of expenditure was used as a base to calculate the subsidies, wealthy local governments would be subsidized more generously than poor local governments. This is one reason why central government specific purpose disbursements are now determined on the basis of standard costs prescribed by the central government. Occasionally, the local governments are known to criticize these standard costs as being too low.

Most of the central government special purpose disbursements are allocated among local governments at the discretion of the central government; there are only a few formula disbursements. Therefore, every local governments seeks to obtain specific purpose disbursements to the maximum extent possible. To that end, local governments spend time and energy on rent-seeking.

The procedure of allocating a particular specific purpose program is as follows: a local government submits an application for a disbursement to the central government; the application describes the project and explains the reasons for its importance; and the central government assesses all of the applications submitted by local governments and selects projects that receive grants. During this selection process, the

central government often requires modifications to a project so that it will conform with central government standards. Needless to say, almost all local governments accept the conditions required. Conditions accompanying the allocation of a specific purpose disbursement provide the central government with a powerful means of control over the activities of the local governments.

Local Transfer Taxes

In addition to local allocation tax and the central government specific purpose disbursements, the local governments also receive several relatively small transfer taxes from the central government. These transfer taxes include Consumption Transfer Tax, Local Road Tax, Petroleum Gas Transfer Tax, Motor Vehicle Tonnage Tax, and Aviation Fuel Transfer Tax. In 1990, they accounted for about 2.7 percent of total local revenues. Consumption Transfer Tax is the largest transfer tax among the five and is transferred to both prefectures and municipalities. Six eleventh the total Consumption Transfer Tax goes to the prefectures and five eleventh to the municipalities. Each local body receives the amount based on its population and the number of workers employed in its jurisdiction. This tax is earmarked for uses specified by the central government. Local Road Tax, Petroleum Gas Transfer Tax, and Motor Vehicle Tonnage Tax are all earmarked for road construction and maintenance. Aviation Transfer Tax is earmarked for the prevention of nuisance caused by flight noise and the improvement of the environment of airports.

2.8. Korea¹⁴

Intergovernmental fiscal transfer in Korea is administered through five major transfer mechanisms. They are (1) Local Shared Tax; (2) National Treasury Subsidy; (3) Local Transfer Fund; (4) Adjustment Allocation Grant; and (5) Provincial Government Subsidy. The first three transfers are distributed from the central to provincial governments, while the latter two are transfers from major cities or provinces to lower level governments. The Local Shared Tax and National Treasury Subsidy are the traditional means utilized by the central government to transfer certain fiscal resources to local governments. The Local Transfer Fund, introduced in 1991, can also be categorized as a mechanism to transfer a portion of the fiscal base of the central government to local governments except that the transfer is made directly out of national tax revenue without having the revenue accounted for first in the central government budget. According to the 1994 budget, Local Shared Tax accounted for 12.2 percent of total local government revenue, National Treasury Subsidy accounted for 7.5 percent, and Local Transfer Fund accounted for 5.0 percent. The last two mechanisms are the means used by the regional governments to transfer some of their fiscal resources to municipal districts, municipal governments, and the rural county governments.

Local Shared Tax. Very similar to Japan's Local Allocation Tax, Local Shared Taxes in Korea is divided into Ordinary Local Shared Taxes and Special Local Shared Taxes. Ordinary Local Shared Taxes, which comprise 10/11 of the total, are distributed on the basis of the pre-determined equalization formula.

¹⁴ The author would like to thank Dr. Jhungsoo Park of Korean Tax Institute for providing me with the most recent materials. Parts of this section draw from Kim (1994).

Special Local Shared Taxes, which comprise 1/11 of the total, is allocated on the basis of special needs of local governments.

The objective of Ordinary Local Shared Taxes is to equalize the fiscal capacities of local governments. Very similar to that in Japan, the equalization formula used to distribute Local Shared Taxes in Korea calculates for each local government the standardized fiscal needs, the standardized fiscal revenue, and their difference. The difference between these two figures signifies the standardized fiscal shortage of the local government and becomes the basis of actual allocation of Ordinary Local Shared Taxes. Calculation of the standardized figures and their adjustment for special local circumstances are all made on the basis of pre-determined formula for objectivity and transparency. The results of these calculations and actual allocation of Local Shared Tax among local governments are published annually for public inspection and scrutiny. While Ordinary Local Shared Taxes are unconditional grants to the local governments, Special Shared Taxes are conditional grants to supplement the operation of the Ordinary Local Shared Taxes.

The mathematical formula for the allocation of local shared tax is as follows:

$$\text{Fiscal Scarcity} = \text{Standard fiscal need (A)} - \text{Standard fiscal revenue (B)}$$

where A = Standard fiscal need + Supplemental need (standard fiscal need = sum of 29 itemized measuring unit x unit cost x supplemental coefficient); B = local tax revenue x 0.8.

The total amount to be transferred through local shared tax is predetermined (13.27 percent of the national tax revenues), and may not cover the total of local fiscal scarcities. Therefore, a percentage--distribution ratio--is used to multiply each locality's fiscal scarcity. The actual transfer to a locality is therefore the product of the distribution ratio and its fiscal scarcity. The distribution ratio is defined as:

$$\text{Distribution ratio} = \text{total transfer amount(C)} / \text{total fiscal scarcity}$$

National Treasury Subsidy. Like Japan's Central Government Disbursements, Korea's National Treasury Subsidies are categorical grants provided by the central government to local governments for specific projects. National Treasury Subsidies are classified into three categories: National Treasury Share, Promotion Subsidies, and Specific Grants. National Treasury Share is provided on the matching basis for natural disaster recovery projects and other construction projects. Promotional Subsidies are allocated to local governments to encourage them to undertake certain projects or to provide financial assistance for certain projects. Specific Grants are provided usually for the full cost of administering some national functions such as general election, military recruitment, etc.. In the 1994 budget, the National Treasury Subsidies reached 8.1 percent of local general account revenue and 4.3 of the central government general revenue.

Local Transfer Fund. Local Transfer Tax was introduced in 1991 to strengthen the local fiscal base and to ensure balanced regional development. The Local Transfer Fund Act stipulates that 50 percent of excess land tax, 80 percent of liquor tax, and 100 percent of telephone tax are the sources of Local Transfer Fund. The Act also specifies the distribution method and targeted projects for which the Local

Transfer Fund is to be used by local governments. The fund is transferred directly to local governments out of the designated tax revenue without first being accounted for in the central government budget.

In 1994, 70.5 percent of the Local Transfer Fund is to be used for local road maintenance. Other projects designated by the Act are regional development projects (17 percent), rural development projects (11.5 percent), and youth related projects (1 percent). The allocation formula for each local government is also specified in the Act. The fund for local roads are allocated on the basis of the proportion of the total length of local roads located within the jurisdiction of a local government. Other funds are allocated on the basis of the standardized fiscal shortage of local governments, approved local and national project plan, etc.

Fiscal Adjustment Grant. Fiscal Adjustment Grant is a transfer scheme introduced in 1988 for Seoul and five major cities to supplement and equalize the fiscal bases of autonomous districts in their cities. Fixed percentages of Acquisition Tax and Registration Tax are used to finance this grant. The percentages are determined in each city by the city ordinance. The allocation of the grant to each autonomous district is made by the formula modelled after Local Shared Tax. The grant supplements the general revenue of the district. In 1994, Fiscal Adjustment Grant is 17.4 percent of Seoul City's general account budget and 33 percent of its autonomous districts' general account budget. For five major cities together the grant forms 19.7 percent of the city budget and comprises 40 percent of the autonomous districts budget.

Provincial Government Transfer System. There are two forms of inter-governmental transfer system at the regional level. One is Provincial Subsidy, and the other is Tax Collection Grant. Provincial Subsidy is basically specific grant provided by the provincial government to municipal governments and rural county governments for specific projects. Tax Collection Grant provides 30 percent the provincial taxes to the municipal and rural governments as their general revenues. This system is in effect a form of tax-sharing scheme between the provincial governments and municipal and rural governments.

2.9. Indonesia¹⁵

Indonesia has probably one of the most centralized tax system in the world. The center collects more than two thirds of the total government revenue, and transfers more than half of the centrally collected revenues to subnational governments through grants. Currently central government grants finance about 65 percent of expenditure at the provincial level and 70 percent of expenditure at the district level. Currently there are two types of transfers--general purpose transfers and specific purpose transfers--from the center to provinces and districts.

General purpose transfers. In 1992/93, general purpose grants constituted 8.9 percent of provincial and 9.2 percent of local government revenues. These general purpose transfers are more like

¹⁵ This section is based on Zia (1993) and Shah et al (1994).

block grants in the U.S., which are subject to the some broad guidelines set by the central government. Four types of general purpose transfers are:

(1) Provincial Development Grant. This is a formula-based grant scheme, 85 percent of the funds are distributed by giving equal share to each province (In 1992/93, Rp. 22.5 billion each). The remaining funds are allocated in proportion to the total area of each province. Although the center has recently given the provinces more flexibility in the use of these funds, it still recommends that road maintenance should receive high priority.

(2) District Development Grant. This is again a formula-based grant scheme with two components: a minimum grant for each local government (Rp. 750 million in 1992.93); and a per capita grant (Rp. 4,000 in 1992/93). In 1992/93, the first component accounted for 11 percent and the second accounted for 89 percent of in total grant allocation. Projects are subject to approval by the provincial governor following evaluation by the Provincial Planning Board and Public Works Service Bureau. Funds are not transferred to local governments but are simply deposited with the local branches of Bank Rakyat Indonesia which pays approved contractors' bills. This is done to prevent diversion of grant funds to non-approved projects. Most of the funds from this grant program have been spent on local road renovations and improvements.

(3) Village Development Grant. This is an equal per village grant. In 1992/93, each village received Rp. 4.5 million. Development projects for financing by this program have to be approved by mayor/district chief.

(4) Less-Developed Village Grant. This is a per capita grant program initiated in 1994/95. According to a recent survey, 20,633 out of a total of 65,554 villages nationwide would be eligible for this grant. It is proposed that the village governments have full discretion in the use of the funds provided the follow the guidelines developed by the Planning Board in consultation with the Ministry of Home Affairs, the Ministry of Finance, and provincial governments. Some of the potential uses are : small scale credit for self-help housing and/or environmental improvements; technical materials and manuals to support self-help efforts to improve agriculture technology and/or introduce new agricultural activities, or to support small urban enterprise start-up; purchase of supplementary "strategic" medicines for preventive care or the treatment of endemic illnesses and epidemics; and installation of small-scale health-related infrastructure, such as drainage or waste water disposal facilities.

The Planning Board, Ministry of Home Affairs and Ministry of Finance will oversee this grant program, and funds will be disbursed by the Ministry of Finance, directly to the local level. The Kepala Desa/lurah will be the official at the local level responsible for immediate accounting for the use of the funds, subject to monitoring by the Bagian Keuangan, Dati II and overall scrutiny by the BPKP, the Government audit agency.

Specific purpose transfers. Specific purpose transfers account for about 80 percent of total central government transfers in 1992/3. The central government makes specific purpose transfers to both provincial and local government to finance primary education, health, transportation, and

reforestation/conservation. The four programs designed to assist the provincial governments are outlined in the following paragraph. Similar programs exist to assist the local governments.

(1) Subsidy for Autonomous Regions (SDO). This transfer program aims to create "financial balance" in autonomous regions. It finances staff expenditures of provincial and local governments to enable them to balance their budgets. In 1992/93, 88 percent of this grant are used to cover salaries, pensions and allowances of subnational officials of all ranks; 4 percent to use of routine expenditures of subnational government on centrally delegated functions; 3 percent on the operating costs of primary schools; 5 percent on items such as staff allowance to be paid to subdistrict level administration and for staff training and compensation.

(2) Provincial Road Improvement Grant. This grant is to develop and maintain provincial roads. Eligible expenditures include construction and maintenance of roads and bridges. The grant is based on a formula which takes into consideration the length and condition of the roads and the unit cost of construction and maintenance.

(3) Reforestation/Conservation grant. This program is intended to carry out reforestation, soil conservation and re-greening activities in environmentally critical areas. Grant allocation is made on a project-by-project basis.

(4) Counterpart Funds. These programs provide matching funds from the central government budget to meet matching funds requirements for externally funded projects on behalf of provincial and local governments.

PART III. LESSONS FOR OTHER COUNTRIES

This part attempts to draw a number of practical lessons for countries that intend to introduce a formula-based equalization transfer system. Based on a comparison of the nine countries' cases, Section 3.1 classifies the equalization transfer schemes adopted by different countries into several types and comments on the data requirement for each of these types. Section 3.2 discusses the methods to assess fiscal capacities and fiscal needs of subnational governments. Section 3.3 answers the question of whether fiscal equalization affects tax effort of subnational governments. Section 3.4 discusses possible data sources for the application of an equalization transfer formula. Section 3.5 turns to address the institutional requirements for developing a new transfer system. Section 3.6 discusses the transitional arrangements from an old, discretionary system to a new, formula-based system. The last section offers the concluding remarks.

3.1. Formulas for Equalization Transfers

Roughly speaking, there are four types of formula for equalization transfers:

Formula A. Formulas that consider not only the equalization of fiscal capacities, but also adjust for the expenditure needs of different regions. Applications of these formulas can be found in Australia, Germany, Japan, Korea, and the United Kingdom. Such formulas are demanding in terms of data requirement, particularly those on expenditure needs.

A typical formula of this type is as follows:

$$TR_i = N_i - C_i - OTR_i \quad (1)$$

where N_i is the fiscal need of the i th region, and C_i is the fiscal capacity of the i th region. $N_i - C_i$ measures the gap between the fiscal need and fiscal capacity (own sources of revenue). OTR_i represents other transfers (e.g., specific purpose transfers) the i th region receives from the center. This formula states that the central government transfer will fill the gap between each region's fiscal need and fiscal capacity, to ensure that a region with reasonable tax effort will be able to provide a reasonable level of public services.

There is a question of how to match the sum of the entitlements ($\sum_i TR_i$) calculated from the above formulas with the available pool for transfers. In theory, the pool can either be larger or smaller than the total entitlement. A commonly used method is to adjust the size of the transfer proportionally according to the size of the pool. Let TT be the size of pool for transfers. Then the actual transfer to the i th region is:

$$ATR_i = (TT/\sum_i TR_i)TR_i$$

where ATR_i stands for actual transfer to the i th region, and TR_i is calculated using equation (1).

Another way to match entitlements with funds available is to use a coefficient, α , in front of the fiscal gap, $(N_i - C_i)$:

$$TR_i = \alpha(N_i - C_i) - OTR_i \quad (2)$$

where α is chosen in such a way that $TT = \sum_i TR_i$. A variation of this method is to apply this coefficient to N_i , instead of $(N_i - C_i)$, that is,

$$TR_i = \alpha N_i - C_i - OTR_i \quad (3)$$

where α is chosen in such a way that $TT = \sum_i TR_i$.

A third way to match entitlements with funds available is to include a "standard transfer" in the formula:

$$TR_i = ST_i + N_i - C_i - OTR_i \quad (4)$$

where ST_i is the standard transfer to the i th region. It is calculated by multiplying a standard amount of per capita transfer with the population in region i . The standard per capita transfer can be positive or negative, and its magnitude is determined in such a way that $TT = \sum_i TR_i$.

Formula B. A formula that considers only the equalization of fiscal capacities. An example is the formula used in Canada. This type of formula has a relatively weak requirement for data and is easy to implement. But it ignores the potentially large differences in special expenditure needs across regions.

A typical formula of this type (often called representative tax system) is as follows:

$$TR_i = P_i (B/P - B_i/P_i)t \quad (5)$$

where TR_i is the transfer from the center to the i th region, P_i is the population of the i th region, B_i is the tax base of the i th region, P is the total population of the country, B is the total tax base of the country, and t is the country's average effective tax rate on the tax base. $B/P - B_i/P_i$ measures the gap between the national average per capita tax base and the i th region's per capita tax base. This formula states that the central government transfer will bring the fiscal capacity of the below-average region up to the national average.

In Canada, regions with below-average capacities ($TR_i > 0$) receive transfers from the central government, and regions with above-average capacities ($TR_i < 0$) receive no transfer but are not required to contribute to the pool for transfers. In Germany, however, the interstate equalization transfers are made directly across states--states with above-average capacities contribute funds to a pool that is distributed to below-average states.

A variation of this formula uses a different "average" per capita tax base as the bench-mark level for comparison. Namely, the national average B/P is replaced by the average of a group of regions. The selection of this group can be used as an instrument by the central government to adjust the intensity of the equalization effort. If the central government selects a group that yields a group average lower than the national average, the transfer scheme becomes less than "full" equalization and requires a smaller pool of fiscal resources.

An equalization transfer scheme based on this type of formula assumes that per capita fiscal needs of all the regions are the same. This is an over-simplification and may create a new source of regional disparity if the costs of providing public services differ vastly across regions. However, if a country has relatively insignificant regional cost differentials or data on such cost differentials are not available, this formula may be a convenient option to consider.

Formula C. Formulas that distribute equalization transfers based on some "needs" indicators. Fiscal capacity is not considered in these formulas often because such data are difficult to obtain. India, Italy, and Spain use this type of formula. There are varieties of indicators that can reflect the fiscal needs of regions, and the choices are very much dependent on the government's objectives as well as other historical and political factors. Typical indicators (often used in combination with weights) used to determine regions' fiscal needs include:

Per capita income level;

Poverty incidence;
 Unemployment rate;
 Population density;
 Area;
 Infant mortality;
 Life expectancy;
 School enrollment rate;
 Infrastructure (e.g., length of roads and railways);
 Other indicators of development level (e.g., electricity consumption and number of telephone lines).

What indicators should be chosen and how much weight each indicator should be given are highly sensitive questions and need to be answered with careful simulations and consultations with regional authorities.

Formula D. Formulas that distribute equalization transfers on an equal per capita basis. Such formulas are used in Germany's VAT sharing, Canada's EPF, England's NDR, and in a number of Indonesia's general purpose grants. Compared to the above three types of transfers, equal per capita transfer is least demanding for data, but has relatively weak equalization effects.

The simplest equal per capita transfer formula is as follows:

$$TR_i = P_i (TT/P) \tag{6}$$

where TT is total amount of transfer and P is total population eligible for the transfer program.

Equal per capita transfer cannot fully equalize but can mitigate regional disparity in fiscal capacity. To see this, suppose there are only two regions, region A and region B, with per capita tax revenues of \$1000 and \$2000 respectively. An equal per capita transfer of \$1000 reduces the ratio of region B's per capita tax revenue to that of region A from 2 to 3/2. But unless the per capita transfer is infinity, the ratio is always less than one (full equalization).

Comments: Type A formula provides the potential for full equalization. It is the most complex and perhaps most accurate one in measuring horizontal fiscal gaps, but is also most demanding for data. Types B and C each ignore a major aspect (capacity or need) of the horizontal equalization, and thus are less effective in addressing regional disparity issues. However, they require less data and may be appealing for countries that intend to start an equalization transfer system on an experimental basis. Type D is probably least effective in terms of equalization, but is also least demanding for data.

3.2. Measuring Fiscal Capacities and Fiscal Needs

The above subsection mentioned several times the fiscal capacity (C_i) and fiscal need (N_i) of a subnational government. This subsection discuss the details on how to estimate these variables.

Measuring fiscal capacity. Fiscal capacity is defined as the ability of a government to raise revenues from its own sources. There are several ways to measure the fiscal capacity of a subnational government. In many developed countries, fiscal capacity is measured using figures of major tax bases and standard (average) tax rates. This method measures the fiscal capacity of a region by the revenue that could be raised in that region if the regional government taxes all the standard tax bases with the standard tax effort. The formula is as follows:

$$C_i = \sum_j B_{ij} * t_j \quad (7)$$

where C_i is the i th region's tax capacity, B_{ij} is the i th region's j th tax base, and t_j is the standard (e.g., national average effective) tax rate on the j th tax base. It is important to apply the standard tax rate to the region's tax base rather than the region's own effective tax rate, in order to ensure that the regions with high tax efforts are not penalized and regions with low tax efforts are not encouraged. In other words, if the region's effective tax rates are higher than the national averages, the transfer it receives does not decrease as a result; if the region's effective tax rates are lower than the national averages, the transfer it receives does not increase as a result.

Applying this method involves several steps:

Step 1: Select the tax bases. In practice, information on some tax bases (e.g., numerous small tax bases) may not be available or is costly to obtain. Therefore, instead of exhausting all the tax bases, fiscal capacity is often measured using several major tax bases as a proxy. Personal income tax, corporate income tax, sales tax or VAT, property tax, and resource tax are the ones that are often used in assessing local fiscal capacities.

Step 2: Collect data on the selected tax bases. One can use the previous year's figures on tax bases. There are also cases where tax bases (e.g., property tax) are assessed every few years (say, three years) since an annual assessment may be too costly. Some of these data may be readily available from various departments of the central or subnational governments. If the data are provided by the subnational governments, it is important to have well established rules on the reporting and auditing procedures as well as penalties on false reporting.

Step 3: Select the standard tax rates. There are many different ways to calculate the standard tax rate on a particular tax base. Several examples are: (1) the effective tax rate of the whole country; (2) the arithmetic mean of all regions' effective tax rates; (3) the arithmetic mean of selected regions' effective tax rates.

Step 4: Calculate the fiscal capacities using equation (7).

The method described above requires detailed and accurate information on major tax bases, which may not be available in many countries. In such a case, fiscal capacity may be measured indirectly by employing some income or output indicators. The most frequently used indicators are:

(a) Gross Domestic Product (GDP) of the region. The region's fiscal capacity is measured by the product of its GDP and a standard revenue/GDP ratio, where this standard ratio can be the national average or an average of a group of regions. The main weakness of using the GDP indicator is that it ignores the fact that different structures of the regional economies may have important impact on the regions' abilities to generate revenues. For example, with the same level of per capita GDP, a region with a high percentage of agricultural production may have a lower revenue capacity than a region with a high percentage of high value-added manufacturing sectors. To mitigate this effect, one can conduct an estimation to determine to what extent other factors (such as the structure of the economy, degree of urbanization, etc.) affect the regions' fiscal capacities, and develop an adjusted model for fiscal capacity by incorporating a few more variables in addition to GDP.

(b) Personal income (sum of all incomes received by the residents) or disposable personal income of the region. The region's fiscal capacity is measured by the product of its total personal income and a standard revenue/personal income ratio. This is an imperfect measure of fiscal capacity since personal income is only one revenue source and may not be proportional to the sum of all tax bases.

(c) Total retail sales of the region. If consumption based taxes are important revenue sources of the region, it may be a good proxy of its total tax base. The region's fiscal capacity is measured by the product of its total retail sales and a standard revenue to total retail sales ratio.

It is important not to use the regions' actual revenue figures to measure their fiscal capacities. If the actual figures are used, the transfer a region receives from the center becomes largely a variable controlled by its own tax effort. The regions would thus have the incentive to under-collect their own revenues in order to attract more transfers from the center. The reason is straightforward: the more a region collects from its own sources, the high the measured fiscal capacity, and the less transfer it will receive. In some countries, this system has encouraged subnational governments to shift budgetary revenues to incomes outside of the budgetary system.

Measuring fiscal need. Broadly speaking, there are two methods used to determine fiscal needs of subnational governments. The first method, used by the United Kingdom, Australia, Japan, and Korea, divides the expenditures of a subnational government into many different categories and for each category estimates the need of this government. The total fiscal need of a subnational government is the sum of the estimated needs for all these categories. This approach involves the following steps:

Step 1: Divide the region's expenditures into several categories. The most commonly used categories include:

- Education
- Health
- Transportation
- Telecommunications
- Social welfare
- Police and fire

Environmental protection
Other Services

Of course, depending on the country's existing budgeting rules and data availability, the division of expenditure categories can have many variations. One can combine transportation with telecommunications, separate police from fire, divide social welfare further into many smaller items, divide education into primary, secondary, and post-secondary educations, etc.

Most countries' equalization transfer formulas take into account the needs for current expenditures (include maintenance of capital projects) but exclude those for new capital projects. The reasons are threefold: (1) capital projects are typically lumpy in size, and their expenditure needs may vary significantly from year to year; (2) it is difficult to find appropriate indicators that reflect the needs for new capital projects; and (3) most capital projects benefit users for many years and even generations. Requiring current tax payers to fully finance projects (as in the case of fiscal transfer) that mainly benefit future users is inconsistent with the "benefits principle" of taxation. In some countries (e.g., in Japan), however, local debt burden is considered part of the local expenditure needs. Since the limit on local borrowing imposed by Japan's Ministry of Home Affairs is proportional to local own revenue, its transfer formula effectively assumes that a locality's expenditure need for new capital projects is proportional to its fiscal capacity.

Step 2. Calculate the expenditure need for each category and then sum up these needs to get the region's aggregate fiscal need. An illustrative example is discussed below.

The general formula for calculating expenditure need in category i can be written as:

$$N_i = \text{Measurement Unit} * \text{Average Per Unit Cost} * \text{Adjustment Index}$$

where i standards for the i th expenditure category, such as education, health, transportation, etc. Measurement unit refers to the number of units that receive services from the regional government. Average per unit cost is defined as total local expenditure on category i divided by the measurement unit (e.g., the average per unit cost of primary and secondary education is the ratio of the total expenditure on primary and secondary education to the total number of students in the country). One can use the previous year's data in this calculation. Adjustment index is a combination of factors that differentiate the per unit cost of the service in the region from the national average.

(1) Primary and Secondary Education

Measurement unit = population of school ages (e.g, age 7-18)

Average per unit cost = the country's per capita public expenditure on primary and secondary education

$$\text{Adjustment index} = a_1 \text{WI} + a_2 \text{RCI} + a_3 \text{SDI} + a_4 \text{PFI}$$

where WI (wage index) = the ratio of teachers' wage level in this region to the national average;

RCI (rental cost index) = the ratio of per square rental cost in this region to the national average;
 SDI (student disability index) = the ratio of the percentage of students with physical disabilities in this region to the national average;
 PFI (poor family index) = the ratio of the percentage of students from low-income families in this region to the national average.

The weights attached to the four factors should add up to one, i.e., $a_1 + a_2 + a_3 + a_4 = 1$. These weights can be derived from an econometric estimation using cross-region or panel data (cross region and time series) from the past years. Shah (1994a) provides an example of such an estimation. Many countries try arbitrary values of weights based on the designers' intuition about the importance of different factors in affecting the costs of services. Assigning these weights can also be a method for the designers to emphasize certain factors in grant distribution.

Figures used to calculate the indices (WI, RCI, SDI, and PFI) are those of the previous year or past few years' averages.

(2) Health

Measurement unit = total population in this region

Average per unit cost = the country's per capita public expenditure on health care

Adjustment index = $a_1\text{HPI} + a_2\text{IMI} + a_3\text{ILEI} + a_4\text{IPDI}$

where HPI (health price index) = the ratio of health care cost in this region to the national average;
 IMI (infant mortality index) = the ratio of infant mortality rate in this region to the national average;
 ILEI (inverse life expectancy index) = the ratio of national average life expectancy to life expectancy in this region;
 IPDI (inverse population density index) = the ratio of national average population density to that in this region;
 $a_1 + a_2 + a_3 + a_4 = 1$.

(3) Transportation

Measurement unit = total length of roads in this region

Average per unit cost = the country's per capita public expenditure on transportation

Adjustment index = $a_1\text{WI} + a_2\text{GRI} + a_3\text{SNI} + a_4\text{IPDI}$

where WI (wage index) = the ratio of wage level in this region to the national average;
 GRI (grade index) = the ratio of average road grade in this region to the national average;
 SNI (snow index) = the ratio of annual snowfall in this region to the national average;

IPDI (inverse population density index) = the ratio of national average population density to that in this region;

$$a_1 + a_2 + a_3 + a_4 = 1.$$

(4) Police and Fire

Measurement unit = total population in this region

Average per unit cost = the country's per capita public expenditure on police and fire protection

$$\text{Adjustment index} = a_1\text{WI} + a_2\text{CRI} + a_3\text{FI} + a_4\text{UBI}$$

where WI (wage index) = the ratio of wage level in this region to the national average;
CRI (crime index) = the ratio of per capita crime rate in this region to the national average;
FI (fire index) = the ratio of per capita number of fires in this region to the national average;
UBI (urbanization index) = the ratio of proportion of population in urban areas in this region to the national average;
 $a_1 + a_2 + a_3 + a_4 = 1.$

(5) Social Welfare

Measurement unit = total population in this region

Average per unit cost = the country's per capita public expenditure on social welfare

$$\text{Adjustment index} = a_1\text{MWI} + a_2\text{PVI} + a_3\text{OAI} + a_4\text{UEI} + a_5\text{DI}$$

where WI (minimum wage index) = the ratio of minimum wage level in this region to the national average;
PVI (poverty index) = the ratio of percentage of low-income population in this region to the national average;
OAI (old age index) = the ratio of percentage of old population (e.g., age 60 or above) in this region to the national average;
UEI (unemployment index) = the ratio of unemployment rate in this region to the national average;
DI (disability index) = the ratio of percentage of physically disabled people in this region to the national average;
 $a_1 + a_2 + a_3 + a_4 + a_5 = 1$

(6) Other Services

Measurement unit = total population in this region

Average per unit cost = the country's per capita public expenditure on other services

$$\text{Adjustment index} = a_1\text{WI} + a_2\text{RCI} + a_3\text{UBI}$$

where WI (wage index) = the ratio of wage level in this region to the national average;
 RCI (rental cost index) = the ratio of per square rental cost in this region to the national average;
 UBI (urbanization index) = the ratio of proportion of population in urban areas in this region to the national average;
 $a_1 + a_2 + a_3 = 1$.

The above method to calculate regions' fiscal needs require substantial information on a large number of factors that affect the costs of providing public services. Much of these information may not be available in some countries. This being the case, a feasible solution is to use fewer variables to estimate directly a region's aggregate fiscal need. There can be many different forms of this type of formula. Below we discuss a few examples:

(1) Estimate a region's fiscal need on the basis on population, income level, and area:

$$N_i = TE[w_p(P_i/\Sigma_j P_j) + w_I(ID_i P_i/\Sigma_j ID_j P_j) + w_A(A_i/\Sigma A_i)]$$

where N_i is the fiscal need of the i th region;
 TE is the total expenditure made by regions;
 P_i is the population in the i th region;
 w_p is the weight assigned to population;
 ID_i is the per capita income distance from the richest region;
 w_I is the weight assigned to income disparity;
 A_i is the area of i th region;
 w_A is the weight assigned to area;
 $w_p + w_I + w_A = 1$

Area is included in the formula because it accounts for differences in the cost of providing many public services. Services such as roads, telecommunications, schools, and libraries face higher per capita production costs in sparsely populated regions than those in densely populated regions. The income distance factor in the formula reflects the government's explicit objective to address regional disparity.¹⁶ Other variables that can be considered for this formula include population density, tax effort (revenue/GDP ratio), etc.

(2) Estimate a region's fiscal need using only education and health indicators:¹⁷

¹⁶ The distribution based on income distances are scaled by population, because otherwise a region with a large population and a region with a small population would get the same amount of entitlement as long as their per capita incomes are the same. The same logic applies to the treatment of weather condition.

¹⁷ A variation of this formula is presented in Gupta et al (1996).

$$N_i = SI_i * HI_i * P_i * c$$

where N_i is the fiscal need of the i th region;
 SI_i is the student index;
 HI_i is the health index;
 P_i is the population of the i th region;
 c is the per capita public expenditure of the country;
 $SI_i = (S_i/P_i)/(S/P)$;
 $HI_i = (H_i/P_i)/(H/P)$;

and where S_i is the number of students in the i th region, H_i is the number of health care workers in the i th region, P is the total population of the country, S is the total number of students in the country, H is the total number of health care workers in the country. SI_i roughly measures the enrollment rate of the i th region relative to the national average. HI_i measures the number of health care workers per capita in this region relative to the national average.

(3) Estimate a region's fiscal need using indicators that reflect "wealth".¹⁸

$$N_i = EI_i * TI_i * P_i * c$$

where N_i is the fiscal need of the i th region;
 EI_i is the electricity index;
 TI_i is the telecommunications index;
 P_i is the population of the i th region;
 c is the per capita public expenditure of the country;
 $EI_i = (E_i/P_i)/(E/P)$;
 $TI_i = (T_i/P_i)/(T/P)$;

and where E_i is the level of electricity consumption in the i th region, T_i is the number of telephone lines in the i th region, P is the total population of the country, E is the total electricity consumption in the country, T is the total number of telephone lines in the country. EI_i and TI_i measure the levels of consumption of electricity and telecommunications relative to the national averages.

3.3. Does Fiscal Equalization Reduce Local Tax Effort?

A frequently heard criticism of equalization transfer schemes is that equalization may adversely affect localities' effort to collect revenue. The rationale is that because an equalization scheme redistributes revenue from revenue rich regions to revenue poor regions, the former may purposely reduce their tax effort

¹⁸ Ibid.

in order not to be penalized by the transfer scheme. This reasoning is, in most cases, a false impression of fiscal equalization.

Consider the formula described by equations (1) and (7). In this formula, local fiscal capacities are calculated using the previous year's tax bases and standard tax rates set by the central government. Therefore, fiscal capacities are independent from tax effort (the actual tax rates). If a locality increases its tax effort by raising its tax rates above the standard rates, the transfer that it will receive does not decrease. If the locality reduces its tax rates to levels below standards, it will not receive more transfer as a result. In other words, such a formula does not encourage low tax effort, and does not discourage high tax effort. The additional revenue collected due to a locality's higher effort will be kept by itself. In this sense, this formula encourages local tax effort.

Of course, if a locality's tax base increases, its transfer will decrease. However, it is important to note that, if the formula is appropriately designed, the magnitude of the decline in transfer can be rather small relative to the benefits a locality can gain from the increase in tax base. As a result, localities do not have the incentive to reduce tax bases simply for the purpose of attracting more transfers. This point can be illustrated by the following example.

Consider a country with only two regions, A and B, each having a population of 1 million and one local tax base--income. Region A has a high per capita income of \$1000, and region B has a low per capita income of \$500. Suppose that the per capita expenditure needs are the same in the two regions, and local tax rates in both regions are 10 percent. In per capita terms, an equalization formula will redistribute \$25 from Region A to Region B. This reduces the net per capita income in Region A to \$975, and increases the net per capita income in Region B to \$525. Obviously Region A does not have the incentive to reduce its tax base to Region B's level: this will avoid the -\$25 transfer, but it will reduce its net per capita income from \$975 to \$500.¹⁹ Moreover, Region A does not even have the incentive to reduce its tax base by a small margin. A comparison of the following two hypothetical cases shows that if Region A reduces its tax base from \$1000 to \$900, its transfer will fall from -\$25 to -\$20, but its net per capita income will fall from \$975 to \$880.

Case 1: Region A's Per Capita Tax Base is \$1000

| | Region A (\$) | Region B (\$) |
|------------------------------|------------------|------------------|
| Per capita income | 1000 | 500 |
| Per capita local tax revenue | 100 | 50 |
| Per capita transfer | -25 | 25 |

¹⁹ When the two regions' tax bases are both \$500, no transfer will take place.

| | | |
|--|-----|-----|
| Per capita revenue after transfer | 75 | 75 |
| Per capita net income (income + transfer) | 975 | 525 |

Case 2: Region A Reduces Its Per Capita Tax Base to \$900

| | Region A (\$) | Region B (\$) |
|--|------------------|------------------|
| Per capita income | 900 | 500 |
| Per capita local tax revenue | 90 | 50 |
| Per capita transfer | -20 | 20 |
| Per capita revenue after transfer | 70 | 70 |
| Per capita net income (income + transfer) | 880 | 520 |

3.4. Sources of Data Required for Calculation

In selecting formulas for equalization transfer, a major consideration is the availability of data. In many developing countries, data constraints force the central government to adopt relatively simple models with few variables. This section briefly discusses the possible channels through which data could be collected for the purpose of calculating equalization transfers.

The central government agency in charge equalization transfer can use a variety of data sources. In most countries, the easiest source is the statistics provided by the central government's statistical agency. In addition to the central statistical agency, line ministries can often provide more detailed statistics on need indicators such as demographic composition, land areas, student enrolment rates, health indicators, length and quality of roads, electricity consumption, number of policemen, etc. Data on local tax bases are often supplied by local tax authorities.²⁰ In cases where the central and local governments share the same tax bases and the center is responsible for tax collection, tax base data can be easily obtained from the central tax authorities. In cases where local tax bases differ from central tax bases, local tax authorities should be required to provide annual tax base figures to the central government agency in charge of

²⁰ Here "local governments" refers to subnational governments in general.

transfer. It is necessary to enact a law or issue a central government ordinance on fiscal transfer that obliges local authorities to submit accurate data on a timely manner. Naturally, incentives exist for local governments to under-report their tax bases in order to receive more transfers. To prevent such practices, it is necessary to include penalty clauses on fraud in the law or ordinance. Equally important is that the central government audits the statistical reports submitted by local governments (either by directly sending officials to local governments or hiring independent auditors).

A general principle for the application of formulas is that the most recent data should be used to calculate fiscal transfers. In other words, the previous year's data on tax bases and expenditure needs should be used, whenever available. In calculating fiscal capacities, a possible approach is to use forecasted tax bases to calculate the preliminary amounts of transfer, and base the current year's (e.g., 1996) initial disbursements on these forecasts. When the actual tax base figures of 1996 become available in 1997, the final amounts of 1996 transfer are recalculated with the actual figures. If the 1996 initial disbursement to a locality is lower/higher than the final amount, then the difference is added/subtracted to/from the 1997 disbursement.

3.5. Institutional Requirement for Introducing a Formula-Based Transfer System

For a country that has no experience with a formula-based transfer system and is interested in adopting one, the first step is to set up a team to work out the methodology and to conduct the detailed calculations. The staff needed for such a team will include: (1) officials from the Ministry of Finance who understand the basic concerns of the Ministry on the overall budgetary impact of transfers; (2) technical experts who understand the models used by other countries and the applicability of these models to the country in question, and who have the ability to revise/design their own models that will be appropriate under local conditions; (3) statisticians who are familiar with the data availability and who are able to conduct simulations with alternative models. The whole team should be able to interpret the simulation results to the Finance Minister and the concerned provincial leaders in an accurate yet non-technical manner.

In terms of administrative affiliation of the team, a possible arrangement is that the team be part of the Ministry of Finance at least in the initial stage of designing the transfer system. In the long run, the desirability of creating an independent grants commission (such as those in Australia, India, and Pakistan) can be considered. The main advantages of an independent grants commission include: (1) reduced political influence from both the central and the regional governments and, as a result, (2) the possibility of exercising fair judgements over disputes among different subnational governments and between levels of governments; and (3) that the recommendations made by the independent commission are easier to be accepted by the parties involved. The disadvantage of an independent grants commission mainly has to do with its limited authority in obtaining data and other supports from the subnational governments.²¹

²¹ See Searle (1994) for a detailed discussion on Australia's Grants Commission.

During the design stage, the team should conduct hearings preferably in all states/provinces to collect information about fiscal capacities, extraordinary expenditure needs, and possible impact of alternative arrangements. Once the system starts operating, the grants commission or another agency that runs the transfer system should publish its calculation method and results annually, so that each state/province can prepare its budget according to the expected amount of transfers.

3.6. Transitional Arrangements

Fiscal expenditures are the materials that politics is made of. This point is especially apparent when the vested interests of particular groups (e.g., regions) are threatened by a proposed reform of the distribution formula of transfers. It is difficult to imagine that a major change in the distribution method causes no opposition from the subnational governments that are worse off because of such changes. Of course, countries with different political structures may encounter different levels of difficulty in implementing changes in the transfer system. Countries where subnational governments have substantial political bargaining powers must be very careful in assessing the impact of the reform proposal on and the possible reactions from the subnational governments.

One way to maximize the political support from the subnational governments is to phase in the new system in an incremental way. Using this method, the number of worse-off regions can be reduced to a minimum and even to zero from the beginning of the reform. With fewer regions suffering from the reform, its political feasibility is increased. Two examples of the such arrangements are as follows:

(1) Increase the weight of the new system (and to reduce the weight of the old system) in grant allocation over an extended period of time (say, three to five years). That is, over time, an increasing share of the total transfers are distributed using the new formula, and a decreasing share of the total transfers are distributed using the old method. This method ensures that, in each of the first few years of the reform, there is no or very few net losers because the distribution of grants changes marginally every year.

(2) For an extended period of time, keep the old system running and the size of the grants distributed by the old method constant in nominal terms. As the economy grows, additional central fiscal resources made available for transfers will be distributed using the new formula. The old system will be abolished when its impact on overall grant allocation is no longer significant. This method has the same effect the first one does.

3.7. Concluding Remarks

A formula-based equalization transfer system as discussed in this paper has at least three advantages over the discretionary system currently prevailing in many countries. (1) It bases the evaluation of each region's entitlement largely on objective variables, thus avoiding excessive bargaining and lobbying by the subnational governments. As a result, it increases the fairness of the distribution outcome. (2) A formula-based system, if properly designed, can eliminate the disincentive inherent in many discretionary systems that encourage low tax efforts and over-spending of the subnational governments. (3) Most

important, a formula-based equalization system provides an effective means to address regional disparity issues. Nevertheless, the design and implementation of a new transfer system is never an easy task. A careful study of the relevant international experience and a careful assessment of the country's own situation are required if the new system is to be both economically rational and politically feasible.

Table 3.1. Comparison of the Grant Systems in Nine Countries

| | US | Canada | UK | Germany | Australia | India | Japan | Korea | Indonesia |
|---------------------------------|--|-------------------------------|---|--|--|--|--|--|---|
| Equalizing fiscal capacities | No | Yes | Yes | Yes | Yes | Weakly | Yes | Yes | Weakly |
| Adjusting for Expenditure needs | No | No | Yes | Weakly | Yes | Yes | Yes | Yes | Yes |
| Sources of equalization fund | Central government revenue | Central government revenue | Central government revenues | VAT sharing, inter-regional transfers (from rich to poor states) | Central government revenue | fixed portions of income tax and value added tax | fixed percentages of 5 central taxes | fixed percentage of total national tax revenues | Central government revenue |
| Data requirement | Ad hoc | Data on subnational tax bases | Data on properties (provided by localities) and detailed expenditure factors (provided by various agencies) | Data on local tax bases and expenditure factors | Data on local tax bases and detailed expenditure factors | Data on population, income, land area, and tax effort. | Data on local tax bases and detailed expenditure factors | Data on local tax bases and detailed expenditure factors | Main scheme is an equal per capita transfer, only need data on population |
| Grant administration | Functional Depts. of the Federal Govt. | Dept. of Finance | Dept. of Environ. | Ministry of Finance | Grants Commission | Finance Commission and Planning Commission | Ministry of Autonomy | Ministry of Home Affairs | Ministry of Finance, Ministry of Home Affairs |

PART IV. A FORMULA-BASED EQUALIZATION TRANSFER SYSTEM FOR CHINA: MODEL AND SIMULATIONS

The current Chinese central-provincial fiscal transfer system mainly consists of three mechanisms.²² The first mechanism is based on the old contract system prevailing during 1988-1993. That is, after 1994, the localities (provinces and cities with independent planning status) continue to remit revenues to or receive transfers from the center according to their fiscal contracts in effect in 1993. The second type of transfer is "returned revenue" from the center according to a calculation that ensures each locality retains no less than what it did in 1993. These two types of transfers are general purpose transfers, or unconditional transfers. The third type of transfer includes various specific purpose grants, such as those for price subsidies, educational projects, environmental projects, disaster relief, and the development of poor regions.

The general purpose transfers from the center to the localities account for the major part of the total transfers. In 1994, the central government's net transfer to the local governments amounted to about 181 billion Yuan, of which two-thirds were general purpose grants. However, these general purpose transfers suffer from at least two major flaws. First, they were not designed to address the increasingly significant regional disparity issue; rather, they were largely designed to recognize the vested interests of the localities.²³ Second, the criteria by which these transfers are allocated are rather ad hoc, that is, the transfer system lacks scientific measurements of fiscal capacities and fiscal needs. This can easily lead to an unjustified distribution and encourage the localities' bargaining activities.

This part presents an illustrative equalization transfer model and the simulation result using 1994 data on China. It provides the estimates of fiscal capacities and fiscal needs of 30 Chinese provinces using the methods discussed in the paper. Based on a formula that aims to ensure that provinces with similar levels of tax effort be able to provide similar levels of public services, the calculation results in a set of hypothetical transfers from the center to the provinces in 1994. These results are then compared with the actual transfers made to the provinces in 1994.

The method used to calculate the provincial fiscal capacities and fiscal needs may be considered overly simplified and the quality of data can certainly be improved. Nevertheless, the estimation carried out here is simply intended to provide an illustrative example of how an equalization transfer formula with a minimum data requirement can be constructed. The following sections discuss the methodology and the results.

4.1. Estimating Fiscal Capacities

²² In 1996, a formula-based equalization transfer system was introduced on an experimental basis. This system applies a formula that uses objective variables to calculate local fiscal capacities and needs. However, the size of this transfer program was only \$2 billion Yuan, or 0.5 percent of the central government revenue.

²³ According to some studies, China's regional disparity is among the highest in the world.

Two methods were tried to determine the fiscal capacities of the provinces, that is, the revenue each province would be able to collect with an average level of tax effort. The most important element in this calculation is the estimation of the provinces' tax bases. The first method uses provinces' GDP levels as proxies of the tax bases. To see how well GDP can forecast revenue, an OLS regression of a linear equation with no intercept is conducted. The result is:

$$\text{Regression I: } REV_i = 0.0186GDP_i \quad (1)$$

R-square = 0.75, No. of observations = 30, Degrees of freedom = 28

where REV_i represents revenue collected province i in 1994, and GDP_i is the value of province i 's gross domestic product in 1994. The result suggests that the differences in GDP can explain 75 percent of the variations in revenue across provinces.²⁴

Instead of using an output measure such as GDP as a proxy of the tax base, the second method attempts to estimate the local tax base using two variables: the total retail sales and the before-tax profits of industrial enterprises. This is based on the assumption that business tax and personal income tax--the two major local taxes--are positively correlated with total retail sales, and another major local tax--corporate income tax--is positively correlated with profits of industrial enterprises.²⁵ Using these two variables as explanatory variables, the second regression yields a better fit:

$$\text{Regression II: } REV_i = 0.0896 SALES_i + 0.1679 PROF_i \quad (2)$$

(4.90) (2.84)

R-square = 0.88, No. of observations = 30, Degrees of freedom = 28

where $SALES_i$ is province i 's total retail sales in 1994, and $PROF_i$ is the profits of the province's state owned industrial enterprises in 1994. Roughly speaking, the regression results suggest that if all local taxes are levied on these two bases, the national average effective tax rate on total sales is 8.96 percent, and the national average effective tax rate on corporate profits is 16.8 percent. The R-square of 0.88 suggests that 88 percent of the variations in revenue collection can be explained by variations in these two variables.²⁶

²⁴ When the structure of the economy (percentage of agriculture in GDP) is added to the regression as the second explanatory variable, R-square improves only slightly to 0.77, and its coefficient is not statistically significant.

²⁵ 25 percent of VAT assigned to provinces is not considered as local tax in this exercise, as it is included in the transfer calculated from the actual local revenue and expenditure figures.

²⁶ To find out whether individual disposable income (the tax base for personal income tax) is important in determining revenue, this variable is added to the regression but yields no improvement in the R-square. When tax effort (revenue/GDP ratio) is added to the above regression, the R-square further increases to 0.94. However,

Because the second method represents a better forecast of actual revenues, it is used to estimate the provinces' fiscal capacities. That is, the following equation is employed to estimate the fiscal capacities of the provinces:

$$C_i = 0.0896 \text{ SALES}_i + 0.1679 \text{ PROF}_i \quad (3)$$

where C_i is the fiscal capacity of province i . The estimated fiscal capacities are reported in Table A-2.

4.2. Estimating Fiscal Needs

The fiscal need of each province is broken down into seven categories: education, health, social welfare, police and law enforcement, infrastructure, government administration, and other services. For each category, I construct a formula to determine the expenditure needs of the province. The variables used in these formulas are the most important determinants of the expenditure and are those for which data are readily available.

The variables used to determine the needs under the seven categories are:

Education: population, average number of years of education

Health: population, average life expectancy

Social welfare: population, percentage of population over age 65, urban unemployment rate

Police and law enforcement: population, percentage of urban population

Infrastructure: length of roads, area

Government administration: population

Other services: population

Determining the fiscal need of each province involves three steps:

Step 1: determining the share of each spending category in total spending. The share of each expenditure category in total expenditure is calculated using the actual spending figures in 1994:

Table 1. Local Expenditures by Category, 1994 (100 Mil Y)

to forecast the provinces' fiscal capacities, one should eliminate the impact of tax efforts by leaving out this variable.

| | 1994 Actual Amount | Share α |
|--|--------------------------|----------------|
| Education, Culture, and Related Expenses | 83858 | 0.276 |
| Health, Family Planning, and Sports | 27467 | 0.090 |
| Social Welfare | 9416 | 0.031 |
| Government Administration | 66539 | 0.219 |
| Police and Law Enforcement | 22000 | 0.072 |
| Infrastructure Maintenance | 23416 | 0.077 |
| Other services (including subsidies) | 71211 | 0.234 |
| Subtotal | 303907 | 1 |

Note: capital expenditures, except for urban maintenance, are excluded. Infrastructure maintenance is named "urban maintenance" in China Almanac of Finance 1995.

Data Source: China Almanac of Finance 1995.

The total fiscal need of 30 provinces in category k (k = education, health, etc.) is the weight (α_k) multiplied by the total fiscal need of all categories. Denoting total local need of all categories by TN, the total fiscal need in category k is

$$TN_k = \alpha_k * TN$$

Step 2: determining the fiscal need of each province in category k. For education (k=E), the fiscal need of province i is calculated using the following formula:

$$N_{iE} = TN_E(P_i E_i / \sum_j P_j E_j) = \alpha_E * TN(P_i E_i / \sum_j P_j E_j) \quad (4)$$

where N_{iE} is province i's fiscal need for education, $\alpha_E=0.276$ is the weight assigned to education, TN_E is the 30 provinces' total fiscal need for education, P_i is the population of province i, E_i is the ratio of the national average number of years of education to that in province i, and $P_i E_i / \sum_j P_j E_j$ is the share of province i's fiscal need in the 30 provinces' total need for education.

For health (k=H), the fiscal need of province i is calculated using the following formula:

$$N_{iH} = TN_H(P_i L_i / \sum_j P_j L_j) = \alpha_H * TN(P_i L_i / \sum_j P_j L_j) \quad (5)$$

where N_{iH} is province i's fiscal need for health, $\alpha_H=0.090$ is the weight assigned to health, TN_H is the 30 provinces' total fiscal need for health, L_i is the ratio of the national average life expectancy to that in province i, $P_i L_i / \sum_j P_j L_j$ is the share of province i's fiscal need in the 30 provinces' total need for health.

For social welfare (k=S), the fiscal need of province i is calculated using the following formula:

$$N_{iS} = TN_S(0.5*P_iOLD_i/\Sigma_jP_jOLD_j + 0.5*P_iUMP_i/\Sigma_jP_jUMP_j) \\ = \alpha_S * TN(0.5*P_iOLD_i/\Sigma_jP_jOLD_j + 0.5*P_iUMP_i/\Sigma_jP_jUMP_j) \quad (6)$$

where N_{iS} is province i's fiscal need for social welfare, $\alpha_S=0.031$ is the weight assigned to social welfare, TN_S is the 30 provinces' total fiscal need for social welfare, OLD_i is the ratio of the percentage of elderly population (over age 65) in province i to the national average, UMP_i is the ratio of the urban unemployment rate in province i to the national average, and $0.5*P_iOLD_i/\Sigma_jP_jOLD_j + 0.5*P_iUMP_i/\Sigma_jP_jUMP_j$ is the share of province i's fiscal need in the 30 provinces' total need for social welfare.

For government administration (k=G), the fiscal need of province i is calculated using the following formula:

$$N_{iG} = TN_G(P_i/\Sigma_jP_j) = \alpha_H * TN(P_i/\Sigma_jP_j) \quad (7)$$

where N_{iG} is province i's fiscal need for government administration, $\alpha_G=0.219$ is the weight assigned to government administration, TN_G is the 30 provinces' total fiscal need for government administration, and P_i/Σ_jP_j is the share of province i's fiscal need in the 30 provinces' total need for government administration.

For police and law enforcement (k=P), the fiscal need of province i is calculated using the following formula:

$$N_{iP} = TN_P(P_iL_i/\Sigma_jP_jL_j) = \alpha_P * TN(P_iUB_i/\Sigma_jP_jUB_j) \quad (8)$$

where N_{iP} is province i's fiscal need for police and law enforcement, $\alpha_P=0.072$ is the weight assigned to police and law enforcement, TN_P is the 30 provinces' total fiscal need for police and law enforcement, UB_i is the ratio of percentage of urban population in this province to the national average, and $P_iUB_i/\Sigma_jP_jUB_j$ is the share of province i's fiscal need in the 30 provinces' total need for police and law enforcement.

For infrastructure (k=I), the fiscal need of province i is calculated using the following formula:

$$N_{iI} = TN_I(0.5*LR_i/\Sigma_jLR_j + 0.5*A_i/\Sigma_jA_j) = \alpha_I * TN(0.5*LR_i/\Sigma_jLR_j + 0.5*A_i/\Sigma_jA_j) \quad (9)$$

where N_{iI} is province i's fiscal need for infrastructure, $\alpha_I=0.077$ is the weight assigned to infrastructure, and TN_I is the 30 provinces' total fiscal need for infrastructure. LR_i is the total length of roads in province i, and A_i is the area of province i. The former reflects the need for maintenance, and the latter reflects the cost due to sparsity of population. $0.5*LR_i/\Sigma_jLR_j + 0.5*A_i/\Sigma_jA_j$ is the share of province i's fiscal need in the 30 provinces' total need for infrastructure.

For other services (k=O), the fiscal need of province i is calculated using the following formula:

$$N_{iO} = TN_O(P_i/\Sigma_jP_j) = \alpha_O * TN(P_i/\Sigma_jP_j) \quad (10)$$

where N_{iO} is province i 's fiscal need for other services, $\alpha_O=0.234$ is the weight assigned to other services, TN_O is the 30 provinces' total fiscal need for other services, and $P_i/\Sigma_j P_j$ is the share of province i 's fiscal need in the 30 provinces' total need for other services.

Step 3. summing up province i 's needs in the seven categories to get the total fiscal need of the province:

$$N_i = \alpha_E(P_i E_i / \Sigma_j P_j E_j) + \alpha_H(P_i L_i / \Sigma_j P_j L_j) + \alpha_S(0.5 * P_i OLD_i / \Sigma_j P_j OLD_j + 0.5 * P_i UMP_i / \Sigma_j P_j UMP_j) + \alpha_G(P_i / \Sigma_j P_j) + \alpha_P(P_i UB_i / \Sigma_j P_j UB_j) + \alpha_I(0.5 * LR_i / \Sigma_j LR_j + 0.5 * A_i / \Sigma_j A_j) + \alpha_O(P_i / \Sigma_j P_j) \quad (11)$$

where N_i is the total fiscal need of province i .

Equation (11) can be rewritten as follows by combining some terms:

$$\begin{aligned} N_i &= \alpha_E(P_i E_i / \Sigma_j P_j E_j) + \alpha_H(P_i L_i / \Sigma_j P_j L_j) + \alpha_S(0.5 * P_i OLD_i / \Sigma_j P_j OLD_j + 0.5 * P_i UMP_i / \Sigma_j P_j UMP_j) + \alpha_P(P_i UB_i / \Sigma_j P_j UB_j) + \\ &\quad \alpha_I(0.5 * LR_i / \Sigma_j LR_j + 0.5 * A_i / \Sigma_j A_j) + (\alpha_G + \alpha_O)(P_i / \Sigma_j P_j) \\ &= 0.276(P_i E_i / \Sigma_j P_j E_j) + 0.090(P_i L_i / \Sigma_j P_j L_j) + \\ &\quad 0.31(0.5 * P_i OLD_i / \Sigma_j P_j OLD_j + 0.5 * P_i UMP_i / \Sigma_j P_j UMP_j) + \\ &\quad 0.072(P_i UB_i / \Sigma_j P_j UB_j) + 0.077(0.5 * LR_i / \Sigma_j LR_j + 0.5 * A_i / \Sigma_j A_j) + \\ &\quad 0.453(P_i / \Sigma_j P_j) \end{aligned} \quad (12)$$

Step 4. adjusting for cost differentials across provinces. The above calculation has not considered the cost differentials across provinces in providing the same level of public services. With limited data, I constructed a wage-and-cost index, using prices of food and construction materials and wage levels. Each of the first two commodities is given a weight of 0.25, and the wage level is given a weight of 0.5. There is obviously much room for improvement, but the present data are sufficient to serve as an illustrative example.

The wage-and-cost index is fixed at 1 for the national average. If a province's index is higher than 1, it means the unit cost of providing public services there is higher than the national average, and vice versa. The index figures are shown in Table A-1(b).

The cost adjusted fiscal need of province i is:

$$AN_i = WCI_i N_i \quad (13)$$

where AN_i is the cost adjusted fiscal need of province i , WCI_i is the wage-and-cost index of province i , and N_i is the fiscal need calculated using equation (12).

4.3. Transfers to the Provinces

Using two different definitions of "needs," the transfers to the provinces are different. If the fiscal need figures (unadjusted for cost differentials) are used, the transfer from the center to province i is:

$$T_i = N_i - C_i$$

where N_i is given by equation (12). If the cost adjusted fiscal need figures are used, the transfer from the center to province i is:

$$T_i = AN_i - C_i$$

where AN_i is given by equation (13). Transfers calculated using these formula are presented in Table A-3. For comparison, the actual transfers in 1994 are also presented in Table A-3.

The above calculations assume that 100 percent of the central government transfers made in 1994 be allocated according to the proposed equalization formula. In other words, the proposed system is a "full" equalization system. However, the distribution of transfers under this system is distinctly different from the actual allocation in 1994: the standard deviation (the average difference between the proposed per capita transfer and the actual per capita transfer) is 263 Yuan, or 198 percent of the average per capita transfer in 1994 (See Table A-4). Obviously, such a drastic reallocation of resources is politically infeasible. I thus tried two alternative "partial" equalization schemes:

(1) 50 percent equalization. 50 percent equalization means that 50 percent of the actual central government transfers (net) made to the localities in 1994 are allocated in proportion to the original allocation and the other 50 percent are allocated by the proposed equalization formula using cost adjusted figures. From Table A-4, one can see that under this system the standard deviation from the actual allocation now becomes 132 Yuan or 98 percent of the average per capital transfer in 1994.

(2) 20 percent equalization. 20 percent equalization means that 80 percent of the actual central government transfers (net) made to the localities in 1994 are allocated in proportion to the original allocation and the other 20 percent are allocated by the proposed equalization formula using cost adjusted figures. From Table A-4, one can see that under this system the standard deviation from the actual allocation now becomes 53 Yuan or 39 percent of the average per capital transfer in 1994.

4.4. Does the Transfer System Equalize?

The transfer system designed above aims to equalize the provinces' abilities to provide public services at similar levels of tax effort. While equalizing per capita income is not the direct objective, due to

a high correlation between income and fiscal capacity, a transfer system like the one suggested above should also have strong redistributive effects on per capita income.

The following regression is conducted to test the hypothesis that a transfer system equalizes per capita income across provinces :

$$PCT_i = a_0 + a_1 PCGDP_i$$

where PCT_i is the per capita transfer to province i , and $PCGDP_i$ is the per capita GDP of province i . If a_1 is negative and statistically significant, it means that the system has a significant equalization effect.

When per capita transfers are calculated using need figures unadjusted for cost differentials, a_1 is significantly negative. At the same time, the R-square is 0.55, implying that 55 percent of the variations of the transfers across provinces serves the purpose of "equalization." From Figure 1, one can see a strong negative correlation between the two indices, indicating a significant redistributive effect of the proposed transfer system. The regression results are as follows:

$$\text{Regression III: } PCT_i = 544.26 - 91.26 PCGDP_i \\ (2.55) \quad (-14.51)$$

R-square = 0.59, No. of observations = 30, Degrees of freedom =28.

When per capita transfers are calculated using needs figures adjusted for cost differentials, a_1 is also significantly negative. The R-square is 0.42. The two variables are plotted in Figure 2, which shows a slightly weaker correlation between the two indices than that in Figure 1. The regression results are as follows:

$$\text{Regression IV: } PCT_i = 518.77 - 83.93 PCGDP_i \\ (1.93) \quad (-4.54)$$

R-square = 0.42, No. of observations = 30, Degrees of freedom =28.

For comparison purposes, I used the actual transfer figures in 1994 to run the same regression. The resulting a_1 is statistically insignificant and the R-square is only 0.0002, showing not even a slight correlation between per capita transfers and per capita GDP levels. This suggests that the current transfer system has not effectively achieved any redistributive goal. The regression results are as follows:

$$\text{Regression V: } PCT_i = 206.46 - 0.97 PCGDP_i \\ (1.10) \quad (-0.075)$$

R-square = 0.0002, No. of observations = 30, Degrees of freedom =28.

The same regression is also conducted using the per capita transfer figures generated by the "partial equalization" transfer schemes proposed in the previous section. Table 2 compares the regression results of four systems: actual transfers in 1994, 20% equalization, 50% equalization, and full equalization. The results show that the full equalization and 50% equalization schemes have statistically significant equalization effect (the slope coefficients are significantly negative). The 20% equalization schemes do

have some equalization effect (the slope coefficient is negative), but it is not statistically significant. The actual transfer scheme has the least equalization effect (the slope coefficient is almost zero).

Table 2. Regression Results under Four Transfer Schemes: $PCT_i = a_0 + a_1 PCGDP_i$

| | 1994 Actual Transfer | 20% Equalization | 50% Equalization | 100% Equalization |
|-------|-------------------------|---------------------|---------------------|----------------------|
| a_0 | 206.46 (1.10) | 268.92 (1.36) | 362.62 (1.66)* | 518.77 (1.93)* |
| a_1 | -0.97 (0.075) | -17.4 (-1.30) | -41.95 (-2.81)* | -83.93 (-4.54)* |
| R_2 | 0.00 | 0.06 | 0.22 | 0.42 |
| DF | 28 | 28 | 28 | 28 |

Note: the calculations use cost adjusted figures on fiscal needs. Numbers in parentheses are t ratios. A "*" indicates that the t ratio is statistically significant.

4.5. Conclusions

Statistical evidence suggests that China's current fiscal transfer system performs almost no redistributive function. The illustrative example of a formula-based equalization transfer model presented in this appendix shows that an important improvement in redistribution can be made by introducing appropriate measures of fiscal capacities and needs with appropriate variables. One should notice that shifting from the current transfer system to a "full equalization" system may not be feasible in the short- or medium run. A pragmatic approach is to increase the magnitude of the new transfer scheme gradually over time in order to minimize political difficulties. The purpose of this illustrative example is not to provide the exact model that China is to use; the intent is to offer an alternative methodology to the ones that are being considered.

Table A-1(a). China: Basic Indicators by Province

| | Popu. 1994 (Mil.) | GDP per cap 1994 (Th. Y) | Area (Th. Mu) | Aged popu. (%) 1987 | Urban unemplmt. rate 1994 |
|----------------|-------------------------|-----------------------------------|------------------|------------------------------|------------------------------------|
| All China | 1198.50 | 3.76 | 9590.09 | 6.23 | 2.8 |
| Beijing | 11.25 | 9.64 | 16.80 | 7.66 | 0.4 |
| Tianjin | 9.35 | 7.76 | 11.31 | 7.79 | 1.2 |
| Hebei | 63.88 | 3.36 | 187.95 | 6.34 | 2.8 |
| Shanxi | 30.45 | 2.80 | 156.30 | 5.98 | 1.2 |
| Inner Mongolia | 22.60 | 3.02 | 1192.04 | 4.26 | 3.7 |
| Liaoning | 40.67 | 6.35 | 146.15 | 6.54 | 2.5 |
| Jilin | 25.74 | 3.76 | 186.81 | 5.56 | 1.8 |
| Heilongjiang | 36.72 | 4.41 | 451.47 | 4.17 | 2.5 |
| Shanghai | 13.56 | 14.54 | 6.30 | 11.52 | 2.8 |
| Jiangsu | 70.21 | 5.78 | 102.52 | 8.23 | 2.1 |
| Zhejiang | 42.94 | 6.21 | 101.77 | 8.20 | 3.1 |
| Anhui | 59.55 | 2.50 | 139.06 | 6.35 | 3.1 |
| Fujian | 31.83 | 5.29 | 121.12 | 6.17 | 2.4 |
| Jiangxi | 40.15 | 2.57 | 166.86 | 5.39 | 2 |
| Shandong | 86.71 | 4.47 | 156.57 | 6.72 | 3.1 |
| Henan | 90.27 | 2.44 | 167.01 | 6.33 | 2.3 |
| Hubei | 57.19 | 3.29 | 186.10 | 6.14 | 3 |
| Hunan | 63.55 | 2.67 | 212.10 | 6.43 | 3.8 |
| Guangdong | 66.89 | 6.34 | 177.99 | 7.28 | 2.4 |
| Guangxi | 44.93 | 2.76 | 237.34 | 6.20 | 3.6 |
| Hainan | 7.11 | 4.66 | 33.98 | 6.36 | 3.6 |
| Sichuan | 112.14 | 2.48 | 570.31 | 6.79 | 3.8 |
| Guizhou | 34.58 | 1.51 | 176.04 | 4.95 | 5.5 |
| Yunnan | 39.39 | 2.47 | 393.33 | 5.70 | 2.7 |
| Tibet | 2.36 | 1.94 | 1220.01 | 6.67 | 5 |
| Shaanxi | 34.81 | 2.43 | 205.52 | 5.26 | 3.5 |
| Gansu | 23.78 | 1.90 | 456.55 | 4.62 | 5.3 |
| Qinghai | 4.74 | 2.92 | 742.82 | 3.93 | 6 |
| Ningxia | 5.04 | 2.66 | 51.73 | 3.69 | 5.3 |
| Xinjiang | 16.32 | 4.13 | 1683.98 | 4.62 | 3.2 |

Source: State Statistical Bureau (1995). Cost data are from Wu Renhong, 1995, "China's Inflation and Regional Disparity," and World Bank, 1994, China: Internal Market and Regulations. Social indicators are from Yasuko Hayase and Seiko Kawamata, 1991, Population Policy and Vital Statistics in China, Institute of Developing Economies, Tokyo, Japan. Author's own calculation.

Table A-1(b). China: Basic Indicators by Province

| | Urban Popu (%) 1994 | Length of roads (kms) 1994 | Average years of educ. 1987 | Average life expctncy 1987 | Wage& cost index 1992 |
|----------------|------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|--------------------------------|
| All China | 23.6 | 1117821 | 5.68 | 70.59 | 1 |
| Beijing | 66.6 | 11532 | 8.12 | 74.93 | 1.19 |
| Tianjin | 57.7 | 4156 | 7.42 | 73.64 | 1.02 |
| Hebei | 16.5 | 50496 | 5.90 | 73.26 | 0.98 |
| Shanxi | 25.8 | 32693 | 6.29 | 69.77 | 0.81 |
| Inner Mongolia | 37.0 | 44202 | 6.19 | 69.24 | 0.82 |
| Liaoning | 45.2 | 42763 | 7.00 | 73.32 | 0.93 |
| Jilin | 43.9 | 29581 | 6.69 | 70.11 | 0.87 |
| Heilongjiang | 49.7 | 48356 | 6.55 | 70.33 | 0.82 |
| Shanghai | 70.5 | 3721 | 7.92 | 75.97 | 1.29 |
| Jiangsu | 23.9 | 25891 | 5.91 | 73.63 | 1.04 |
| Zhejiang | 16.5 | 33170 | 5.82 | 71.82 | 1.21 |
| Anhui | 17.2 | 30876 | 4.71 | 71.21 | 0.87 |
| Fujian | 18.3 | 44608 | 5.12 | 70.90 | 1.19 |
| Jiangxi | 20.9 | 34556 | 5.15 | 68.10 | 0.86 |
| Shandong | 17.4 | 50225 | 5.52 | 72.88 | 0.90 |
| Henan | 14.8 | 47704 | 5.43 | 71.68 | 0.83 |
| Hubei | 29.0 | 48349 | 5.92 | 68.91 | 0.94 |
| Hunan | 16.5 | 58803 | 6.00 | 68.82 | 1.01 |
| Guangdong | 16.1 | 75716 | 5.96 | 73.83 | 1.57 |
| Guangxi | 14.1 | 39550 | 5.54 | 70.81 | 1.07 |
| Hainan | 34.1 | 13015 | 5.84 | 69.76 | 1.22 |
| Sichuan | 16.3 | 100002 | 5.40 | 68.70 | 0.90 |
| Guizhou | 15.4 | 32398 | 4.37 | 70.12 | 0.95 |
| Yunnan | 15.9 | 65578 | 4.13 | 64.25 | 0.94 |
| Tibet | 14.1 | 21842 | 1.91 | 63.50 | 1.17 |
| Shaanxi | 21.3 | 39058 | 6.29 | 69.74 | 0.91 |
| Gansu | 18.8 | 34984 | 4.40 | 70.24 | 0.97 |
| Qinghai | 32.6 | 17061 | 3.79 | 66.40 | 0.90 |
| Ningxia | 28.8 | 8324 | 5.15 | 69.74 | 0.93 |
| Xinjiang | 47.7 | 28611 | 6.14 | 69.25 | 1.00 |

Source: State Statistical Bureau (1995). Cost data are from Wu Renhong, 1995, "China's Inflation and Regional Disparity," and World Bank, 1994, China: Internal Market and Regulations. Social indicators are from Yasuko Hayase and Seiko Kawamata, 1991, Population Policy and Vital Statistics in China, Institute of Developing Economies, Tokyo, Japan. Author's own calculation.

Table A-2: Fiscal Revenues, Expenditures, and Estimated Fiscal Capacities

| | Actual revenue (Mil. Y) 1994 | Tax effort (Rev/GDP) 1994 | Actual expndt. (Mil. Y) 1994 | Actual transfer (Mil. Y) 1994 | Estimated fiscal capacity 1994 |
|----------------|---------------------------------------|------------------------------------|---------------------------------------|--|---|
| All China | 231159 | 5.1 | 392962 | 161803 | 228596 |
| Beijing | 4585 | 4.2 | 9853 | 5268 | 9055 |
| Tianjin | 5015 | 6.9 | 7232 | 2217 | 4563 |
| Hebei | 9522 | 4.4 | 16084 | 6562 | 9396 |
| Shanxi | 5382 | 6.3 | 8923 | 3541 | 4562 |
| Inner Mongolia | 3630 | 5.3 | 9282 | 5652 | 3188 |
| Liaoning | 15367 | 5.9 | 22358 | 6991 | 12657 |
| Jilin | 5127 | 5.3 | 10459 | 5332 | 5213 |
| Heilongjiang | 8466 | 5.2 | 14240 | 5774 | 9368 |
| Shanghai | 16962 | 8.6 | 19084 | 2122 | 14323 |
| Jiangsu | 13662 | 3.4 | 20017 | 6355 | 17909 |
| Zhejiang | 9463 | 3.5 | 15303 | 5840 | 13422 |
| Anhui | 5468 | 3.7 | 9327 | 3859 | 6263 |
| Fujian | 9194 | 5.5 | 13773 | 4579 | 6868 |
| Jiangxi | 4929 | 4.8 | 9203 | 4274 | 4175 |
| Shandong | 13466 | 3.5 | 21877 | 8411 | 16734 |
| Henan | 9335 | 4.2 | 16962 | 7627 | 9989 |
| Hubei | 7746 | 4.1 | 13720 | 5974 | 9679 |
| Hunan | 8589 | 5.1 | 15149 | 6560 | 8103 |
| Guangdong | 29870 | 7.0 | 41683 | 11813 | 24621 |
| Guangxi | 6226 | 5.0 | 12493 | 6267 | 5423 |
| Hainan | 2753 | 8.3 | 4001 | 1248 | 1008 |
| Sichuan | 13599 | 4.9 | 23739 | 10140 | 12181 |
| Guizhou | 3124 | 6.0 | 7423 | 4299 | 2325 |
| Yunnan | 7670 | 7.9 | 20373 | 12703 | 7631 |
| Tibet | 554 | 12.1 | 3030 | 2476 | 196 |
| Shaanxi | 4259 | 5.0 | 8552 | 4293 | 3670 |
| Gansu | 2908 | 6.4 | 7238 | 4330 | 2536 |
| Qinghai | 701 | 5.1 | 2536 | 1835 | 583 |
| Ningxia | 717 | 5.4 | 1938 | 1221 | 603 |
| Xinjiang | 2870 | 4.3 | 7110 | 4240 | 2352 |

Source: Tables A-1 and A-2, and author's own calculations.

Table A-3: Fiscal Needs and Fiscal Transfers

| | Unadjusted for cost differentials | | | Adjusted for cost differentials | | | Actual per cap transfer (Y) |
|----------------|-----------------------------------|------------------|-----------------------------|---------------------------------|------------------|-----------------------------|-----------------------------|
| | Fiscal need | Formula transfer | Per capita formula transfer | Fiscal need | Formula transfer | Per capita formula transfer | |
| | (Mil. Y) | (Mil. Y) | (Y) | (Mil. Y) | (Mil. Y) | (Y) | |
| All China | 392962 | 161803 | 135.0 | 387677 | 161803 | 135.0 | 135.0 |
| Beijing | 3735 | -5238 | -465.6 | 4447 | -4687 | -416.6 | 468.3 |
| Tianjin | 3014 | -1525 | -163.1 | 3086 | -1502 | -160.6 | 237.1 |
| Hebei | 19585 | 10030 | 157.0 | 19315 | 10089 | 157.9 | 102.7 |
| Shanxi | 9640 | 4998 | 164.2 | 7833 | 3327 | 109.3 | 116.3 |
| Inner Mongolia | 9513 | 6226 | 275.5 | 7809 | 4700 | 208.0 | 250.1 |
| Liaoning | 13300 | 633 | 15.6 | 12381 | -281 | -6.9 | 171.9 |
| Jilin | 8634 | 3368 | 130.8 | 7528 | 2354 | 91.5 | 207.1 |
| Heilongjiang | 12982 | 3557 | 96.9 | 10688 | 1343 | 36.6 | 157.2 |
| Shanghai | 4513 | -9657 | -712.2 | 5825 | -8644 | -637.5 | 156.5 |
| Jiangsu | 21493 | 3529 | 50.3 | 22367 | 4535 | 64.6 | 90.5 |
| Zhejiang | 13285 | -135 | -3.1 | 16199 | 2825 | 65.8 | 136.0 |
| Anhui | 19400 | 12933 | 217.2 | 16936 | 10857 | 182.3 | 64.8 |
| Fujian | 10550 | 3625 | 113.9 | 12613 | 5843 | 183.6 | 143.9 |
| Jiangxi | 13114 | 8799 | 219.2 | 11341 | 7288 | 181.5 | 106.5 |
| Shandong | 26869 | 9977 | 115.1 | 24199 | 7593 | 87.6 | 97.0 |
| Henan | 27687 | 17421 | 193.0 | 23007 | 13240 | 146.7 | 84.5 |
| Hubei | 18444 | 8628 | 150.9 | 17340 | 7792 | 136.2 | 104.5 |
| Hunan | 19790 | 11505 | 181.0 | 20149 | 12253 | 192.8 | 103.2 |
| Guangdong | 20700 | -3860 | -57.7 | 32586 | 8101 | 121.1 | 176.6 |
| Guangxi | 14243 | 8683 | 193.2 | 15363 | 10110 | 225.0 | 139.5 |
| Hainan | 2459 | 1427 | 200.8 | 3021 | 2047 | 287.9 | 175.5 |
| Sichuan | 36252 | 23695 | 211.3 | 32657 | 20826 | 185.7 | 90.4 |
| Guizhou | 11963 | 9487 | 274.3 | 11436 | 9267 | 268.0 | 124.3 |
| Yunnan | 14559 | 6820 | 173.1 | 13794 | 6269 | 159.1 | 322.5 |
| Tibet | 3374 | 3129 | 1325.7 | 3961 | 3830 | 1622.8 | 1049.2 |
| Shaanxi | 11045 | 7260 | 208.6 | 10129 | 6569 | 188.7 | 123.3 |
| Gansu | 8987 | 6350 | 267.1 | 8737 | 6307 | 265.2 | 182.1 |
| Qinghai | 3139 | 2516 | 530.8 | 2850 | 2306 | 486.5 | 387.1 |
| Ningxia | 1810 | 1188 | 235.7 | 1683 | 1099 | 218.0 | 242.3 |
| Xinjiang | 8321 | 5876 | 360.1 | 8396 | 6148 | 376.7 | 259.8 |

Source: Tables A-1 and A-2, and author's own calculations.

Table A-4: Fiscal Transfers under Alternative Equalization Schemes (Yuan)

| | 100% Equalization | | 50% Equalization | | 20% Equalization | | Actual per cap transfer 1994 |
|----------------|---------------------|------------------------------|---------------------|------------------------------|---------------------|------------------------------|---------------------------------------|
| | Per cap transfer | Differ. from act. amt. | Per cap transfer | Differ. from act. amt. | Per cap transfer | Differ. from act. amt. | |
| All China | 135.0 | 0.0 | 135.0 | 0.0 | 135.0 | 0.0 | 135.0 |
| Beijing | -416.6 | -884.9 | 25.8 | -442.4 | 291.3 | -177.0 | 468.3 |
| Tianjin | -160.6 | -397.7 | 38.2 | -198.9 | 157.6 | -79.5 | 237.1 |
| Hebei | 157.9 | 55.2 | 130.3 | 27.6 | 113.8 | 11.0 | 102.7 |
| Shanxi | 109.3 | -7.0 | 112.8 | -3.5 | 114.9 | -1.4 | 116.3 |
| Inner Mongolia | 208.0 | -42.1 | 229.0 | -21.1 | 241.7 | -8.4 | 250.1 |
| Liaoning | -6.9 | -178.8 | 82.5 | -89.4 | 136.1 | -35.8 | 171.9 |
| Jilin | 91.5 | -115.7 | 149.3 | -57.8 | 184.0 | -23.1 | 207.1 |
| Heilongjiang | 36.6 | -120.7 | 96.9 | -60.3 | 133.1 | -24.1 | 157.2 |
| Shanghai | -637.5 | -793.9 | -240.5 | -397.0 | -2.3 | -158.8 | 156.5 |
| Jiangsu | 64.6 | -25.9 | 77.6 | -13.0 | 85.3 | -5.2 | 90.5 |
| Zhejiang | 65.8 | -70.2 | 100.9 | -35.1 | 122.0 | -14.0 | 136.0 |
| Anhui | 182.3 | 117.5 | 123.6 | 58.8 | 88.3 | 23.5 | 64.8 |
| Fujian | 183.6 | 39.7 | 163.7 | 19.8 | 151.8 | 7.9 | 143.9 |
| Jiangxi | 181.5 | 75.1 | 144.0 | 37.5 | 121.5 | 15.0 | 106.5 |
| Shandong | 87.6 | -9.4 | 92.3 | -4.7 | 95.1 | -1.9 | 97.0 |
| Henan | 146.7 | 62.2 | 115.6 | 31.1 | 96.9 | 12.4 | 84.5 |
| Hubei | 136.2 | 31.8 | 120.4 | 15.9 | 110.8 | 6.4 | 104.5 |
| Hunan | 192.8 | 89.6 | 148.0 | 44.8 | 121.1 | 17.9 | 103.2 |
| Guangdong | 121.1 | -55.5 | 148.9 | -27.7 | 165.5 | -11.1 | 176.6 |
| Guangxi | 225.0 | 85.5 | 182.3 | 42.8 | 156.6 | 17.1 | 139.5 |
| Hainan | 287.9 | 112.4 | 231.7 | 56.2 | 198.0 | 22.5 | 175.5 |
| Sichuan | 185.7 | 95.3 | 138.1 | 47.6 | 109.5 | 19.1 | 90.4 |
| Guizhou | 268.0 | 143.7 | 196.2 | 71.8 | 153.1 | 28.7 | 124.3 |
| Yunnan | 159.1 | -163.4 | 240.8 | -81.7 | 289.8 | -32.7 | 322.5 |
| Tibet | 1622.8 | 573.7 | 1336.0 | 286.8 | 1163.9 | 114.7 | 1049.2 |
| Shaanxi | 188.7 | 65.4 | 156.0 | 32.7 | 136.4 | 13.1 | 123.3 |
| Gansu | 265.2 | 83.1 | 223.6 | 41.6 | 198.7 | 16.6 | 182.1 |
| Qinghai | 486.5 | 99.4 | 436.8 | 49.7 | 407.0 | 19.9 | 387.1 |
| Ningxia | 218.0 | -24.2 | 230.1 | -12.1 | 237.4 | -4.8 | 242.3 |
| Xinjiang | 376.7 | 116.9 | 318.3 | 58.4 | 283.2 | 23.4 | 259.8 |
| SD | | 263.5 | | 131.8 | | 52.7 | |
| C.O.V. | | 1.95 | | 0.98 | | 0.39 | |

Note: 100 percent equalization means that 100 percent of the actual central government transfers (net) made to the localities in 1994 are allocated by the proposed equalization formula using cost adjusted fiscal need measurements.

50 percent equalization means that 50 percent of the actual central government transfers (net) made to the localities in 1994 are allocated in proportion to the original allocation and the other 50 percent are allocated by the proposed equalization formula using cost adjusted figures.

20 percent equalization means that 80 percent of the actual central government transfers (net) made to the localities in 1994 are allocated in proportion to the original allocation and the other 20 percent are allocated by the proposed equalization formula using cost adjusted figures.

SD: standard deviation; C.O.V.: coefficient of variations.

Appendix: State-Local Fiscal Transfer: the Cases of the United States, Canada and Brazil

I. State-Local Fiscal Transfer in the State of New York²⁷

The State of New York consists of three levels of government: the state government, 61 county governments, and municipal governments (62 cities and 1400 towns and villages). In addition to counties and municipalities, there are a large number of school districts in the State of New York. Except for those in New York City, school districts are not governed by the cities, towns or villages; rather, they are organized for the sole purpose of running primary and secondary schools. As a result, school districts often overlap with cities, towns and villages.

Fiscal transfers from the state government to the local governments (counties, municipalities, and school districts), local agencies, and individual welfare recipients account for a large part of state government budget. In fiscal year 1995-6, \$22.5 billion, or about two thirds of the State of New York's general fund (general revenue) went to various transfer programs. Among these transfer programs, the school aid program and the revenue-sharing program are intergovernmental transfer programs--they are distributed to local governments. Others are welfare assistance directed to eligible individuals. Below we discuss the two main intergovernmental transfer programs in the State of New York.

(1) School aid program

In fiscal year 1995-6, the total amount of the school aid was \$7.7 billion, or 34 percent of the total state transfers to localities. This program provides assistance to school districts to finance primary and secondary education.

The school aid program is the single largest transfer program in the State of New York (this is also the case in most other states in the U.S.). The distribution of the aid is based on a set of more than 20 formulas that measure the fiscal needs and fiscal capacities of localities in providing primary and secondary education. The major components of the school aid program include comprehensive operating aid (including extraordinary needs aid), tax equalization aid, tax effort aid, gifted and talented aid, limited English proficiency aid, public excess cost aid, declassification support service aid, education related support services aid, reorganization incentive operating aid, transportation aid, building aid, organizational incentive building aid, computer software aid, textbook aid, instructional computer hardware and technology equipment aid, library materials aid, growth aid, the transition adjustment, administrative efficiency incentive aid, special services aid, BOCES aid, employment preparation education aid, and incarcerated youth aid.

²⁷ The author would like to thank Ron Kogelmann, Ed Ingoldsby, Mike Murphy, Lisa Timoney, Rosina Mulligan, and Dennise Norton of the Budget Division, Executive Department, State of New York for providing me with helpful information.

The largest component of the school aid program, the "Comprehensive Operating Aid," accounted for about 56 percent of total educational aids from the state to localities in fiscal year 1995-6. The formula for calculating this aid is as follows:

A district's comprehensive operating aid is determined by first calculating its "formula aid" and then comparing it with the minimum "flat grant" guarantee.

According to Education Law, Section 3602, Subdivision 12, each district receives the greater of:

(i) "Formula Operating Aid"

(ii) US\$400 X selected TWPU (Flat Grant Provision)

where TWPU = Total Aidable Pupil Units

Formula Operating Aid = $(\$3,900 + \text{Ceiling Adjustment}) \times \text{Operating Aid Ratio} \times \text{Selected TAPU for payment}$

Operating Aid Ratio = The highest of the following but not less than zero nor more than 0.90:

1.35 - (combined Wealth Ratio x 1.50)

1.00 - (combined Wealth Ratio x 0.64)

0.80 - (combined Wealth Ratio x 0.39)

0.51 - (combined Wealth Ratio x 0.22)

Combined Wealth Ratio = $(0.5 \times \text{Full Value Wealth Ratio}) + (0.5 \times \text{Income Wealth Ratio})$

Full Value Wealth Ratio =

1993 Full Value/ 1994-5 TWPU

State Average Full Value/TWPU
(\$261,300)

Income Wealth Ratio =

District 1993 Adjusted Gross Income/1994-5 TWPU

State Average Adjusted Gross Income/TWPU
(\$82,800)

Generally speaking, the amount of aid a district receives is determined by three factors: (1) the number of students--the higher the number of students is, the higher is the amount of aid; (2) wealth (value real estate properties) of the district relative to the average of the state--the higher the wealth level is in the district, the less the amount of aid; and (3) household income level of the district relative to the average of the state--the higher the income level is in the district, the less the amount of aid. The second and third factors reflect the program's objective of equalizing fiscal capacities of districts across the state. One should note that the relationships between these factors and the amounts of aid are generally not linear.

(2) Revenue-sharing program (unconditional transfer program)

Currently the size of this program is relatively small. In fiscal year 1995-6, the total amount distributed by this program was \$700 million. However, it used to be one of the largest aid programs in the State of New York. When the program was first created by state legislation in 1971, it was stipulated that 18 percent of the state income tax receipts would be distributed to cities, towns, and villages within the State of New York. For fiscal year 1977-8, the State capped the aid program at the 1976-7 level, due to the state's difficult budgetary situation. In 1979, funding was changed to 8 percent of total state tax collection. From 1980 to 1984-5 State fiscal year the funding was capped at \$800 million. Since 1984-5, this program became a "Base Year Aid" program consisting of four components: per capita revenue sharing aid; aid to special cities, town, and villages and "excess" aid; and needs-based aid. The total amount of this program was specified by the annual appropriation bills, and the allocation across localities was based on the previous year's figures with a uniform increase or decrease rate. Despite many small ad hoc adjustments, the current distribution is largely determined by the formulas adopted in 1984-5.

The 1984-5 formulas consider the population, value of properties, and income level of each locality and were designed to equalize fiscal capacities of the local governments. Among the four components, the largest is the Per Capita Revenue Sharing Aid, which distributed \$800,860,900, or 83 percent of the total revenue sharing aid in fiscal year 1984-5. The special city, town, and village aid distributed \$96,390,000; "excess" aid distributed \$30,400,000; and "Needs Based" aid distributed \$38,800,000. The following is a brief description of the Per Capita Revenue Sharing Aid.

The per capital revenue sharing aid is distributed according to the following two general formulas:

A. Approximately \$400,430,450 to counties, cities, towns, town outside village areas, and villages as follows:

1. Towns-- a uniform per capita townwide rate of \$3.55 is allocated.

2. Counties

- \$0.65 per capita is allocated when the average of per capita full value and per capita personal income is \$8,000 or more.

- An additional \$0.05 per capita is allocated for each \$100 or part thereof by which this average falls below \$8,000.

3. Cities, Towns Outside Villages Areas, and Villages

- When the per capita full value is \$8,000 or more, the per capita amounts are:

Cities: \$8.60

Villages: \$3.60

Town Outside Village Area \$22.05

An additional \$0.05 per capita is allocated for each \$100 or part thereof by which per capita full value falls below \$8,000

4. City of New York - There is no special formula. The City is paid per capita amounts under both the city formula and the county formula, as described above.

B. Approximately \$400,430,450 to Cities as follows:

Each city's share is based on the ratio of its population to the total population of all cities in the State.

Other Transfers

In addition to transfers to local governments, there are a number of important transfers to other local agencies and to individual welfare recipients. These include:

(1) Medicaid assistance program. In fiscal year 1995-6, the total amount was \$5.3 billion. This program was designed to provide health insurance for the poor, and is co-financed by the federal government and local governments. There are 33 services mandated by federal legislation that this program must provide. The federal government matches 50 percent of the costs of these services. Between the state and local governments, the matching rate varies depending on the type of services. For hospital expenses, the state covers 25 percent and the localities cover another 25 percent. For long term care, the state covers 40 percent and the localities cover 10 percent. In fiscal year 1996-7, the budget contribution of the federal government to Medicaid is \$12.3 billion, the state contribution is \$9.4 billion, and the local contribution is \$3.9 billion.

(2) Income maintenance program. In fiscal year 1995-6, the total amount of this program was approximately \$2 billion. This program provides income support to unemployed and disabled people.

(3) High education aid. This program provides subsidies to state universities and tuition grants for students enrolled in local community colleges. In academic year 1995-6, the total amount of this aid was \$626 million. Tuition grants are provided based on economic needs of the students. In 1995-6, the maximum amount each student could get was the higher of \$3900 and 90 percent of tuition. For continuing to receive tuition grants, students must maintain certain number of credit hours and GPA.

II. Province-Local Fiscal Transfer in Ontario, Canada

Southern Ontario has a two-tier local government system. The upper-tier municipalities include regions (including Metro Ontario) and counties. The lower-tier municipalities include cities, towns, and townships governed by regions and counties. Northern Ontario has a single-tier local government system (regions and counties). The province is also divided into 10 school boards which are responsible for financing and operating primary and secondary education. Similar to those in the United States, school boards in Ontario are independent from the regions and counties.

The province allocates unconditional and conditional transfers to municipalities (regions, counties, cities, towns, townships, and school districts) for both operating (current) and capital expenses. In 1994, transfers from the province accounted for about 32 percent of total municipal revenues. In the same year, the municipalities raised about 38 percent of their revenues from property taxes and 30 percent from fees and user charges (including 12 percent from user fees, 10 percent from special charges, and 8 percent from sewer and water fees).²⁸

The relative importance of transfer as a source of a municipality's revenue varies significantly depending on several factors.²⁹ The most important factor is the municipalities' responsibilities. For example, although counties and regions are both upper-tier municipalities, their responsibilities differ greatly (regions fund their own police forces and counties get free police protection). In addition to providing their own police forces, regions also tend to provide more comprehensive social services and health care than counties.

The second factor is the revenue capacities of the municipalities. Generally, urban municipalities raise more of their own revenues (and therefore receive less transfers) than municipalities with a lower degree of urbanization. In 1988 counties received 37.8 percent of their current revenues from provincial transfers. Metro Toronto (with a high proportion of urban population), on the other hand, received just 23.1 percent of its revenues in the form of transfers.

The third factor affecting the distribution of transfers is whether a municipality is located in the north. Different patterns of provincial support are also evident in comparing the north with the south. For example, in 1988, transfers account for 27.4 percent of total current revenue for county cities (those in the south), but 42.6 percent in district cities (those in the north). Expressed in dollars per household, transfers to county cities were about \$713 per household, while the corresponding amount to district cities was about \$1,390 per household.

Conditional Grants

²⁸ Ernie Eve, Q.C., "1995 Fiscal and Economic Statement," 1995, Ministry of Finance of Ontario.

²⁹ Based on "Report of the Advisory Committee to the Ontario Minister of Municipal Affairs on the Provincial-Municipal Financial Relationship," 1991.

In 1988, about 70 percent of provincial transfers to municipalities were distributed in the form of conditional grants. Since then, as the size of unconditional grants was reduced, the share of conditional grants increased to about 90 percent in the early 1990s. Conditional grants are given to municipal agencies to finance education, roads, health care, environmental protection, public libraries, flood control, and other services.

Currently there are more than 100 programs of conditional grants. Most of these provide matching grants, which share certain percentages of the cost of locally delivered services. For example, the province matches 50 percent of the cost of road maintenance. The amounts of transfer (conditional and unconditional) to municipalities in 1991-2 are shown in the following table.

Table 1. Major Provincial-Municipal Cost-Sharing Programs, Ontario, 1991-2 (\$ million)

| Services | Provincial share | Local | | Total |
|---------------------------------------|---------------------|--------|-------|--------|
| | | taxes | Fees | |
| Municipal affairs | | | | |
| Unconditional grants | 947 | --- | --- | 947 |
| Conditional grants | 36 | --- | --- | 36 |
| Other | 6 | --- | --- | 6 |
| Education | 5,201 | 6,992 | --- | 12,193 |
| Transportation | 823 | 1,811 | 146 | 2,780 |
| Community and social services | 1,883 | 526 | --- | 2,409 |
| Environmental | 275 | 1,455 | 1,588 | 3,318 |
| Health | 265 | 183 | 28 | 466 |
| Natural resources and conservation | 53 | 52 | --- | 105 |
| Cultural and communications | 41 | 353 | 13 | 407 |
| Tourism and recreation | 57 | 1,076 | 298 | 1,431 |
| <u>Total</u> | 10,922 | 13,308 | 2,960 | 27,190 |

Source: Ontario Fair Tax Commission, Fair Taxation in a Changing World: Report of the Ontario Fair Tax Commission, 1993.

The largest conditional transfer program is the provincial subsidies to school boards for elementary and secondary education.³⁰ The funding mechanism is embodied in a set of legal documents known as the General Legislative Grants (GLG) regulations. Through a combination of operating and capital assistance programs, the GLG regulation attempts to mitigate inequalities in financial resources among school boards across the province. These assistance programs can be referred to as "equalization payments" since they attempt to equalize the financial resources among school boards by taking into account the size of the local tax base (i.e., resources available) and the resources required by a school board to provide the base level of education service.

The General Legislative Grants are comprised of four components. The first and the most important component, called "Basic Per Pupil Grants," is an equalization payment made by the province to a school board. This provincial grant equals the difference between the amount considered necessary by the province for a school board to provide the base level of education and the amount raised from local property taxes.

The calculation of the basic per pupil grant is based on two key variables:

- (1) Average Daily Enrollment (ADE), which is the measure of the number of pupils enrolled in each school board. The ADE multiplied by the provincially established basic per pupil amount equals the recognized ordinary expenditure of the school board. In 1995, the basic per pupil amounts were \$4,184 for each elementary pupil and \$5,116 for each secondary pupil.
- (2) The value of the equalized assessment of all property in each community served by the school board determines the amount of money that can be raised from local property taxes.

The second component of the General Legislative Grants is called "Board-Specific Grants." The provincial government recognizes that the cost (teacher wages, rental cost, etc.) of providing the base level of education varies with geographic, demographic, and social-economic conditions across the province. The "Board-Specific Grants" are therefore design to assist localities with additional costs so that they can provide the base level of educational services without placing additional financial burden on local taxpayers.

The third component, called "Program-Specific Grants", is provided to school boards to encourage them to extend education programs and services into areas that respond to local needs, and to meet provincial priorities. These grants are grouped into four subcategories which include language grants (e.g., French & English as second languages), initiative grants (e.g., class size reduction in grades 1 and 2), special grants (e.g., student transportation, education programs in care and treatment facilities), and other grants (e.g., isolated boards).

³⁰ Local Government Finances in the Greater Toronto Area, "Background Report 3: Subsidy and Service Levels", 1996.

The fourth component, called "Capital Funding Assistance," is distributed on a cost-sharing basis to school boards. Capital projects undertaken by school boards that qualify for this type of assistance include new schools, site purchases, buses, and replacement and renovation of schools. The provincial share of costs is provided to school boards as loans, and the amount that a school board receives is dependent on its relative taxing ability. On average, the provincial support rate on growth-related capital projects, including new schools, additions, and sites, is 60 percent.

Unconditional Grants³¹

The unconditional transfer system has five components plus a revenue guarantee. Although they are referred to as "unconditional transfers" by Canadians, some of them are actually block grants with broad conditions attached. The three most important components are: the Police per Household Grant, the Northern Support Grant (NSG), and the Resource Equalization Grant (REG). Below is a brief description of these three programs.

(1) Police per Household Grant

This is an equal per household grant provided to regions. The amount of transfer a region receives is the product of the number of households in the region and the uniform \$50 per household rate. This grant is not meant to be a direct subsidy to cover regional policing costs and, as a result, the level of assistance is often criticized by regions as providing inadequate compensation for policing costs (the average expenditure on policing is \$290 per household).

(2) Northern Support Grant (NSG)

This grant, introduced in the 1973 Ontario budget, had two purposes. First, it was intended to recognize the higher costs of providing services in the north and, therefore, higher living costs; and second, it was to compensate north municipalities for the termination of mining payments. Prior to 1973, the mining profits tax was collected by the province and a portion of it was shared with municipalities in which miners resided. In 1973, these payments to municipalities were replaced by NSG, as well as the General Support Grant and REG.

The distribution of this grant is based on the municipalities' own revenue collection. Municipalities in the south receive a transfer equal to 6.15 percent of their levy and municipalities in the north receive 29.65 percent of their levy.

(3) Resource Equalization Grant

This grant intends to close the gap in fiscal capacities across municipalities. Municipalities with higher capacities to finance their services with their own sources are given less subsidies than municipalities with lower capacities. The fiscal capacity of a municipality is measured by the average value of residential properties per

³¹ Based on Advisory Committee (1991).

household. The transfer is then calculated by comparing the assessment of residential property value per household of the municipality against the simple average assessment of residential property value per household for municipalities across the province.

Pattern of Distribution

On a per household basis, the level of funding is significantly higher in the north than in the south. While this is largely the result of the NSG, the result is also reinforced by the fact that most northern municipalities receive significant funding under the REG and revenue guarantee. Moreover, northern municipalities tend to receive higher levels of conditional grants.

Table 2. Ontario: 1988 Provincial Transfers to Municipalities per Household (\$)

| | Unconditional | Conditional | Total |
|---------------|---------------|-------------|-------|
| <u>South</u> | | | |
| Metro Toronto | 217 | 936 | 1,153 |
| Co. Cities | 258 | 581 | 839 |
| Regions | 210 | 709 | 919 |
| Counties | 169 | 804 | 973 |
| <u>North</u> | | | |
| Regions | 635 | 687 | 1,322 |
| Dis. Cities | 590 | 921 | 1,511 |
| Districts | 400 | 1,081 | 1,481 |
| Total | 238 | 784 | 1,022 |

Source: Advisory Committee (1991).

III. State-Municipality Revenue Sharing in Brazil³²

Brazil has a federal system with three levels of government: the federal government, the state governments, and municipalities. The federal government assumes exclusive responsibility for the taxes on income, payroll, wealth, foreign trade, banking, finance and insurance, rural properties, hydroelectricity, and mineral products. The federal government allows states to levy supplementary rates up to 5 percent on the federal bases for personal and corporate incomes. The main state taxes include the general value added tax on goods and services, tax on inheritance and gifts, and tax on motor vehicles registration. These three taxes consist

³² Based on Anwar Shah, 1991, The New Fiscal Federalism in Brazil, World Bank Discussion Paper, No. 124.

of 72 percent of the states' revenues. Municipalities are empowered to levy taxes on services, urban properties, retail sales of fuels except diesel, property transfers, and special assessments.

Municipalities raise only 18 percent of revenues from their own sources and rely heavily on federal and state transfers. The most important source of transfer is from the federal government, accounting for approximately half of municipal revenues. The second important source of municipal revenues is the constitutionally mandated state-municipal revenue sharing arrangements. State transfers constitute one third of municipal revenues. In many states, municipalities rely almost exclusively on transfers from higher-level governments.

Mechanisms for state-municipal revenue sharing arrangements have been specified in the regulations issued by the federal parliament. The regulations provide specifics of the formula as well as timing for the release of funds. The most recent regulations as given in Projeto de lei Complementar no. 177 (1989) specifies that municipal shares of federal and state transfers should be immediately deposited in the joint account of all municipalities. Further, individual municipal accounts should be credited no later than the second working day of each week for all revenues received in the previous week.

The formulas for state-municipal transfers are highly transparent and have been instituted by Federal regulations. Distribution of tax transfers for the most part follows the origin principle. ICMS (state value added tax) revenues are distributed by a formula which mandates that at least 75 percent of such revenues to municipal governments be allocated based on value added produced in the municipalities. Since ICMS is a value added tax, this clearly recognizes the origin as the guiding principal in the distribution of these transfers. Following this principle, municipal transfers in per capita terms shows a wide divergence across states. Small weight is given in the formula to other factors which the individual states may consider important in the distribution of these monies in their jurisdictions. For example, the State of Para uses population (7 percent weight), area (2 percent), and fiscal effort (9 percent) as special factors. In addition, the State of Para distributes 7 percent of the fund in equal amounts per municipality. The State of Parana uses proportion of population in rural areas, population, and area as special need factors.

The specific formulas of state-municipal revenue sharing are as follows:

a. State Value Added Tax (ICMS)

The distribution of ICMS to municipalities is determined by the following formula:

$$M_i = 0.25 * ICMS \{ (VA_i / VA_s) * p + (\text{other factors}) * (1-p) \}$$

where M = funds allocated to municipality i;

VA = value added (average of past two years)

= value of outflow of goods + value of services rendered within municipality value
of inflow of goods

P = proportion of funds distributed by values added component (the following range for
p is specified by law (L.C. no. 177): $0.75 \leq p \leq 1$).

Other factors = each state is given complete discretion over specific other factors to be

included in the formula

b. Motor Vehicle Registration Tax

50 percent of the receipts of this tax are returned to municipalities by State Treasury by origin. The funds are immediately disbursed to municipalities upon collection.

c. Federal Industrial Product Tax (IPI)

This program is intended to provide financial compensation to states for loss of ICMS revenues on account of exports. The distribution criteria is the same as that for ICMS.

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